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THE ILLUSTRATED JOURNAL OF AGRICULTURE

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On comparing this diagram with the immediately preceding one (p. 168, vol. 3. of the Journal), you will see that a new form of phosphate of lime is obtained, quite different from the bi-calcic which was produced in the soil by water and carbonic acid. And a great gain this was, for the bi-calcic is slowly soluble, and the mono-calcic is rapidly soluble, in water. And hence arose the term "superphosphate of lime;" for the phosphoric acid which, in bones, had been combined with three equivalents of lime, had been concentrated upon one equivalent of lime, and this one equivalent had been over, or super-charged with phosphoric acid. You must bear in mind, please, that it is the phosphoric acid which is wanted in the manure, not the lime; as in ammoniacal manures, it is the nitrogen, and not the hydrogen, which is for the service of plants. Some of our English landlords are pretty sharp, when their own interests are concerned, but on this occasion, Liebig's words seem to have fallen in vain on their ears. Not so, however, with the ears of Mr Thomas Proctor, of Bristol; they were erect at once; he hastened home, set to work at once, and had the honour of starting the first manufactory of superphosphate that ever existed, from which hundreds of thousand of tons have set out on their fertilising errand, and from which the family of the original proprietor has reaped a rich harvest of reputation and wealth.

In those days, superphosphate of lime, or "sulphated bones," as it was sometimes called, sold for £7. 10. sterling a ton; now, it can be bought for £3. And the reason for this fall in price is simple enough. At first bones were the only available source of phosphate of lime. Chemists, particularly Daubeny, I remember well, knew that in foreign parts, in Estremadura and elsewhere, there were deposits of phosphatic rock; but, unfortunately, there were no railroads in those days, and the Estremadura roads were only travelled by pack-mules, which poor beasts were clearly incapable of transporting any decent quantity of rock to the sea-board. But in 1842, Mr J. B. Lawes, then of Deptford, but now of that national glory, Rothamsted farm, commenced experiments on the phosphatic nodules of the green sand formation in Suffolk and Cambridgeshire. These nodules, commonly called *coprolites*, were originally supposed to be, as the Greek derivation shows, the *kopros* or dung of extinct animals. Whatever they may be, their composition was satisfactory, and a factory was mounted on a large scale for their utilisation, the product of which was, and is, known as *mineral superphosphate*.

Afterwards, the universal world was searched for phosphates; bone-ash, the residue of bones used for fuel to try out "the fat of the South American cattle, was largely imported; and our own *apatite*, as rich in phosphoric acid as any of the mineral phosphates, but too utterly refractory for use without previous treatment with sulphuric acid, is likely to become very popular in Europe.

I must repeat here, what I have often said before: any one who uses Canadian apatite, crushed to never so fine a powder, without making it into superphosphate, is throwing away time, trouble, and money. All the experiments made

Guano-biphosphaté.—We again call attention to the offer of the Department of Agriculture, Quebec, to sell superphosphate, delivered free on board at Quebec, for \$26 a ton. This superphosphate has cost the Government over \$30 a ton, and is sold at the low rate mentioned, in order to enable farmers to experiment upon this new fertilizer.

First steps in Farming—Young Man's Department.

A few years previous to 1840, a general feeling seemed to exist among the more advanced farmers in Britain, that half-inch bones were not quick in coming into action. In certain seasons of great drought, the turnip crop, for which they were principally used, derived but little benefit from their application. Guano was as yet unknown, except in its own home, Peru, and the refuse of the rape-oil manufacture, with perhaps a few tons of wool-waste and scum from the sugar-refineries, were the only supplementary manures available.

But, in 1840, a meeting of the British Association was held, at which Liebig propounded a new theory for the chemical treatment of bones, whereby they were rendered more rapidly soluble, and consequently were ready for the crop without loss of time. What he did was simply this: he showed that (v. p. 167, vol. 3 of the Journal) carbonic acid slowly and quietly took from the tri-calcic phosphate some of its lime, and thus increased the solubility of the bone; "why not, then," asked the great chemist, "use at once some strong acid, the sulphuric for instance, and dissolve the bones before they are deposited in the soil; the chemical change would be completed in an hour, and the phosphate of lime will be soluble in water. Nay, more; not only will time be gained, but a more thoroughly soluble condition of the tri-calcic phosphate will be brought about;" as thus:

