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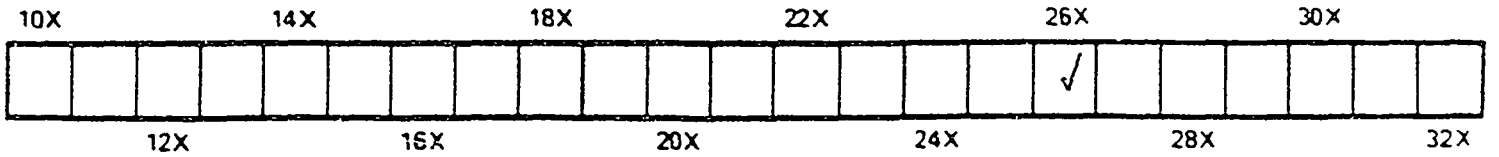

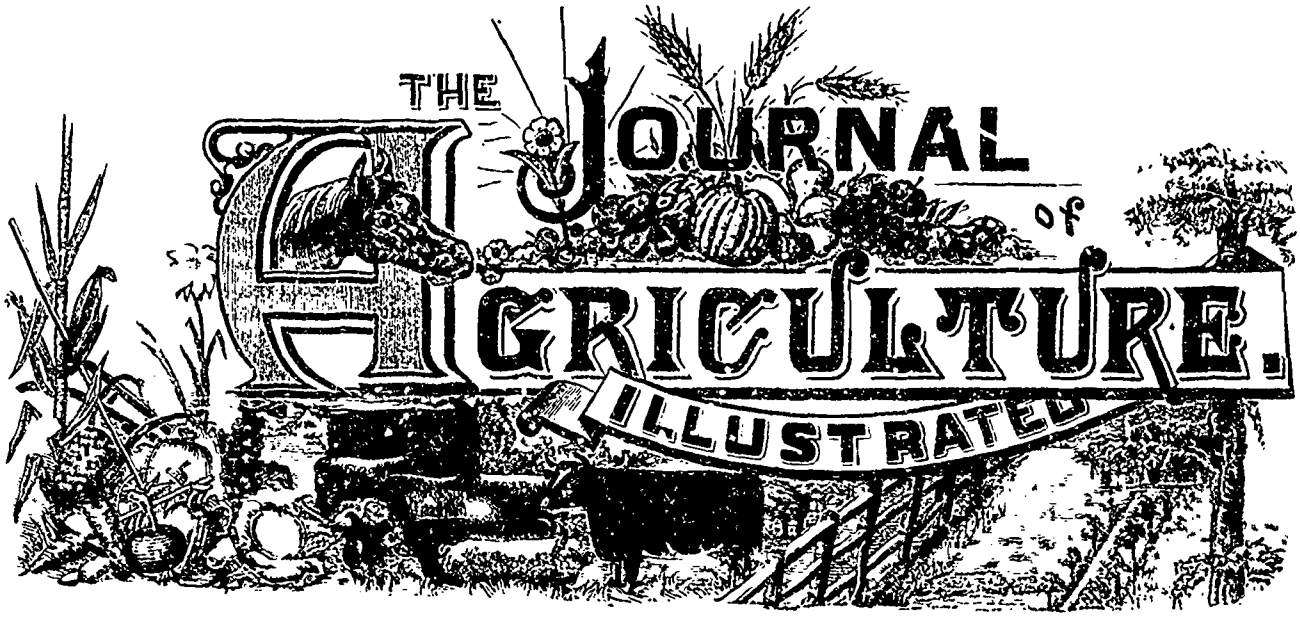

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Knowledge in the fewest words.—The best paying practice.

Our readers will notice the change in the appearance of our Journal. From this date, all matter of business appertains to Messrs. E. Senécal & Sons, 10 St. Vincent street, Montreal; to whom must be addressed subscriptions, advertisements, &c., &c. The Director of Agriculture, at Quebec, retains the supervision of all matter relating to the editing of the Journal, and all questions and correspondence, intended for insertion in the reading columns, must be addressed accordingly.

The steady aim of the Journal has been to keep the farming community in this province as well informed as possible as to the elements of true knowledge in agriculture, but in the fewest possible words; avoiding, as far as practicable, all discussions on matters not perfectly established by a successful and paying practice.

The study of the best stock, for the various needs of the farmer, and its treatment in view of the highest profits to be obtained, will continue to receive as in the past, all our attention. And as dairying, in all its branches, is becoming one of the most, if not the most important factor in successful farming in the Province of Quebec, we intend to devote a few pages to dairy matters in general, in every issue. Vegetable and fruit culture, as well as arboriculture will also receive special attention.

We hope that our efforts will be duly appreciated.

Situated as we of the Province of Quebec are, in the coldest and most exposed part of North America, we possess one advantage which should not be forgotten. It is this: what succeeds fully in Quebec must prove of interest to all exposed parts of America. Our fruit must be of the hardiest, our grain and vegetables of the quickest growth, and yet selected with a view to the highest profits. We, therefore, hope that our efforts will continue to be appreciated even beyond the limits of our province.

We shall, as in the past, give special attention to all researches of a nature to advance knowledge in every branch of farming and profitable gardening, &c, and we shall feel grateful for all the assistance which our readers and friends kindly give us.

We can state, without being accused of boasting, that the interest created in beet-root sugar, and the subsequent erection of three large beet-sugar factories in this Province, was initiated by the directors of the Journal of Agriculture. Unfortunately, these factories, principally through want of technical knowledge on the part of their managers, have not proved financially successful. However, what is proved beyond cavil is the fact, that sugar-beets of the best quality can be grown here as profitably as in the most favored beet-sugar countries in Europe, that the climate is eminently favorable to the process of beet-sugar making, and that what remains to be secured is:

1° Thorough technical knowledge, and thorough business ability on the part of the managers of our beet-sugar factories;

2° Sufficient capital on the part of the company to grow, as in Europe, one half of the needed beets;

3° A farm, where the refuse of the beet-sugar industry shall be profitably employed, and where farmers may learn how thoroughly profitable this industry may be made to the farming community in general as well as to its shareholders.

What the directors of the Journal of Agriculture have done for the beet sugar industry they did, with full success, for the butter and cheese factories of this province. Through our constant efforts we have secured for the province a tenfold increase in these factories, in the last five or six years, and this is only the beginning of what we may expect for the future. Our aim is to see the Province of Quebec amongst the first in America in all things appertaining to thoroughly successful dairying, in all its branches.

We may therefore promise our best attention to all questions relating to improved agriculture in all its branches,

and as the farming community, in general, has comparatively little time for study, we shall constantly do our best to be short, clear and practical, our motto being: "Knowledge, in the fewest words, and the best paying practice.

Deliberations of the Council of Agriculture of the Province of Quebec,

approved by order in council, 15th November, 1883.

Montreal, June 20th 1883.

PRESENT: Mr Massue, Browning, Blackwood, A Casgrain, E Casgrain, DeBlois, Gauthier, Guilbault, Lemyre, Martin, Marsan, Pilote, Somerville.

MR MASSUE in the Chair.

The minutes of the last meeting were read and approved.

A report was read, from Messrs. Gauthier and Casgrain, informing the council, that, in the districts they have visited, both bulls and cows exist, bearing all the indications necessary to justify the reporters in believing that there is still in existence a race of Canadian cattle; and the more so, since the inhabitants of the districts in question declare that they have no knowledge of any cross having ever taken place.

The report was received and approved.

The committee, appointed at the last meeting to organise a provincial ploughing match, reported: that, in consequence of the information it has received as to the want of disposable funds for this purpose, it finds it absolutely impossible to arrange this meeting.

A report was read from the committee which visited the Veterinary College of Montreal.

Resolved: that the report of the committee which visited the Montreal Veterinary College be received and approved, and that the thanks of the council be offered to the president of the committee for the excellent report presented.

A report was read from the president of the committee on the fruit-growers associations concerning an interesting publication by Mr Charles Gibb on the fruit-trees of Russia, and on the possibility of introducing into Canada the cultivation of several of the species.

Resolved: that the report be accepted and approved, with the thanks of the council to the president

Mr Browning, seconded by M A. Casgrain, moved: that the council of agriculture, penetrated with admiration of the patriotic devotion of Mr Chas Gibb, who, at his own cost, undertook a voyage to Russia, with the sole view of discovering, by an investigation on the spot, if it were possible to introduce into this country the cultivation of the fruit-trees of Russia, seizes the occasion of this, the first meeting of the council since Mr Gibb's return from Russia, to express publicly to that gentleman its most sincere thanks for the eminent service which he has rendered to his country by the learned essays published in his excellent "Report on the fruit trees of Russia," which he has kindly sent to each of the members of this council; and that the secretary receive instructions to forward a copy of the present resolution to Mr Charles Gibb. (Carried.)

A letter was read from the Department of Agriculture and Public works, informing the council that, for the future, the Journal of Agriculture will no longer be distributed gratuitously to the members of the agricultural associations, but only to those who subscribe for it at the rate of thirty cents a year.

A letter was read from M. S. LeSage, assistant commissioner of agriculture, transmitting to the council a report presented by the "Committee on Agriculture, Immigration, and Colonisation," to the Legislative Assembly, at its session of March 23rd, 1883 The report recommends the council of agriculture to take measures to oblige every agricultural association to obtain at least one of the butter-making apparatus s invented by Mr Lynch, and to make sufficient trial of them to enable their merits to be determined

Mr W H. Lynch, the bearer of the letter, asked leave to appear before the council, for the purpose of explaining the merit and the method of working the apparatus for butter-making of which he is the inventor.

The council decided that the explanations of Mr Lynch should be heard at the afternoon session. The council then adjourned until 2 P. M.

AFTERNOON SESSION, 2 P. M.

PRESENT: Messrs Beaubien, Blackwood, Browning, A. Casgrain, E. Casgrain, Cochrane, DeBlois, Gauthier, Guilbault, Lemyre, Martin, Marsan, Massue, Ouimet, Pilote, Somerville.

Mr Beaubien stated that, in the name of the council of agriculture, he had engaged to furnish a sum of one hundred dollars for the planting of forest trees on the Exhibition property, at Mile-End.

Mr Blackwood, seconded by the honourable Mr Ouimet, moved: that the council ratifies the promise made by M. L. Beaubien, one of its members, to give the sum of one hundred dollars ($100.00) to the Exhibition Committee, for the purpose of planting a certain number of forest trees on the land of the said Exhibition, on the *arbor-day* of this city.

Mr W. H. Lynch was introduced, and gave, in detail, explanations of his dairy-apparatus, showing its advantages as regards the manufacture of butter of superior quality.

M. Marsan, seconded by M Martin, M. D., moved: that the council, having considered the report of the committee of the legislative assembly on agriculture, is compelled to declare that it cannot force the agricultural associations to buy the butter-apparatus invented by Mr Lynch, or any other; but it authorises the said associations to appropriate a sum not exceeding fifty dollars ($50.00) for the purchase of butter-making apparatuses, or for employing the best improved machines for that purpose. (Carried)

A letter was read from M. Adolphe Lomer, addressed to the president of the council, stating that he intended to try once more to establish a manufactory of *superphosphate of lime* in this province, which manure he would be able to sell at $20.00 a ton. Mr Lomer's letter concluded by enquiring what encouragement the council would give to this new manufacture.