Composition of tri-calcic phosphate.	Re-agent employed.	Products of decomposition.
Phosphoric acid } Lime } Lime } Lime }	Water } Water } Sulphuric acid	Monocalcic phosphate and Sulphate of lime, which is land plaster, or gypsum.

in Britain with this substance (apatite) carry with them this one lesson, and I cannot understand how any one can have remained unconvinced. It is tiresome, doubtless, both to my readers and to myself, to keep on repeating the same thing, but so obstinate are some folk that, even now, experiments are being tried in this country with ground apatite; as if people were unwilling to believe that practical agricultural chemists, like Lawes, Voelcker, Jamieson, and Aitken, were capable of conducting the trials to which they have devoted the last twenty-five years. I warn the young farmers of the province that experiments in manures are about the most difficult things to conduct they will ever meet with. Thousands of dollars are wasted every year in such rubbish as Coprogène, or Boomer's system of making manures out of rotten water, and the main thing, comparison, seems to be utterly neglected. "I sowed so many pounds of such a manure on such a field, and I got a good crop." That is what the unthinking man says; *post hoc, ergo propter hoc*, i.e. the crop came *after* the manure, and therefore was caused *by* the manure; as if a man should say: the thunder is heard after the lightning, and therefore the lightning is the cause of the thunder. By the bye I am happy to say that Mr Chas. Gibb, of Abbotsford, has empowered me to say that, after taking great pains to manufacture manure by the Boomer process, he has given it up. As far as he could judge, he tells me, the crops were utterly unaffected by it.

You will please to understand that, when I speak of the utter uselessness of undissolved apatite, I by no means intend to insult the softer forms of mineral phosphate. On the contrary, if I were to use phosphatic manures for turnips, or any other root-crops, I should mix finely ground phosphate with superphosphate. For it is clear, that perfectly manufactured superphosphate is soon exhausted, and that at the most important time of all, namely, when the bulb is beginning to swell, and then a good end would be served by the plant having the undissolved phosphate to fall back upon. If I were to make sulphated bones, I should only employ about 30 lbs. of brown sulphuric acid to the 100 lbs. of bones, to the same end, viz: that after the dissolved part of the bones was worked up in the soil, the undissolved part would go on supporting the plant for the rest of the season. You understand, of course, that mineral phosphates are only valuable in proportion to the phosphoric acid they contain. When, as in the ordinary course of commerce, nitrogen, in some form, is added to superphosphates, they should have specific name given them—ammoniated superphosphates, for instance. It can hardly be necessary to say that superphosphate should never be sown in autumn; it would all be carried off into the nearest river when the snow melts.

Upon the whole, I am inclined to think that, where mineral phosphates are available, I would not dissolve bones in sulphuric acid. I should grind them into the finest meal, and mix them with mineral superphosphate. I saw some very fine bone-meal in Montreal last month; price \$32 a ton. You must not forget that bones contain $4\frac{1}{2}$ 0/10 of ammonia, which is the dearest of all manurial elements, costing as it does, at the Montreal gas-works, no less than 16 cts. a pound. However, as many of us may have bones for next to nothing from a neighbouring butcher, I may as well give the recipe for dissolving them here:

Into a large tub pour twice the quantity of water (in bulk not weight) as you intend to use acid; to this add the bones, broken up as fine as you please, and then pour in the acid and stir the whole up with an iron fork, taking care not to splash yourself. Of brown sulphuric acid, equal in weight to 1.70 of its bulk of water, 50 lbs will be wanted for 100 lbs of bones, but, as I said before, I should try 30 lbs if the bones are ground so that no piece is larger than a small pea.

You will thus have a most valuable manure, consisting of superphosphate, undissolved phosphate, and ammonia. (1) An average sample of genuine dissolved bones contains about 30 0/10 of phosphates, 20 0/10 of which are soluble in water, and $2\frac{1}{2}$ 0/10 of ammonia; a first class mineral superphosphate contains more than 30 0/10 of soluble phosphates, but no ammonia at all, and as all crops demand nitrogen in some form, either as nitrates or otherwise, it seems to me that, for those who are desirous of knowing what they are about, it would be wise to buy each constituent separately; for example: 1800 lbs of mineral superphosphate and 200 lbs of sulphate of ammonia would actually contain more soluble phosphate and ammonia than a ton of dissolved bones. This with a few bushels of ashes, and, for clover, lucerne and other leguminous plants, a barrel or so of plaster (sulphate of lime) would be the ideal manure for this province (2)—as for your special manures, they are all absurdities, and if you try them, you will suffer for it.