Resolved: that the council of agriculture, while it recognises the importance of a manufactory of superphosphate of lime in this province, regrets to be unable to offer any direct encouragement to Mr Lomer; but the council will with pleasure address a request to both the federal and local governments, recommending that all possible encouragement should be given to the establishment of a manufactory of this kind in the country. (Carried.)

Mr Browning, seconded by Mr Gauthier, moved: that the council of Agriculture, believing that the report of Mr Chas. Gibb is of public utility, recommends that it be translated into French, and distributed by the council to the different agricultural associations. That a sum of one hundred dollars ($100.00) be employed to pay for two thousand impressions of Mr Gibb's reports: that is to say, one thousand copies of the report on Russian fruit-trees, and one thousand of the report on Russian shrubs. (Carried.)

During the session, Mr Beaubien convoked a meeting of the committee on Fruit-growers' associations, and submitted a letter from the president of the Horticultural Society of l'Islet, asking for a grant to that society of one hundred dollars ($100.00), instead of fifty dollars ($50.00), the latter sum being considered insufficient in the present circumstances

Resolved that in the opinion of the committee, the Horticultural Societies of the county of l'Islet, and of Abbotsford, should each receive a sum of $100.00 a year.

And the committee adjourned.

This report having been submitted to the council of agriculture was received and approved.

Mr Marsan, seconded by Mr E. Casgrain, moved:

That the Horticultural Societies of the county of l'Islet and of Abbotsford, shall each receive for the future an annual grant of one hundred dollars.

A petition was read from the farmers of a certain district of the county of Berthier, asking leave to form a second agricultural association in that county.

The honourable Mr Ouimet, seconded by Mr Guilbault, moved

That the petition of the farmers of a certain district of the county of Berthier, asking leave to form a second agricultural association in that county, be not granted. (Carried.)

The Council then adjourned.

(Signed) GEORGES LECLÈRE,
Secretary.

From the French.

FORESTRY.

The Red Elm.

This tree delights in a lofty situation, and does especially well in cool, rich, mountainous soil. It is not so large as the White Elm, seldom exceeding sixty feet in height: the quality of the wood, however, is better, and couples made from its twigs are strong and very elastic. It is said to grow as fast as the Negundo: a strong statement! In other points, it is of the same habit as the American Elm. The Red Elm may be called the National Tree of the United States. Eng. 1, represents the leaf of the Red Elm.

Iron wood.

Thirty feet is the usual height of the Iron-wood, which rejoices in rich, high places. For information regarding this tree, see the remarks on the American Hornbeam. The hard, tough wood of the Iron wood answers for the same purposes as that of the Hornbeam. Eng. 2, represents the leaf of the Iron-wood.

Large-toothed Poplar.

This poplar rarely exceeds a height of 40 feet by 15 inches in diameter. The details of its treatment will be found in the chapter devoted to a summary of the species common to all the provinces.

Fig. 1.

Button-wood.

In rich, alluvial soils, and on river-banks, the plane does well. Eighty feet is its usual height. The seed ripens in autumn, and keeps well in a dry state. Spring is the proper season for sowing it, and the covering of earth should be slight. A pound of the seed contains about 300,000 pickles, of which about 20 0/0 grow. When young, the plants require protection, but they may be set out in the nursery at the end of a year; and three years from sowing may occupy the place of their permanent abode. The plane is said to grow as fast as the poplar, and is equally suited to the system of propagation by cuttings. Its wood is, in quality &c., equal to that of the maple; and as an ornamental tree, it is very beautiful. Eng. 3, displays the leaf of the button-wood

Lime-tree.

The lime rejoices in rich, deep, cool, moist soils. It flowers in June, to the great delight of the bees, and ripens its seed in autumn. Kept in damp sand, the seed will preserve its vitality for six months. Five thousand pickles go to the pound. A rapid grower, the lime attains a height of eighty feet, by three and even four feet in diameter. Its wood is white, soft, light, difficult to split, and furnishes a fair combustible, though its proper use is for carving and cabinet-work in general. Eng. 4 shows the leaves of the lime-tree.

Tulip-tree.

This magnificent tree, rarely seen now in Canada, is well suited to low damp soils. It reaches a height of one hundred feet or more, by five to six feet in diameter. A pound of seed, which ripens in autumn, contains twenty thousand pickles, and it may be sown then or in spring. If sown in autumn, it will not come up till the following spring; if sown in spring, it takes a whole year to germinate. The long tap-root of the tulip-tree causes it to be impatient of transplantation, though the seed comes up well, and, consequently, it must be treated like the tap-root of the oaks, hickories, &c., i e it must be severed in the seed-bed, as recommended in the chapters on those trees. The wood of the tulip-tree is excellent for carving, and may take the place of pine in joiners-work; but it must be painted if intended for out-door work. Paper is made of the bark.

SECTION II.

Coniferous Trees.

The following is a list of the conifers, besides those already described, which are found in Ontario.

Red Cedar	Hemlock Spruce
Yellow Pine	Arbor-vitæ

Fig. 2.

Virginian Juniper.

The seed of this tree ripens in autumn, and should be sown in spring in a seed-bed; it attains a height of thirty feet, and prefers dry places. It may be transplanted a year from seed, and finally set out at three years old. As the seed is loath to sprout, the bed should be frequently watered. The wood of the juniper which is close-grained and sweet scented, is used to make the sheaths of lead-pencils. This is hardly to be called a forest-tree, though good hedges can be made of it if properly trimmed Eng. 5 shows the leaf and seed of the Red Cedar.

Yellow Pine.

This pine, which does not, at maturity, often exceeds sixty feet by fifteen inches in diameter, loves sandy situations. Its wood, very fine in grain, is much used in building and in joiners-work. For other details, see the chapters on pines in the summary of trees common to all the provinces of the Dominion. Eng. 6, shows a bough of the soft pine.

Hemlock Spruce.

This species finds itself at home on stony hill-sides, where the soil is light. It will grow, but much more slowly, on richer lands. The seed, a pound of which contains eighty thousand pickles, ripens in autumn, and should be treated

like that of the the spruce, and at two years old, the plants may be set out permanently. As regards beauty of form, it is one of our noblest indigenous trees, often reaching eighty feet in height. The wood of the hemlock is coarse in grain, and difficult to work up. Now-a-days, boards, planks, and laths in great numbers are made of it, on account of the scarcity of pine. Sleepers or ties for railroad use are derived from it; but they are of very inferior quality. In tanneries the bark of the hemlock is much used, and this is one of the principal causes of the rapid disappearance of this tree; for, unfortunately, the bark is harvested for sale to the tanners, and the unhappy tree is left to perish where it lay. Eng. 7 represents a bough with the cone of the Hemloch spruce.

Arbor vitæ—White Cedar.

The white cedar grows naturally in low, marshy places. The seed ripens in autumn, and the tree, eventually, reaches a height of forty feet by twenty inches in diameter It grows but slowly, taking twenty years to attain a height of sixteen feet by four inches. Useful as the white cedar is as a wind-guard, there are other trees which, in that capacity, are preferable to it: the Norway spruce, for example. It is only as an ornament that I can advise its cultivation. Still, it is worth taking care of, by hoeing, &c., where it grows, as its wood is excellent for shingles, fence posts, which made of this

Fig. 3.

wood will last forty years, and rails, which last sixty. The white cedar will bear clipping into any desired shape. It is said to take well from cuttings. and the young plants found in the bush transplant most successfully.

Thus, the sylvan flora of Ontario, regarded from the forester's point of view, and setting aside, as I have done, all the shrubs, and the comparatively useless trees, is composed of the following species:

Poplar-leaved birch,
Canoe birch,
Yellow birch,
Black "
Red "
White oak,
Chesnut oak,
Scarlet "
Post "
Swamp "
Coffee tree,
White spruce,
Shell bark hickory,
Pig nut hickory,
Bitter hickory,
White heart hickory,
Hornbean,
Chestnut,
Quercitron,
White elm,
Red "
Ironwood,
Aspen poplar,
Balsam "
Norway "
Black "
Mountain maple,
White "
Sugar or rock maple,
Striped "
Red "
Black ash,
White "
Green "
Red cedar,
Beech,
Tamarack,
Butternut,
Black walnut.
American aspen,
White pine,
Red "
Button wood,
Canada hemlock,
Balsam fir,
White willow,
Yellow "
Mountain ash,
Arbor vitæ,
Lime-tree—Bass-wood—Linden,
Tulip-tree.

All these species are found over almost the whole of Ontario, except the American chestnut, the black walnut, and the Virginia tulip-tree, which are only met with in the S. W. part of the province.

Ontario might enter with profit upon the cultivation of the green ash and the negundo, or ash leaved maple, both of which are indigenous in Manitoba, but answer perfectly in the other provinces. A description of these two trees will be found in the chapter on the sylvan flora of Manitoba.

Fig. 4.

Fig. 5

CHAP. VI.

FOREST-TREES INDIGENOUS IN THE PROVINCE OF QUEBEC.

I have described in the two preceding chapters all the forest-trees belonging to the province of Quebec. All that remains is to give a distinctive list of them, and to the point out the districts in which they grow naturally:

Poplar leaved birch,
Canoe "
Yellow "
Red "
Black,
Bitter hickory,
White heart hickory,
Pig nut "
Hornbeam
White oak,
Swamp "
Scarlet "
Coffee-tree,
White spruce,
Beech,
Tamarack,
Butternut,
White elm,
Red "
Iron wood,
Aspen-poplar—balsam,
Canada "
American aspen,
White pine,
Red "
Rock "
Yellow "
Button wood,

Black "	Hemlock,
Norway "	Balsam fir,
Mountain maple,	Double balsam fir,
Sugar maple,	White willow,
Striped "	Yellow "
Red "	Mountain ash,
Black ash,	Arbor vitæ,
White "	Lime or bass-wood.
Red "	

Some of these species are found in every part of Quebec; success, therefore, may be looked for everywhere in planting them, if the quality of the soil is such as is demanded by nature for their free growth. The subjoined list contains the names of the trees in questions:

Canoe birch,	Tamarack,
White spruce,	Balsam poplar,
Norway "	American poplar,
Black "	Mountain ash.

The following species are found almost everywhere in the province as far as Mingan, on the North bank of the St. Lawrence. The Rock pine, however is an exception: it is hardly ever met with above Quebec:

Poplar leaved birch,	Red birch,
Yellow "	White ash,
Black "	Red "
White pine,	Balsam fir,

Fig 6.

Rock "	American fir,
Yellow "	Arbor vitæ.
Red "	

As far as the Saguenay, the following occur:

Mountain maple,	American elm,
Sugar "	Poplar—aspen,
Striped "	White willow,
Red "	Yellow "

Leaving Cap Tourmente, the following species join the others:

Red oak,	Hemlock,
Black ash,	Lime-tree—bass-wood.
Iron wood,	

Ascending the river from Quebec, the following species, in addition to be above named, are found:

Hornbeam,	Beech,
White oak,	Butternut.
Post oak.	

And lastly, in the western region of the province, from Three Rivers onward we find the following eight additional species:.

Bitter hickory,	Silver maple,
White heart hickory,	Red elm,
Shell bark,	Canada poplar—Cotton wood,
Coffee-tree,	Button-wood.

I may mention here two trees, which though not indigenous in the province of Quebec, are proved by many experiments to be easy of cultivation in our latitude as far as 90 miles below Quebec: the *black walnut* and the *negundo* or ash-leaved maple. Of these two, the black walnut is, as every one knows, of great value in commerce, and the other, the negundo, has the remarkable quality of great precocity, sugar being furnished by this tree at seven or eight years old. The black walnut has been described in the chapter on the species belonging to Ontario, and the negundo will be described in the chapter on Manitoba, where it is indigenous.

CHAP. VII.

FOREST TREES INDIGENOUS IN NEW BRUNSWICK AND NOVA SCOTIA.

The species peculiar to these two provinces have been already named; the whole of them being comprised in the sylvan flora of Ontario. Below, will be found a complete list:

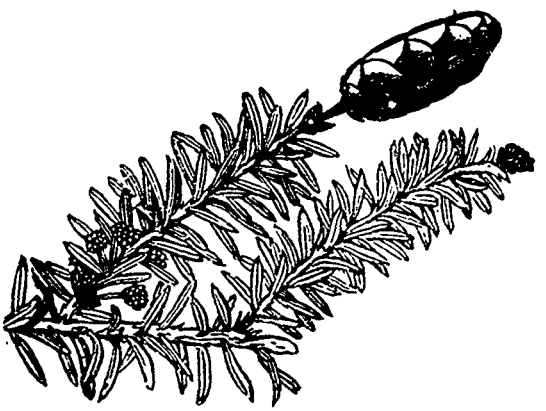


Fig. 7.

Poplar-leaved birch,	Tamarack,
Canoe "	Butternut,
Yellow "	White elm,
Black "	Iron-wood,
Red "	Aspen poplar,
Hornbeam,	Balsam "
White oak,	Cotton wood,
Red "	American aspen,
White spruce,	White pine,
Black "	Red "
Norway "	Cypress,
Mountain maple,	Hemlock,
Sugar "	Balsam-fir,
Striped "	Double balsam-fir,
Red "	White willow,
White ash,	Red "
Black "	Mountain ash,
Red "	Arbor vitæ,
Beech,	Lime-tree—Bass-wood.

All these species are found over nearly the whole extent of the two provinces, except the white oak and the butternut, which do not grow in the southern districts, and the arbor vitæ which disappears entirely in Nova Scotia.

CHAP. VIII.

FOREST-TREES INDIGENOUS IN PRINCE EDWARD'S ISLAND.

Prince Edward's Island contains the following species, all of which have been already described:

Poplar-leaved birch,	Tamarack,
Canoe "	White elm,
Yellow "	Iron-wood,
Black "	Aspen poplar,
Hornbeam,	Balsam "
White spruce,	Cotton-tree,
Black "	White pine,
Norway "	Red "
Mountain maple,	Rock "
Sugar "	Hemlock,
Striped "	Balsam fir,
Red "	Double balsam fir,
Black ash,	White willow,
White "	Yellow "
Red "	Mountain ash,
Beech,	Arbor vitæ.

All these are common over the entire island, except the arbor vitæ, which only grows spontaneously on the west side.

Fig. 8.

CHAP. IX.

A SHORT DESCRIPTION AND A LIST OF THE SPECIES INDIGENOUS IN MANITOBA.

Three species, not indigenous in the other provinces, are found in Manitoba:

Burr oak,	Negundo—ash leaved maple.
Green ash,	

Burr-oak.

The acorn of this tree is much larger than that of the other oaks. It is its only absolutely distinguishing mark. All that I have said of the oak in the preceding chapters applies to this one.

Green Ash.

This is smaller than the white ash, but in every other respect its qualities are the same, though its growth is more rapid. In fact, it is said to increase in size as fast as the negundo, a description of which tree I append. The green ash prefers a rich, deep soil, and is perfectly suited to forest-culture in the prairies of the West. Its wood is used for the same purposes as the wood of the other kinds of ash, and its treatment will be found in the chapters on that tree.

Negundo—Ash-leaved maple.

The qualities which make the negundo so valuable are its rapid growth and the sugar-yielding properties of its sap. At thirty years from seed it arrives at maturity, measuring, usually, thirty feet in height. The seed, which it begins to yield at three years old, ripens in autumn, and should be sown at once: the following year the plant will be one foot high. Five years from sowing, trees of this species have produced sugar! Some people, who evidently know nothing about the question, deny that the negundo affords sugar. All that I have said about the red maple (the plane) applies to this tree. I recommend the cultivation of the negundo, as being very profitable, in Quebec and Ontario, and it should be tried in the other provinces as well, where it will probably meet with success. Eng. 8, represents the negundo's seed.

The following trees are comprised in the sylvan flora of Manitoba:

Poplar leaved birch,	Negundo—ash-leaved maple,
Canoe "	White ash,
Yellow "	Balsam-poplar,
Black "	Cotton-tree,
Red "	Aspen,
Burr oak,	White pine,
White spruce,	Rock "
Red "	Balsam-fir,
Norway "	Double balsam-fir,
Mountain maple,	White willow,
Striped "	Yellow "
Red "	Mountain ash,
Black ash,	Arbor vitæ,
Green ash,	Lime-tree.
Tamarack,	

All these are found in every part of Manitoba, except the *maples*, the *white pine*, and the *lime-tree, or bass-wood*, which are only to be met with in the south-west part of that province.

From the French.

J. C. CHAPAIS.

CHEESE MAKING.

EDITOR OF JOURNAL OF AGRICULTURE.

Dear Sir.—I beg to call the attention of cheese makers in general to some facts regarding the colouring of cheese.

I believe the time is not far distant, when colouring will not be used in cheese, for it is an injury to the flavour and keeping qualities every time, and when this fact becomes generally known to consumers, the practice of colouring will cease.

However at present, there is a demand for coloured cheese, and as we are compelled to cater to the demands of the market, the question how to obtain the best colour at the lowest price is worthy of our consideration. Anatto is the colouring principle used in all the preparations in the market, and hence we should think there would be a uniformity in the prices of them; but by actual tests, I find that it costs more than three times as much to colour the same amount of cheese with some of them, than it does with a preparation of pure Anatto or Anattoine which may be prepared by every cheese maker for himself.

It is to point out the pecuniary advantages that will accrue to the cheese maker, and to give the directions for preparing the colour, that I write this letter for the Journal.

There are several brands of basket Anatto, some of which I find to be very much adulterated with various substances, such as salt, potash, and red clay. It is very difficult to procure a pure article of basket Anatto.

However, with Anattoine it is different, for this can be found quite pure; and I find it is the surest and best as well as the most economical of any.

From many tests and reports, I find that it costs from 8 cts to 15 cts. to color 100 lbs. of cheese with the prepared Anatto extracts, purchased in jars or jugs or by the gallon.

This, in a factory of 400 cows, means an expense of from $80.00 to $150.00 per season, while with Anattoine, which may be prepared by any one according to the directions below given, the cost will be from $25 00 to $35.00. This will save from $55.00 to $115 00 per season in a large factory.

Anattoine costs about $1.25 per pound in small lots; and one pound will make 4 gallons of excellent colouring at a cost of less than 40 cts per gallon.

One gallon will colour 1200 to 1500 pounds of cheese, or at the rate of 2½ to 3 cts. per hundred pounds

The manner of preparing this color is as follows: Take 1 lb Anattoine and put it in 2 gallons of pure, soft, *cold* water.

In another vessel put 2 lbs. of pure potash, 2 lbs. best sal soda, ½ lb. best saltpetre, and 1 lb. salt. Add 2 gallons of hot water. Stir both mixtures separately for 24 hours, and then mix all together, and stir frequently for 48 hours, when it must be put in jugs or jars, and set in a *dark, cool* place but not where it will freeze. From ½ oz. to 1 oz. will be sufficient for 10 lbs. of cheese.

When using, measure out the colour and add three times the amount of hot water before putting it into the milk. This colour will keep a long time, if these directions are followed.

If there should be any who are unable to obtain Anattoine, I will cheerfully get it for them, as cheaply as possible, if they send me their orders before the 20th of March.

J. M. JOCELYN, Stansted, Que.

VETERINARY DEPARTMENT.

Under the management of D. McEachran M. R. C. V. S.
(*Address P. O. Box* 1265, *Montreal.*)

Wintering Stock.

In our last issue we endeavoured to show the necessity for comfortable housing especially with reference to heat and ventilation. We will now follow up the subject in some of its minor but not less practical details. Above all things, avoid over-crowding of young stock; where too large a number are kept together, some of them do not thrive, on the principal of "the survival of the fittest," the strong pushes the weak aside and deprives it of its share of food. Not only on this account, but overcrowding is objectionable from a sanitary point of view, each pair of lungs consumes its quota of oxygen, and where the requisite number of cubic inches of air are not allowed, impaired aeration of the blood is the result, and besides this the urine and fæces emit noxious odours, so that the animal in an over-crowded pen is exposed to those influences most likely to generate disease. It is of great importance, too, to provide for thorough ventilation in every stable and cow house, this is one of the defects too common in our farms buildings; ventilating shafts should be arranged so that a downward current of pure air and an upward current of heated and exhausted air will be in constant circulation in every building containing stock. As a rule, where we find an attempt made in this direction, the shafts are too small, and are usually single, they should never be less than from eighteen inches to three feet square, and should be divided into two, or better still, four compartments, this will ensure an upward and downward current, no matter from what quarter with the wind blows. The division should not come down flush with the ceiling; it should end about two feet from it: this will prevent a cold draught descending from it. The lower end should have a trap-door, swung on pivots, which can wholly or partially close the ventilator according to the weather. The upper end should open by a fanlight. Such a simple contrivance can be constructed by any of our readers, and will effectually prevent damp walls and dropping ceilings, which render a stable or cowhouse unhealthy. Thorough *drainage* is of even more importance. No stable or cowhouse can be healthy without good drains. Yet we seldom see good drainage in our farm buildings. It is of importance, too, to see that the building is sufficiently lighted: a dark building is very unhealthy for animals and they lose health and vigour, just as plants do when deprived of light. Besides, it is impossible to keep a dark stable as clean or comfortable as a well lighted one. The stalls in which they are kept should be sufficiently large to give them ample room to move about and get up and down comfortably, and allow whoever is attending them to get around them properly to feed and clean them. As a rule we find that stalls are made too narrow Every horse-stall should be from five feet and a half to six feet clear; loose-boxes, eight and ten feet, or better still, ten and twelve feet. The pitch of the floor should not exceed one inches and a half in the ten feet; we sometimes see it three inches and a half; such a pitch must prove injurious, as it causes the weight to be thrown on the hind legs, when standing, and the viscera to gravitate backward when lying down; such diseases as spavin, ringbone, etc., are often traceable to undue weight thrown on weak parts from this cause. In the cow-stable, more especially, does this prove injurious. Pregnant animals, particularly, suffer from lying in a narrow stall with a steep pitch. The forcing backward of the abdominal contents often resulting seriously from protrusion of the genital organs.