As we are upon the subject of nitrate of soda, for the moment (v. note 2), I take the opportunity of saying that you will probably hear this manure talked of as a stimulant. This, again, is nonsense. "Nitric acid," says Mr Lawes, in his evidence before the Royal Commission on agricultural depression, "Nitric acid is the essential manure. It is the great food of all plants in all soils. It is *not* a stimulant at all, really; it is one of the most essential elements of food there is. With our own food we may overfeed a person, for instance, if you give a person butter without any bread, you may call that a stimulant if you like, but you would kill him. Nitrate of soda is no more a stimulant than butter without bread is a stimulant; it is an essential article of food." And all forms of nitrogen, as ammonia &c., come under the same category, they are all honest, genuine plant-food. I am not, upon the whole, an advocate for the use of salt as a manure; but it will not be unbeneficial when using heavy doses of nitrogenous manures on grain crops to mix a moderate quantity of salt with them: the effect will be to check the extra growth of straw, without diminishing the extra yield of grain.

There is a great want in this province—a cheap sulphuric acid—and there is no reason why the want should not be supplied. With the copper pyrites from the mines in the Eastern Townships, there should be no difficulty in making, and selling at a fair profit, brown acid for a cent and a half per pound; with this and our own apatite, so rich in phosphoric acid, a good superphosphate might be put on the market at \$15 a ton, which with, as we saw above, a couple of hundred pounds of sulphate of ammonia, a few bushels of ashes, and a barrel of plaster, would furnish a manure for any crop we may wish to grow at a very moderate price, say, \$20 a ton:

One ton of superphosphate.....	\$15.00
Two hundred pounds of sulph. am.....	8.00
Plaster.....	3.00
20 bushels of ashes.....	4.00
	30.00

The mixture would weigh about 3500 lbs., and one third of it, or from 1000 lbs. to 1200 lbs., would be as good a dressing for an acre of land as one could desire, and the cost of it only \$6.66 per acre! ARTHUR R. JENNER FURST.

(1) The damp mixture must be dried by mixing with ashes, road dust, or black earth.

(2) The superphosphate, plaster, and ashes may be mixed; but I should sow the sulphate of ammonia by itself, at twice, after the crop is up, if on grass, as soon as the land will bear treading. It, as well as nitrate of soda, is very soluble, and in wet seasons, in Britain, soon vanishes; it is more likely to stand here.

The history of all civilized nations has its transition periods as regards every department of life. The habits of to-day differ materially from those of one hundred years ago, and the next century will no doubt revolutionize much, which the present holds sacred and unalterable. Science, in its onward march, is making rapid strides, and society in every sphere is affected thereby. Agriculture as a distinct branch of science, crude though it always has been, and still is, to the masses, affords in the history of its development lessons worthy of close attention and of careful consideration. I shall not take up your space by narrating the revolutions in agricultural practice connected with the great nations of antiquity; either shall I stop to show the intimate connection of the nation's prosperity with the prosperity of the husband-man, but I pass on to the consideration of circumstances peculiarly our own, and coming within the scope of our own observation.