Cattle often suffer during winter from becoming soiled by lying in their droppings, which drying and matting, form hard and uncomfortable incrustations on the hips. This can be obviated by having the stall raised three inches above the gutter, and of just such a length as when the animal stands back the length of her chain, the fæces will drop into the gutter, and if the feeding trough is placed low, on the floor in fact, the cow must step back to feed; in this way the hips will be kept clean. We observed in the stable of the Hon. Louis Beaubien, at his farm, Côte St. Catherine, a very commendable contrivance for keeping the animals clean and saving the manure, solid and liquid. It consists of a large gutter about two feet square running behind the row of cow-stalls, and continued right out to the manure pit, into which the solid manure is pushed, while the fluid percolates into a well or reservoir for the purpose, from which it is occasionally pumped on to the heap; the whole being under cover.

The gutter extends about two feet into each stall, the whole being covered by a flat iron grating, of a width only sufficient to allow the manure to drop through. By this means, the cleanliness and comfort of the cattle are secured, litter is economised, and the manure is saved. We might suggest as an improvement the throwing in of a few inches of dry earth each time the gutter is scraped out, which should be at least twice a day.

All animals, particularly horses and cattle, should have daily exercise, especially young growing stock. "As the sapling is is bent so does it grow", so with animals; and if deprived of that exercise necessary to develope their joints and limbs, defects are engendered, which, in colts at least, render them unsaleable if not useless. The feet of colts require looking to frequently during winter; care should be taken not to allow them to grow too long as, they lose their form, and act as levers on the tendons and joints, giving rise to sprains and injuries resulting in such affections as spavins, curbs, ringbones, and navicular disease. Want of exercise also causes swelling of the legs, in some cases, causing weakness of the lymphatics, from which they never thoroughly recover.

In our next issue we will notice some of the diseases incidental to badly wintered stock.

Diseases incidental to Housing Stock in Winter.

RING WORM.

This contagious affection of the skin is due to a vegetable parasite, and is very common in young cattle during spring and early summer, especially among calves which have been kept in cold dirty stables, over crowded and badly cared for, although in some seasons, it appears in cattle and horses which receive the best of care.

The microscopic fungus, *Tricophyton Tonsurans* is readily transmissible from one animal to another and to other species. During the present winter this disease is enzootic in this city among horses, and hundreds of horses have been affected.

It produces circumscribed bald spots over the body, and about the head and neck: these spots are circular in form. The spores and filaments of the parasite destroy the hairs and external layer of the skin, the former breaks and the latter forms a crust which is of a greyish or brownish colour, attended by slight itching, and in some cases a redness of the skins due to rubbing.

It is usually easily cured, and often runs its course spontaneously in a week or two, sometimes, however, it is more persistent. Care should be taken to isolate the affected, otherwise, it will spread through the entire herd; stalls and posts should be thoroughly cleaned and disinfected, curry combs and brushes should be thoroughly washed in a strong carbolic acid solution.

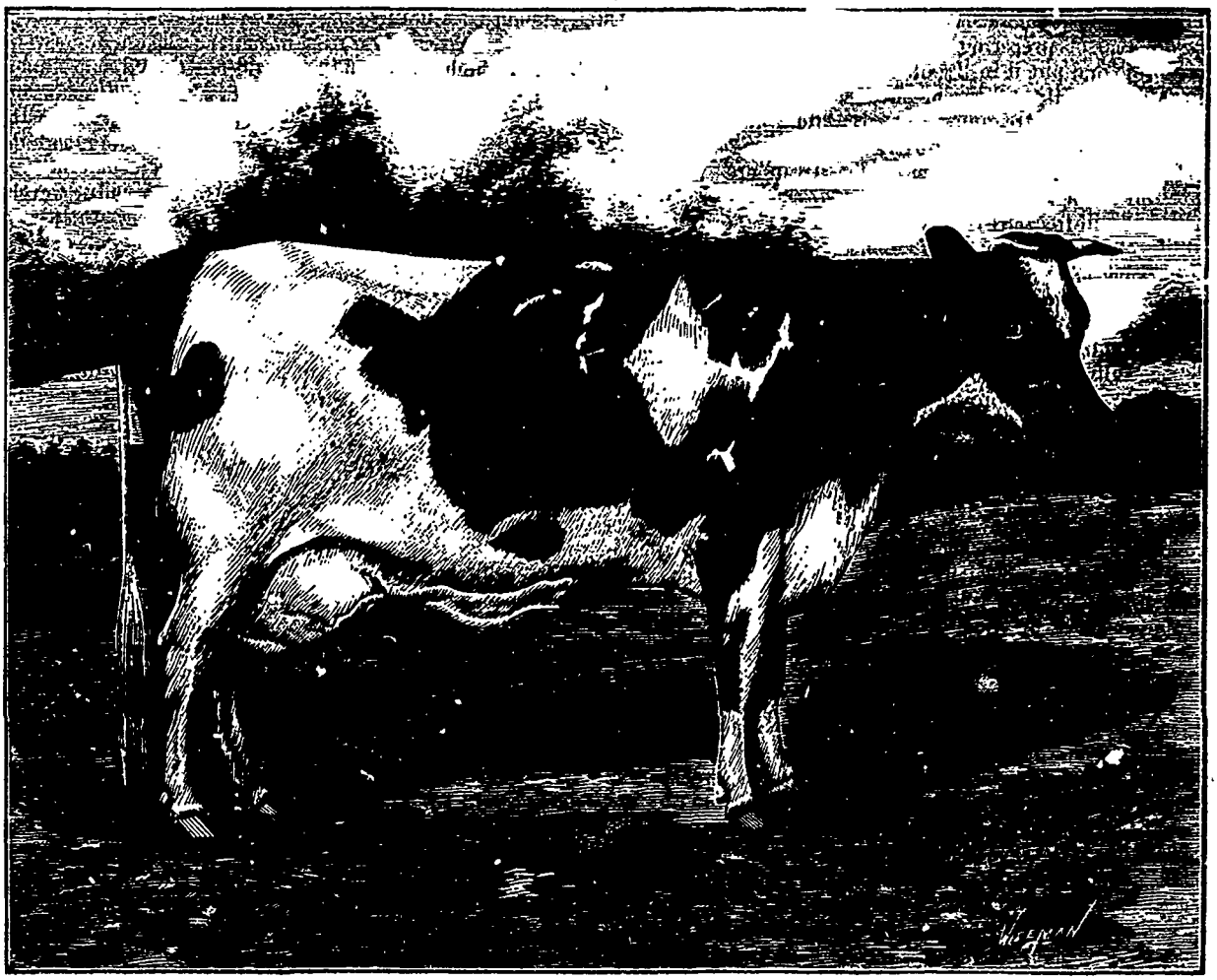
With these precautions and a few dressings with iodine ointment it can be got rid of. If there is much irritation, wash with a solution of carbonate of potash or soda.

LOUSINESS

This is another common affection of wintering stock. It is seen most commonly in young stock kept in badly ventilated and over-crowded buildings. These parasites (*Hæmatopinus Eurytemus*) are very common in badly wintered, under-fed cattle, occurring in large numbers about the head, neck, and shoulders. They soon spread through a herd, producing great irritation and loss of flesh. We have known cattle to die from sheer emaciation produced by the irritation of these pests.

Their presence is easily recognized by the irritation of the skin, constant itching, rubbing or licking itself, baldness, and a careful inspection of the skin will discover them in thousands. In cattle they are sometimes of a blue colour, at other times of a greyish white.

We have frequently met with lousiness produced by the proximity of the stall to the hen-roost, and the invasion of the cow's or horse's skin by the lice of the fowls. They produce great irritation, especially at night, often in one night they will rub large bare patches, and from the irritation there seems to be no rest. In every case of skin irritation in stock kept in close proximity to poultry, a minute examination of the skin should be made, and in most instances, poultry lice will discovered.



HOLSTEIN COW.

Thorough washing with soap and water, and dressing with McDougall's disinfecting fluid, decoction of tobacco, coal oil, or solution of carbolic acid, will usually get rid of them, but these remedies must be applied occasionally, otherwise the development of new generation from eggs may cause a return. The stalls, brushes, combs, &c., must be thoroughly cleaned also. If poultry supply the parasites, they must be removed, or a close partition built between the birds and horses or cattle.

CLYDESDALE HORSES.

We have much pleasure in calling the attention of our readers, and especially of our agricultural societies, to an advertisement in this issue of fourteen imported Clydesdale Stallions and nine mares, which are offered for sale at the Horse Exchange, Point St. Charles.

We have carefully examined them all, and can confidently recommend them. Of course they are not all equally good, but nearly all of the stallions are well adapted for our provincial mares. A few of them err, perhaps, on the large side, and are better adopted for Western mares.

That the Clyde cross has proved a valuable one on our Canadian mares is now well understood and abundantly proved. We hope, therefore, that the societies requiring horses (and we believe every one should have one or two first rate stallions), will send representatives at an early date to make a selection from this large number of horses.

It should not be overlooked that horses having wintered in the country are acclimated and fit for service in spring, whereas, a horse just arrived off a sea voyage, and not accustomed to our climate, is seldom of much service that season

OUR ENGRAVINGS.

Mercedes.—Holstein cow. Test yield of butter 99 *pounds in thirty days.*

Trees, leaves &c.—To illustrate article on forestry.

Water-meadows.—Illustrations of catch-meadows &c.

Hill-side Water-meadows.

Any one who has driven along the upper-road from Richmond to Coaticoke must remember the innumerable rills which, gushing from the rock on the south side of the hills, run trickling down the slopes, wandering here and there through the meadows, and freshening up the grass for a few feet on each side as they pass; supplying this farmhouse and that cattleyard with the finest and most pellucid water; and, gradually augmenting in volume, by and by form brooks of moderate width, which feed trout, the beauty, activity, and quality of which I, with my fifty years experience of that fish, have never seen surpassed.

Ten years ago, happening to pass the summer in the neighbourhood of Compton, I tried an experiment, on a very small scale, to see if the water of one of these bright, clear streams would act on grass in the same manner as streams of the same character act on grass in England. Beginning on the second of May, I led the water over about a quarter of an acre of old, rugged grass; let it run for four days; then dried it for three days, working thus until the end of the month, which, fortunately for my experiment, remained cold and backward throughout its duration. I showed the piece to an old inhabitant of the district on the 25th of June, without having told him what fantastical tricks I had been playing with it, and his opinion was, that there was three times as much grass on the plot as on any other part of the meadow. I think he overrated the crop, but the difference was very striking, and could be seen from afar. And this, remember, was an experiment under great disadvantages, autumn being, as I stated in the last number of the Journal, the best season for watering.

Now, this little stream, a mere rill, runs past three farms, and, trifling as its volume is, it would irrigate, if properly managed, at least seven acres on each of them. Any one can see it: it crosses the road above the ravine between Compton Centre and Mr Cochrane's farm at Hillhurst. A lovely spot—nothing more beautiful in my own dear old country: an immense admission for me to make! The trout, many in number, are brilliant in colour; the grass on each side of the stream is of good quality, and the land, being rocky and uncomfortable to plough, would be all the more useful if it could be kept in permanent meadow. It is no trifling advantage on a farm of 150 acres, to have 7 acres of meadow, yielding a maximum crop, or crops, of hay, with good pasturage afterwards, and, at the same time, absolutely independent of manure. Neither, in such a situation as I have described—and there are hundreds of similar ones in the townships—would the cost be worth talking about: I have seen on Exmoor, Devonshire, many an acre laid out for $4 each, including large and small water-carriers, culverts under fences, hatches, and flood gates. A great part of the work may be done with the plough, in the hands of a skilful

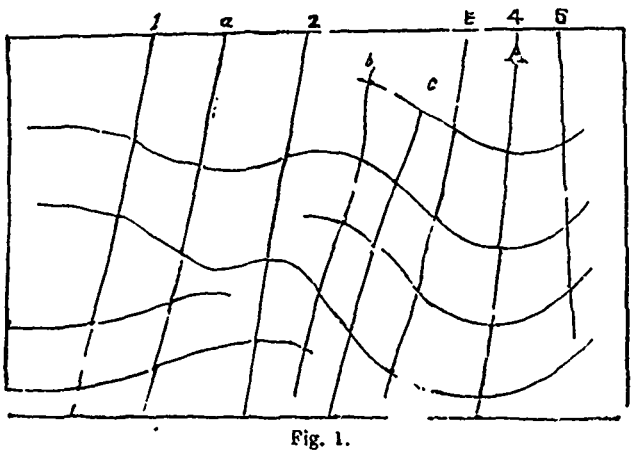


Fig. 1.

ploughman, and the annual expenditure for dressing-up the carriages, &c., would be a mere nothing.

The main carriages, which take the water in the first instance from the book, are formed three feet wide and six inches deep on the *lower* side, and forty-four yards apart, with a fall of two inches in a chain of twenty-two yards, or one in 396. Between these a smaller gutter is cut, eighteen inches wide and five inches deep, at a distance of three-fifths from the upper carriage, and two-fifths from the lower one. These gutters again collect the water into a sheet, that it may be the more evenly distributed over the piece then under treatment: but for this, the water would get into little streams, and cut its way in small furrows.

If, from too long persistance in mowing, the grass has given place to *moss*, the best plan is to let the water flow over it for a week at a stretch. This will soon kill out the moss, while a thin sheet of water has but little effect. Continue the watering at intervals; always letting the land get dry between whiles, but never allowing the land to get sodden by the water remaining on it too long at a time: by neglect of this sort, coarse aquatic grasses are sure to take the place of those of superior quality.

Liquid manure tanks.—As I have before remarked in this Journal, I have seen many liquid-manure tanks built, and many carts for its distribution bought, but I never saw

their use persisted in: the tremendous labour connected with the system soon frightens even the most enthusiastic improver. But where, as in the Compton case, the brook travels close to the side of the farm buildings, there is no trouble at all in carrying out the contents of the tank. The urine from the cattle, the contents of the privies, the sewerage, in fact, of the whole establishment, might be collected by the stream, and carried over the meadows at any time thought desirable. As the water filters over the grass—or rather through it—nothing is lost, but all is deposited where it is wanted; and, thus, early and abundant crops are produced for pasturage, or for soiling in the cattleyard or stables, the manure made from the consumption of which may be carried on to the arable land, and so increase, in a very short time, the gross produce of the entire farm It is a well known fact, that, after passing over the grass, the water, however foul it may have been at first becomes perfectly clear, and fit for all domestic purposes. And these meadows will pay for any judicious labour you may lay out on them. When eaten bare, they should be bush-harrowed, and heavily rolled when the land is moderately damp. After the hay crop is severed, a gentle watering for, say, 24 hours, will do no harm, but, as I mentioned last month, summer-flooding had better be avoided altogether, if sheep are to be pastured.

an enterprising man, who would be willing to invest a few thousand dollars in *intensive* farming on any of the sunny, well-watered banks along the hill-side, might double his capital in a very few years. The soil is willing to grow anything you like to ask it. I never saw such swedes in England—the station is handy, and the neighbourhood pleasant beyond description.

And, now, having described as well as I can the advantages and the general plan of the simplest and cheapest form of water meadows, I proceed to show how such a meadow, in land of the most irregular shape, may be laid out. The level used for this purpose is the ordinary one, an engraving of which was given in our last number. Many of my readers are, doubtless, accustomed to its use, in ditching etc, but others may be glad of information on the subject. It is to be observed that on the cross-piece above the weight there is a notch, in which, when the line lies straight, the plumb level is attained.

Taking the fig. 3 to be a meadow, or a piece of a meadow, we must first consider where the irrigating stream can most easily be introduced, consideration being given to cheapness combined with practicpal utility. Let us suppose that the point A is the most convenient spot. Next, consider in what direction the water, if left to itself, would probably run: take

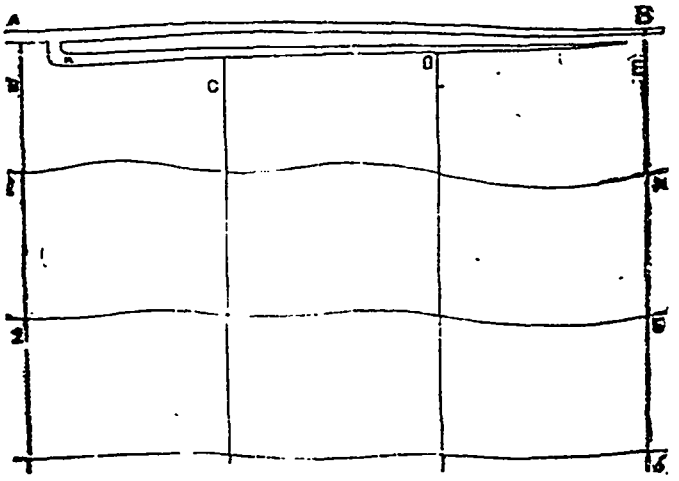


Fig. 2.

I see no reason why—where, as at Compton, land, exposure, and water, are all propitious—strawberries should not be cultivated for the market. Irrigation—in summer, of course, in this case—would double the size of the berries, and, consequently, more than double the value of the crop: fine fruit, as my readers know, always fetches an extra price. It would would pay well to lay out the beds for the strawberries as described in the last number of the Journal p. 124 eng. bedwork. A very thin sheet of water, running for about 12 hours at a time, will be sufficient. In the early stages of growth, the land should be stirred frequently with the hoe round the plants. The last watering should be given just before the berries begin to colour; after which the beds should be kept as dry as possible: strawberries ripened in rainy weather have no flavour. The wild strawberries on the slopes below the upper road at Compton are, without exaggeration, enormous; many of them as large as my thumb-nail! Superb in colour, and full of flavour, if the season is suitable. I fancy there are many hundred acres in the Townships which offer equal inducements to the fruit-grower, but I know what I am talking about as to Compton. I studied the country thoroughly in 1873, and I am sure that

the line, for instance, from 1 to 2. Take the level, and proceed to mark out that line in the following way: set the feet 1 and 2 level on the ground by means of the plumb-line 3; mark the place of no. 1; then advance the level, putting no. 1 in the place of no. 2, and finding a new place for no. 2 by means of the plumb-line. Go on in the same way until you have got a level line across the meadow. Some one, following, should make a mark with a hoe or other tool at every other move of the level—there will thus be a *sign* at every ten feet. Now, begin this levelling at B, and, if the ground is tolerably flat, you will get a line somewhat in the same direction as B C. The *arrows* indicate the way in which the water is to be made to run on in the gutter-line. To manage this, you must deviate a little from the precise level, letting the plumb-line drop a little *before* the level mark when you are inclining *down* the meadow, and *behind* it when the inclination is up the meadow. The water will, then, run out of the low places, and upon the high places. Follow all the indications of the level, however curved or crooked they may be.

When you have finished the line B C, return to a point D, which should be, generally speaking, about thirty feet

from B. Going on as before, you will probably make a line something like D E. You see by fig. 3 that the distance from C to E is too great, therefore, a subsidiary gutter, F G, must be inserted, to collect the water flowing from the farthest part of B C, to spread again over the interval between D E and B C. And in like manner, the subsidiary lines [illegible] and I H must be drawn, always remembering that the distance between the gutters should not exceed thirty feet, or thereabouts, in this comparatively flat sort of work. The plough, with one steady horse, will complete this part of the job.

The next thing we have to do is to draw out the gutters to carry the water from the *carriers* to the gutters we have just made, and as nearly at right angles to them as possible: see fig. 1. In this plan, the curves of the lines form a series of loops, and the undulations of the meadow are mapped out by them as they go down around the hills, and up around the valleys. The water will be principally wanted about A in the figure. Taking care to go as nearly through the centre of the downward loops as possible, draw out, with the plough,

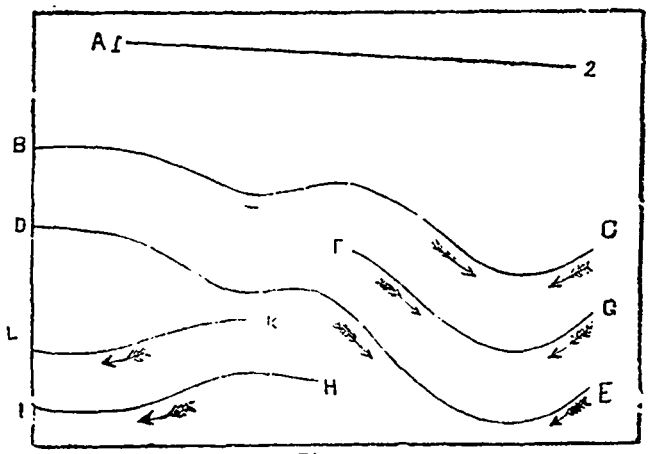


Fig 3

the lines 1, 2, 3, 4, 5, and fill up the intervals with *a*, *b*, *c*. The intervals between these lines should not exceed forty-five, or, at most, fifty feet.

The next step is to bring in the water. First, clear the turf out of the gutters, and, then, with a spirit level, setting a mark every two rods, allow the *carrier* a fall of about 2 inches if the nature of the ground will admit of it: less will do, but the carrier must then be made wider in proportion. The carrier must be carefully, very carefully, drawn out; if the greater quantity of water be required at A, it must retain its width and fall to that point; but if the water is chiefly required at the beginning end, the carrier should taper away to a point and the fall be lessened.

Supposing we have not enough water to irrigate the whole of the meadow at once, we must divide it into two or more parts: see fig. 4, where A B is a *carrier* as far as *c* and a watering gutter from *c* to B; *a* and *b* are watering gutters taken out of it. Now, to water the part on the left hand of the plan fig. 4, all that is necessary is to put a stop in A B at the point 1; and so on at 2, to fill the gutter b. Stops may be made of turves cut in wedge-form.

Lastly we have fig. 2, wherein will be seen the meadow finished for irrigation. This sketch will, I think, give a better idea of the whole arrangement of a meadow than my laboured explanation. A B is a carrier from the stream, tapering towards B; *a* is an irrigating gutter, also tapering towards B; *b*, *c*, *d*, *e*, are feeders perpendicular to the level-gutters 1, 4; 2, 5; and 3, 6.

The gutters are not to be cut every year in the same place, but there will be no loss of space in making new ones, as the turf taken from them will just fill up the old ones.

As this, the best and most modern of all the plans of laying out catch water-meadows, and the one that will work with the smallest supply of water, is also the cheapest to put into operation, I presume it will be acknowledged to be the best suited to this country. I can't see how it can cost five dollars an acre to lay out, and the annual expense of clearing out the gutters, repairing pen-stocks, etc., must be very trifling. The two principal things to be attended to in irrigation are: no stagnation, and no rushing water to create furrows in the land.

ARTHUR R. JENNER FUST.

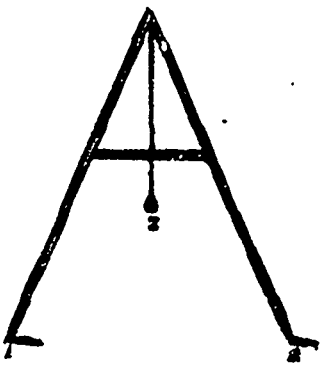


Fig. 5.

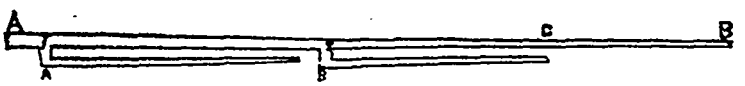


Fig 4.

Hampshire Downs.

Well, the Hampshire Downs have again distinguished themselves at the exhibition of the Smithfield club in London. This time, the lambs exceed in weight the lambs of the same breed in 1881 by twelve pounds a head. Mr Morrison's wethers, *under* 22 *months*, weighed 319 pounds each. Thirty three lambs, about 10 months old, were shown, which averaged 204 pounds; and Mr Parsons Hampshire Down lambs, little more than 9 months old, won the cup as the best pen of their breed, and the CHAMPION PRIZE as the best pen in the whole lot of long-woolled, medium-woolled, short-woolled, and cross-bred sheep. Next to the Hampshire Down lambs came the cross-bred Hampshire Down and Cotswold lambs; another proof, if proof were now needed, that the Hampshire Down ram is as pre-potent as the Short-horn bull; for the Cotswold sheep is anything but celebrated for its precocity.

A. R. J. F.

FERTILIZING FARM CROPS.

BY JAMES CHEESMAN, Montreal.

Agriculturists of Rome, in the days of the Old Empire, knew the use of barn-yard manure, and employed all they

could obtain of it to fertilize their various crops with. The technical principles involved in their practice were not understood by them nor did they appear to know of any other source of plant food than animal excreta. (1) In what condition or quantities the article could be most usefully employed, were questions which have remained to this day undecided. We know pretty well what will happen under definite circumstances to the excreta of any given number of animals fed on an allowance whose chemical constitution can be estimated, but to tell what the phrase "barn-yard manure" means, even in the case of intelligent farmers living side by side, is what baffles all. Probably, there is no more perplexing subject than that of farm wastes, and yet how little have the English-speaking agriculturists of the world done towards its solution. In France, Belgium, and Germany, the preservation and, I might add, the manufacture of the farm yard wastes, both in the manure heap and the compost stack, are among the most important functions of the farmer. He would think it almost as prodigal a waste to neglect the storage of this material to feed his plants, as he would to pass over some important feature of the hay, grain, or root harvests, in preparing food for live stock. It should be quite as easy to form standards of quality for farm-yard manures, as it is to make grades of commercial fertilizers, based on the materials used in making them. There can be no reason why at least fixed standards should not exist for indicating the quality and money value of farm-yard or stable manure. We know approximately the composition of the varied feeding stuffs used on the farm, and we also know about how much of the food eaten by animals will pass through their stomachs. It therefore follows, as a matter of comparative arithmetic, that we can estimate, nearly enough for working commercial purposes, the constitution of a ton of yard manure kept under cover. To arrive at these standards, it would be necessary to work on a corresponding number of feeding tables, for dairy and beef cattle constructed in harmony with the market values of the articles which are cheapest. I mean, of course, those which yield the largest amount of nutriment for the money expended. Thus, in the East, straw, hay, bruised oats, corn meal, linseed and cotton seed meal, roots and fodder, can be made available for horses, beef cattle, sheep and cows, in such proportions as suit their physiological requirements In carrying out such a plan, the country could be divided into districts somewhat as follows: The New England States, the Northern, Middle, Gulf, and Western States, and the food tables might be prepared by one of the well known experimentalists presiding over the stations located within these districts. When we remember the facts elucidated by the leading experimental chemists of the great countries of Europe, and verified by our own scientists on this side of the Atlantic, it needs but little reasoning to show how much we lose by present methods. According to these results, the manurial residues of the articles of food referred to may be stated as follows: Straw, $1 50 to $3; hay $2 50 to $3 5; oats, $4 50 to $6; corn meal, from $4 to $6 50; linseed and cotton seed meal, from $12 to $25, per ton. These values can be determined by any intelligent farmer taking the market prices of ammonia, phosphoric acid, and potash, in the commercial fertilizers sold in his district. For example, let us take the average manure product of a cow at ten or eleven tons. The manure ought to be worth, on any farm between Boston and New York, at least $2 per ton, if properly protected from drainage and exposure to the weather.

If an average of two pounds only of cotton seed meal per day be used, and its manurial residue be valued at $20 per ton, we have a consumption of 730 lbs., which gives $7.30, or one third the value of our manure heap. The balance can be ascertained from the quantities of straw, corn meal, oats, hay, and roots, fed. Some feeders, who produce high class cream, use much larger quantities of concentrated foods, such as pea and bean meals, linseed meals containing little oil, rape-cake, and tares. Every thinking husbandman values the economies of the farm, however small, and will make the estimate of value in his manure heap as he would the yield of butter.

Let us take another test. Connecticut farmers know that ammonia in blood and in the sulphate from the gas-house cannot be bought under sixteen cents per pound. This is a concentrated article, while his farm manure may contain say one per cent, if his cattle are fairly fed, and the manure be properly kept. Every ton ought, therefore, to give at least 20 lbs, which, if valued at but ten cents per pound, would be worth $2 per ton without taking into account the phosphoric acid and the salts of potash.

Now in addition to errors of drainage and storage, there is the danger of over-fermentation, which favors the formation of carbonate of ammonia, a most volatile compound, which has the unhappy habit of taking to itself invisible wings to effect its escape into the atmosphere. Nearly every farmer uses land plaster, and very many use German kainit, both of which are very cheap, selling at from 4 to 5 mills and from 6 to 8 mills per pound respectively. Now there is no more economical mode of using these very important fertilizers than as preservers of farm yard manure. Thus, according to the quantity of moisture in the heap, and its consequent temperature, carbonate, or other compounds, of ammonia may be formed. About 2 lbs per day per animal of either sulphate of lime (land plaster) or kainit, which yields sulphates of potash, magnesia, lime, and chlorides, may be used. Either will help to retain the moisture, but at the least rise of temperature, a mutual exchange may commence by which the sulphates will yield their sulphuric acid to the ammonia, and the metallic bases become carbonates, yielding sulphate of ammonia and carbonates of potash, magnesia and lime. All such applications should be added to the heap in the morning as the litter is removed from the stalls and placed on the heap, care being taken to apply it in a finely ground state, passed through a sieve of 20 or 30 mesh, to insure an even distribution throughout the bulk. To farmers who keep 100 head of cattle, the results of such a practice would be immense. It is not exaggerating to assert, that the waste of soluble and volatile compounds on a farm is fully $1 where grain is used. The waste of forty head is therefore equivalent to the price of one ton of commercial fertilizer, and the waste of eighty equal to one ton of ammonia. The value of dung heaps on the farm, where sulphates have been used as preservers, would range from $3 to $10 per ton, varying, of course, with the quantities of moisture, carbonates of potash and magnesia, sulphates of ammonia, and phosphoric acid.

The varied results obtained in cropping indicate in a forcible way the differences of value which the article bears. The variations in the crop results will correspond almost precisely with those found in the composition of the manure, other conditions being equal. Hence the declamations we hear on one side against the value of farm manure, and the claims made on the other in its favor. There is now no reason to doubt that scientists who have conducted experiments regard farm manures as the very cheapest form of fertilizer a farmer can possess. Of the natural manures which we have to deal with, lime is by no means common and not the least useful. The word lime is another example of the vagueness with which we employ phrases of common use. A farmer

(1) Oh! They ploughed in lupines, spurry, and other green crops.
A. R. J. F.

is told that his soil needs lime, but whether it requires it in the caustic, hydrate, carbonate, or sulphate condition, is not explained to him We cannot conceive of any description of soil in which this valuable metallic base would not be serviceable Although lime is oftenest employed in the natural or mild forms of hydrate or carbonate, it is, of course, used in combination with phosphoric acid, but the carbonate is the commonest form of using it. The two most important functions exercised by lime in the soil, when properly used, is to act promptly on any organic acids which exist there, and to change silicates into double ones. Every husbandman knows when his land is sour by the kind of herbage grown, and accordingly he applies lime as a remedy. He may not know, however, that liming is a delicate operation which needs judgment, calculation, and skill, in the application of the remedy.

The best mode of using lime is that adopted by the mason and bricklayer. They slake their lime without loss of time, in order to secure a perfect combination of the calcic oxide with the water, to form hydrate of lime. Now the most intelligent farmers have learned to do the same, by preparing the heaps of caustic lime, slaking them, and then covering them up with earth to protect them from the air. When ready to distribute the hydrate of lime thus formed, the heaps should be evenly scattered over the land and harrowed into it. In this way, whatever organic acids come within the reach of the hydrate are immediately acted upon, whereas if the lime in the condition of carbonate had been employed, it would have been perfectly useless for the purpose of changing the sour condition of the soil. The too common practice of distributing lime in small exposed heaps over the surface of the soil cannot be too strongly condemned as a waste, since all the beneficial actions of the hydrates are lost. Not only do the mischievous acids remain, but the nitrate of potash formed under favorable conditions is lost too Prof. Tanner thinks it probable that lime applied in the caustic condition gives rise to the formation of a series of double silicates, which are very much favoured if the lime be slaked with water containing salt. Thus applied to clay soils, we should have silicate of alumina and lime, and from these, if soda, potash, and ammonia were present in the soil, we could obtain from the alumina and lime silicates of soda, potash, and ammonia. For the little knowledge we possess about the action of these valuable compounds we are indebted to Prof. Way, who, many years ago, carried out some experiments with a view to establish the facts we now possess regarding them. The theory is a fascinating one, and well worth the attention of every farmer who is able to make a reliable experiment There is something very interesting in the order of preference shown by the silicates of alumina and lime in parting with their lime for soda, and in giving up soda for potash, and in separating from potash in turn for ammonia. The mechanical effect which lime exerts on stiff, heavy land is another important feature not to be lost sight of. Soils become mellow and friable to the touch, and can be worked with greater ease than before. There is another important action of lime in soils containing much organic matter, which must not be passed over, and that is the formation of nitrate of lime. This is a form of nitric acid which yields more nitrogen than either the potash or soda compounds, and is equal to 20 per cent. of ammonia.

Carbonate of lime in the form of air slaked lime, or, still better, in the milder forms met with in finely ground shells, chalk or marl, is very valuable on a great variety of soils. Chalk, from its very soft and pulverulent condition, is the most soluble form of a carbonate met with, and is on that account much to be preferred to any other condition of the article. On light soils it is especially useful, not only in adding another compound to them, but in giving body and tenacity when used in sufficient quantity. When it is desired to obtain a carbonate for use, the farmer must, of course, be influenced at all times by the question of cost, a consideration which it will be no less necessary to study when using a caustic lime. Wherever rich marls can be obtained, and at suitable prices, there the article may be used to advantage. Marls vary a good deal in their yield of lime, and may contain from ten to eighty per cent of the carbonate. In firm loams, lacking organic matter, lime carbonate is always useful in adding a necessary constituent to the soil and in improving its physical condition.

Green manuring is an operation familiar to every American farmer, but as they do not all grow clover, vetches, or Italian rye grass, they will not all appreciate the value of manuring with these crops. In France, England, and the Northern States, the practice is well known, and its success depends on effectually covering the vegetable matter turned under the soil in the operation of ploughing. When it is intended to use the crop directly for fertilizing, the ploughing should be done just as the flower is about to open, and when the days are sunny, and the soil is dry, in order to facilitate decomposition. Fully three-fourths of the organic matter thus buried has been derived from the atmosphere, and the land so treated obtains its fertility from the even distribution of the nitrogenous crops, which are decomposed at a very slow but certain rate. Practical men of large experience consider the value of a green crop ploughed in as equal to the droppings of cattle which have been fed on three times the quantity.(1) The great fact behind this all important action is the decomposition of the nitrogenous compounds which yield ammonia and nitric acid, from which nitrates are formed.

Thanks to the well directed efforts of the agricultural stations, we are becoming familiar with a better system of rotations than has hitherto prevailed. The foundation of this system is laid on the truth, that continuous growing of any one kind of crop weakens, or rather exhausts, the soil of those inorganic compounds on whose presence successful cultivation depends. To arrive at this conclusion, much laborious investigation in the chemist's laboratory had to be gone through. It is now a well acknowledged principle of farm practice that two crops of the same kind, or even the same species, should not be grown successively on the same plot of land. For those who have not seen the figures of the Rothamsted (England) experiments on soil exhaustion, I give a statement of Dr. Lawes' results. The soil being well fitted to grow barley, that crop was chosen for the experiments. Barley was grown for twenty years without either natural or artificial manures. The yield of dressed grain per acre was twenty bushels on one plot, and in a second plot, the annual average was twenty-two bushels. During the first ten years the average annual produce from the first plot was 22⅜ bushels, and on the second, 25 bushels; whilst during the second ten years, the average of the first plot fell to 17½ bushels, and the second to 18⅛ bushels per acre. The total amount of grain per acre in the one case was an average of 1,281 lbs. for the first ten years, and 985 lbs. for the second decennial period. On plot No. 2 the respective annual average weights were 1, 414 lbs. and 1,070 lbs per acre for each period. The yields of straw and chaff were similarly reduced in quantity. Wheat has given the same general results. Thus, for twenty-four years wheat grown continuously yielded an annual average of 15½ bushels per acre for the first twelve years, and 12⅜ bushels for the second twelve years. In 1875 the dressed grain fell to 8⅝ bushels. The oat crop appears to diminish

(1) As a *very* practical man, I must content myself, for the present, with modestly but peremptorily and irrevocably denying this proposition. A R J. F.

very rapidly. Experiments having been commenced by Dr. Lawes in 1869 without manure of any kind the crop yielded 36⅝ bushels, and decreased to 12½ bushels in 1875. Such is the rapid degeneration of the oat plant under the practice of continuous growth without proper food supplies.

The weak point in American farming has always been the small attention to roots, and the comparatively poor quality of those grown. Unless more roots and hay be raised, and the area in cereals in the East be curtailed, every crop grown will suffer. The common practice with most cultivators in the Northern States appears to be the alternation of grain, grass and potatoes, and scarcely that, since from sixty-five to eighty per cent. of the area is under grass. If the area under grass were reduced to about 35 per cent., or less, the Scotch system of a six-course rotation would fit very well. Under this practice, one third of the soil would be under grass or fodder crops, another under grain, and a third under roots. (1) By restricting the area of some crops and increasing that of others, it does not follow that a lessened product will result. Diminished areas mean more intensive culture. Thus, the first year, clovers and grasses might be sown in proportions to suit the different kinds of soil to be dealt with, then grains, as corn, oats and buckwheat, and afterwards roots. Thus: mixed clovers, corn, potatoes and roots, grasses, oats, and buckwheat, and mixed clovers. Under this system, fully one-half the area would be devoted to the growth of forage crops. Clover would stand two years, and would absorb one-third only of the land, corn would take one-sixth, potatoes and other roots a like amount, grasses another sixth, and buckwheat and oats the same area. The theory on which all rotations are based is, that different plants require different treatment in the matter of food or nutrition. Clovers love lime and sulphuric acid, potash and magnesia; wheat, comparatively little lime and less sulphuric acid, while roots make a heavy demand on all the mineral sources of food. This is why clover is immensely benefited by a liberal dressing of land plaster. Potatoes, large doses of kainit for their sulphates of potash, and magnesia and chloride of magnesia and sodium, while wheat delights in phosphoric acid with only moderate supplies of magnesia and potash. To illustrate this more forcibly, let a comparison be made of some grain, root, grass, and tobacco crops, and we shall find the dried products varying from 1 to 18 per cent — cotton lint, 1; cotton seed, 8.9; wheat grain, 1.9, wheat straw, 5, Indian corn, 1.5, red clover, 6.8, cabbage, 8, Irish potatoes, 4.3 turnips, 10; tobacco, 15 to 18. These analyses are the averages of a great number of tests by Playfair, and German and American chemists. Plants drawing heavily upon one kind of mineral are alternated with those needing it only in very small quantities.

To be continued.

CORRESPONDENCE.

Quebec 12 *Dec.* 1883.

A. R. JENNER FUST, MONTREAL.

DEAR SIR,

I have your esteemed favor regarding the crushing of Linseed. I now enclose a sketch of my small place, which I purchased last spring, and would like your opinion as to the most profitable crops to grow. My occupation is Bee Culture, principally, but I wish to make the farm pay. In winter, I thought of producing Devonshire butter for sale, it fetches 30 c. netting me 25 c from 2 or 3 cows, the skim milk goes to feed 2 young Suffolk sows, which I intend to breed from: What is the best feed for them, and how much a day? I keep no horse, finding the food costs more than the hire for what I want done. Referring to the sketch, the N. W. field did not produce much hay this year, but the aftermath was very strong, and I think I shall get a good crop off it next year. The N. E. field I propose cropping as marked, this is the one which you recommend me to dress with 15 Scotch cart loads of manure and 20 bush. ashes, for potatoes, and 300 lbs. bone meal for Turnips. The West half of the S.E. field is ploughed for oats, but I believe you recommend barley: if I can grow at least as much of the latter as of the former I shall do so, as oats can be purchased to day at 45 c. p. 32 lbs. The whole of the S W. field I propose to sow to Barley, with Clover and Timothy, the Western part should be manured, I think. What had I better put on? The Turnips (about an acre) gave me about 400 bush. (Sutton's Champion swede) with the aid of 1000 lbs. of Goemon Biphosphate mixed with about ⅔ rotten leaf mould and cost me $16.00 p. ton (it is now offered a $12.00). It is admitted I had the finest if not the largest crop per acre around Quebec this year. Potatoes were a failure, as I gave them too much manure this spring. I would not have planted this crop a second time running on this spot, but was over-persuaded by my man. What would be the best dressing for barley on clay loam? Mr Cochrane's crop of black oats is enormous—70 bush: is this by weight or measure? I can get gas lime at 30 c. a load, if it is any use, and the works produce Sulph. Ammonia. I should like to grow peas, as they sell at a $1.00, but am told my land is too rich. How many bushels could one expect? How much butter should a cow produce in the 9 months to pay expenses?

Trusting I am not taxing your kindness too much and enclosing stamp for an answer, I remain,

YOUR'S TRULY
* * *

(2) Hardly The Scotch six course rotation is divided thus. one sixth roots, two-sixths grain, three sixths grass A. R. J. F.

Gas lime—⅔ earth to ⅓ lime—for old grass; 10 cartloads to the acre.

Skim-milk, barley meal, and corn-meal, for *fatting hogs*; to be finished off with pease for a month. Small pork, *no pease*.

Try clover and orchard-grass—*dactylis glomerata*.

The barley, where the land seems poorest, might have 120 lbs. of sulphate of ammonia and 150 lbs. of superphosphate.

Pease sown *thickly* in rows, 27 inches apart, would not find the land too rich. Don't they do well in your garden?

Mr Cochrane's crop of black Tartar oats was large for the climate, but my farm-tutor, Rigden, grew, near Brighton, Eng., 420 bushels on 3 acres.

The question about the cow's yield of butter cannot be answered without a previous knowledge of the food given.

A. R. J. F.

New method of washing butter.

It is stated that a new method of washing butter has been patented in Germany. As soon as gathered in the churn in particles of about a tenth of an inch in size, it is transferred to a centritugal machine, the drum of which is pierced with holes and lined with a linen sack that is finally taken out with the butter. As soon as the machine is set in rapid motion, the butter-milk begins to escape; a spray of water thrown into the revolving drum washes out all foreign matters adhering to the butter. This washing is kept up till the wash-water comes away clean, and the revolution is then continued till the last drop of water is removed, as clothes are dried in the centrifugal wringer. The dry butter is then

aken out, moulded, and packed. It is claimed that the product thus so fully and quickly freed from all impurities, without any working or kneading, has a finer flavour, aroma, and grain, and better keeping qualities, than when prepared for market in the ordinary way.

Farming in Maryland.

The exponent of farming in this section is Mr Wm. Woolsey. He is said to be the best farmer in Maryland, and second to none in the United States. His beautiful and fertile place is about 7 miles from Belair. Mr Woolsey is not a theorist who has indulged his fancy and spent his money in theoretical farming, but a practical, earnest worker, who has made a fortune from a small beginning by the judicious culture of barren land. There are certain axioms in farming which Mr Woolsey states with an emphasis that will admit of no mistake. His favorite fertilizer, outside of barn-yard manure, is raw bone. He says: "A rich man may use 100 or 200 pounds of bone to the acre if he chooses, because it is not material for him to raise a crop, but a poor man must use from 1,000 to 1,200 pounds to the acre or he will be ruined. Mr Woolsey's grand farm is in strong contrast to its former condition 35 years ago, when he took charge of it, as described by himself and neighbors. For the 312 acres constituting the home place he gave less than $4,000. It was then dead poor, and would not grow a crop to pay the cost of cultivating the land. Lime did not act on the place, and he has improved with bone. After two years experimenting with guano he gave it up, because he saw he was paying too much for ammonia and was not getting enough phosphate. He has always farmed for money, and has always made it. A number of persons interested in agriculture visit the scene of Mr Woolsey's operations, and all go away impressed with his mode of farming. These not unfrequently are officials and others from a distance. Some time since Governor Hamilton (who is a large farmer) and party came down for the purpose of inspecting Mr Woolsey's crops and cattle. Gov. Hamilton said he had not believed that such crops as he saw could be grown. He was satisfied, he said, that a prominent politician of Harford, who accompanied him, had not overstated the case, though the gentleman was so in the habit of shooting with a long bow that he could not believe him. Gov. Hamilton said he had never raised such a crop of corn as he saw before him, and never expected to, but he would try to improve his corn production. Mr Woolsey plants his corn in rows 3½ feet apart, with 12 to 14 inches between the stalks. His average crop is 100 bushels to the acre on all the land cultivated, and in the last eighteen years he has only gone as low as 80 bushels to the acre on one occasion. He never uses any kind of manure on corn, but turns under a good sod. At Gov. Hamilton's request Mr Woolsey wrote him the average yield of the field which Gov. Hamilton had seen. Mr Woolsey said that in consequence of a severe drought the yield of corn was reduced to 95 bushels per acre, but added, with a smile, few of them can do as well through a large field.

Mr Woolsey, though over 70 years of age, is hale and hearty and as active a man of 40. He left his beautiful residence and highly ornamented and well-shaded grounds to go over the farm with a representative of *The Sun* without feeling that he was doing anything unusual. He talked as he went, and took pleasure in giving to others the benefit of his experience. He seeds his wheat on corn stubble, using ½ ton of raw bone per acre, or if he seeds wheat on fallow, which he does rarely, he puts ½ ton of bone on each acre. Timothy is seeded with the wheat and clover in the spring. Mr Woolsey said 50 bushels of corn per acre would have done 25 years ago, but it won't do now. Agricultural implements and fertilizers have forced farmers along. The speaker continued, pointing to luxuriant fields of grass, that they would do for beds for any person in winter time, so continuous was the growth. These fields stay in grass from 4 to 6 years, and cut 2 tons of hay to the acre. As they grow older the growth is not so heavy, but the hay is finer. His permanent pasture has been in grass 25 years. Cattle are on it all the time from early spring until late in the fall. It was in many places overwaist-high, and would have cut a fine crop of hay. The wheat average on corn stubble is about 30 bushels, last year it was 33. On fallow the average has been 45. The oat yield is 50 to 60 bushels per acre, and as high as 70 bushels have been made. Mr Woolsey said he tried to get rich raising potatoes. The first year he got $1.25 per bushel, and was well satisfied, the next year he got but 25 cents per bushel, and stopped raising in quantities. He plants the middle of June, and thinks the Burbank the best variety. He farms, in all, between 700 and 800 acres.

Cattle-grazing he regards as the most profitable branch of farming, and he fattens from 125 to 150 head annually. Drovers bring two-year-old steers to his barn from West Virginia. He buys the feeding stock at his farm and sells the fatted cattle there. He has large scales there, and buys and sells by weight. Last year a drover came up with a drove of 101 head, and Mr Woolsey gave him $5,000 for them on sight. When he is ready to sell, merchants come to his place from New York and Philadelphia. Most of his cattle are shipped to Europe. Mr Woolsey said that the West Virginia beef was the best that got to the Baltimore market. The cattle for fattening were bought last October, and sold from March to September. In summer the cattle get grass alone. In winter all are stalled and fed grain. Mr Woolsey raised a steer that weighed 2,700lbs. The cattle when sold weigh on an average 1,400 pounds. He has put on as much as an average of 600 pounds in 12 months on one whole lot of cattle, but generally less. The cattle were seen feeding finely, looking as if anxious to take on all the fat possible. They are attaining greater weight this year on grass than ever before, and the whole herd will easily average 1,600 pounds. They are all three year-old-steers. Some were pointed out to Mr Woolsey as having the beautiful heads, straight backs and rich colors of the Devons. He said yes, and that some of the fancy breeders pretended to object to Devon blood, but he always told the drovers not to stop in the selection of his cattle on account of an admixture of Devon stock, because he liked it. There is much in the selection of stock for grazing, and several gentlemen in the neighborhood stated they would be glad to pay Mr Woolsey $2 per head to select their fattening cattle, as they would make an additional $7 per head by having him do so.

Mr Woolsey says it is the finest grass season ever seen in Harford; that it is time for the grass to begin to fail, but it is as succulent as it was in May. All the grass fields are booming. The prospect for the corn crop is as good as Mr Woolsey ever saw, the wheat a full average, oats unusually heavy, potatoes as good as can be. Mr Woolsey keeps Berkshire pigs. Mr Woolsey has some grade Jerseys, descendants of an animal presented to him by Mr Enoch Pratt. Mr Pratt and the gentleman who raised the Jersey presented to Mr Woolsey, a noted breeder of such cattle, were on a visit some time ago to Mr Woolsey. The grade Jerseys were shown, and the breeder of pure cattle, Mr Woolsey states, said that a cross of Devon and Jersey was much better for milk and butter than the pure Jerseys, adding that of course it did not do for him to make this declaration in his own locality. Mr Woolsey has many followers in farming in Harford, and is generally looked up to in agricultural matters.

Baltimore Sun.

Canadian export of beef; with special reference to Veterinary Science.

Read before the Montreal Veterinary medical association by E. A. Cross, Student in the Veterinary College.

Montreal December 6, 1883.

Gentlemen, —the study which I bring before you to-night embraces such a large field, that it gives ample room for any one who knows anything at all about it to express their ideas It is a very important one, not only to the agriculturist, veterinarian, and shipper, but to the country in general, as it brings in a large revenue. It has developed into a large trade, as I will presently show you, and our cattle have made no small name for themselves in the European markets.

I have divided the subject into the following headings. 1. Trade; how it has increased so rapidly and to such an extent; 2. Climate and soil adapted to raising cattle, 3. History of the prominent breeds and the ones best adapted. 4. Most profitable way of feeding and raising, 5. Most important diseases and their preventions.

I shall endeavour to give a short account of each of these headings, taking them in the order given. The first to come under our notice is Trade: this is of comparatively recent occurrence, as I remember coming out from England on the same ship with a man who was just returning on the trial trip of a cargo of cattle, which he had brought and sold in England I also remember him saying that he had been very successful; and I presume had realized a handsome profit on his new enterprise, as far as I can remember, it was about the first of August 1876,and from this recent date the cattle trade between Canada and Great Britain has developed, until now it has attained such a large and important export.

The following are the amounts of the exports to European ports:

1877	6,940
1878	18,655
1879	25,009
1880	50,905
1881	45,535
1882	35,735
1883	55,000

Mark the very rapid increase from '77 to '80, showing what handsome profits must have been realized by the shippers, as they seemed to have bought up all the available cattle. This has been partially the reason why the decrease followed during '81 and '82; there are also several other reasons which seem to present themselves to me as the cause of this decrease, viz., farmers find that it does not pay to raise common native-bred cattle, as they are too small for shippers, costing the same rate for freights, which deducts considerably from the profit of the animal; also the large expense it is to lay on a few pounds of fat to cover their ill-formed ilia, scapula, and ribs, so that the farmers find it more profitable to raise one fine animal than two inferior ones. Another reason is, the latter animals do not come up to that standard of roast beef which the Englishman's stomach seems to yearn for. Another reason, is a higher duty put on corn by the present government, which is the best and cheapest grain for cattle. There is still another important cause for the decrease, viz., the exports to the U. S. of '82 have more than doubled those of '81. The figures are:

1881	7 558,
1882	16,145

This great increase in the exports to the U. S. is attributable to the cheap freight to Europe viâ Boston.

I learn that the number of cattle exported this year to Europe is 49,234 up to date; this nearly reaches the number shipped in '80; such a very large increase this year is due to the freights being put at a figure which competes with those from the U. S. Another reason is, that farmers now see that raising beef cattle is a very lucrative business, and are now producing cattle of such a standard as to be worthy of shipment, this standard could not be brought about inside four years, as the average age of shipping cattle is over three years There will not only be a most extensive trade of beef export from Ontario, but I hope to see a large one from the Far-West plains of British America which will develope into one of the most important industries of Canada, if not *the* greatest I think a few remarks would not be out of place to show how this trade has sprung up in Chicago. A few years ago, a few hundred head of cattle would have glutted the Chicago market coming at the same time, while now thousands will not affect it. The coming business was a great help, especially for the consumption of the small and rough class of animals shipped by the ranchmen. Another reason is, that, nowadays, there is more meat consumed in proportion to the number of population, also,it has largely increased in U. S Last year Western grass-fed steers brought as high figures as sixty dollars ($60.00) each, per head, in many cases. This fact alone ought to be enough to show not only the great importance of this trade but the immense profit which must be realized by it. There were also numbers of steers shipped from the Western states to the Eastern ones to be fattened more, for the European markets, this branch of the trade can be done between the North-West territory and out thence to the English markets.

The cattle purchased by the North West ranchmen are of superior quality, being highly graded with Shorthorn blood, although originating from the Spanish cattle. This fact gives a decided advantage to the N. W. over that of the Southern cattle, growing plains, as down there, the high grade cattle do not thrive, and in many cases die, on account of the climate not being adapted to their health and preservation; on the other hand, there is a disadvantage of breeding too highly-graded animals, as they are apt to become lazy, and do not forage for themselves in the very severe storms which are apt to occur throughout the N. W. territory.

There has been a great scarcity and consequently a great demand for cattle by the ranchmen of the Western states: this has been caused by the great decrease of cattle from Texas, on account of railways going into that country, and giving a direct market communication with Chicago, which is the great centre of the Western States markets. A few years ago, between three and four hundred thousand head of cattle were driven up from Texas, and one to two hundred thousand from the Pacific slope, annually, and sold in Wyoming and Colorado alone. This shows what an immense trade there must be done in the Western States in the cattle business, and if the North West territory proves to be as suitable for growing beef, it will not only line the pockets of the ranchmen, but will make this country one of the most important and richest countries of the world.

2. Climate and Soil adapted to raising cattle.—

Our climate cannot be surpassed for its healthy invigorating qualities and freedom from disease. In the older provinces, in the summer, cattle are allowed to graze on the most luxuriant pasture, well supplied with pure water, large areas to run over, where they can obtain the great varieties of herbs necessary for health, growing muscle, and laying on fat. The winter season is somewhat chilly, as I have heard Americans say, but this does not prevent the animals from thriving, as they are close in comfortable houses, where a proper temperature is maintained.

(*To be continued.*)