As an agricultural country, England, to-day, is far in advance of the system which obtained there one hundred years ago. Her scant acres demand a progressive tillage to meet, in part, the wants of her increasing population and wealthy landlords; but, with all her higher intellectual culture, England, as a food producing country, cannot compare with China or Japan. Her manufactured goods reach every part of the globe, and, in return, food is brought for her manufacturing people, and her farmers and landlords are not taught to produce for the nation. So long as the East and West offer fields rich in plant food from which to draw large crops, her demands will be supplied, but at the expense of the soil so ravaged. Should the time arrive when these countries shall succumb, as the consequence of the ravaging system, a revolution in the customs of her people must inevitably follow. In this province of Quebec the pioneer period is fast passing away, when muscular men, only, were required to fell the forests and reduce the wilderness to the necessities of civilized life. These men did a noble work, and a virgin soil rewarded their labours with abundant harvests. Time passes; the products of the soil year by year diminish; bad seasons, diseases, and pests, follow; and the farmer never ceases to lament over the crops he "used to grow," forgetting that the soil, like himself, is becoming exhausted and a fit subject for attacks from its natural enemies. This is the dark period. We are now in it, and although it has dealt kindly with us as a whole, there is many an aged man, whose sons have been enticed to the Elysian fields of the West wishing to sell the old homestead for little more than the buildings cost and can find no purchaser even at that price. This is by no means an overdrawn picture; neither is it as discouraging as it seems. The history of every agricultural country, England included, has a similar chapter: Michigan, Iowa, Minnesota, and many of the Middle and Western States, are now passing through a like experience. The average wheat yield has gradually diminished from 30 to 12 bush. per acre, through the system of soil spoliation. Manitoba and the great North West offer, no doubt, peculiar advantages at the present time, which appear to shine with a brilliancy brighter than the Crimean war, and the great railroad systems being built at that time, shed on the prosperity of Ontario twenty-eight years ago. History will repeat itself, and thirty years hence the fertile fields of these new provinces will exhibit features similar to those of the older provinces to-day.

We, in Quebec, have every thing in our favor, if intelligence is brought to the assistance of willing hands. The world's great markets are nearer to us than to any of the agricultural provinces of the Dominion. The yield of our virgin soil is equally good; our climate in many respects superior, and if our soil were made to produce its normal quantity, agricultural capitalists from Europe would gladly

settle among us, and no man's farm would go a begging for a purchaser at its true value. To accomplish such a result our successful farmers, i. e., our money making farmers, must revolutionize their system of investments; and, instead of robbing their own land to put a mortgage on another's at a high rate of interest, they must invest their surplus capital on their own farms, and if this be done with an intelligent knowledge of cause and effect, the returns will be paid as regularly and as fully as the interest on any mortgage, besides the satisfaction and comfort which is acquired, and acquired in no other way, by the doing of every thing well. Why do young men go west? Simply because we have not enough of scientific men in our rural districts, to lend that charm and profit to farming which it deserves. They learn little more of the science than "hard work and rigid economy." Every year adds to the number of those who are striving to elevate the standard of our farming operations; but the masses move slowly. The first step is to convince them that superior cultivation always pays. Consider the one item of freight, which must be paid by the producer: (1) 30 bush. of wheat is a good western yield per acre, and by good cultivation that amount can be produced here. The carriage of these 30 bush. from Minnesota, or Manitoba to Montreal is \$6, which is a fair interest on \$100, and capitalizes that amount, so that land here producing the yield given above is worth \$100 per acre more than land producing the same return in the West, other circumstances being equal: but as I have already stated, the other circumstances are mostly in our favour. Schools, literature, and legislation, are taking up this great work and their combined influences are being felt. To raise our provincial wealth to its real value will require both time and energy. Our agricultural societies are composed of the average farmers, and no doubt they have been beneficial; but it seems to me that the time has arrived, when they should have more extended objects in view than giving premiums to the man exhibiting the largest cow or the fattest ox. Why should not each society become a mutual educational club, seeking information from time to time upon all subjects connected with the farm? This I am aware has in some places been tried, but after a short trial has fallen into disuse. The Council of Agriculture could, however, soon put the matter on a permanent footing, by granting public moneys only on the condition that regular meetings were held, and subjects discussed of interest to agriculturalists. I offer the suggestion for the consideration of the proper authorities and at a future time shall take up other matters tending to improve our system of farming, and, as a direct consequence, increase our national wealth. JOHN EWING,

ST. FRANCIS AGRICULTURAL COLLEGE.

Richmond P. Q., March 16, 1882.

OUR ENGRAVINGS.

The Parade of Shire-stallions.—Spark, the property of Mr Gilbey, for which he gave £1000, is the principal feature in this well designed picture. As Dr MacEchran was just enough to say in the last number of the Journal, "the most noted breeders in Scotland import Shire-mares, and cross them with the best horses in the country, thus producing better horses than the pure Clydes.".....They are marvellous animals, and it is no wonder that the French said of them, at the great Paris exposition of 1878, "they are not horses but elephants."

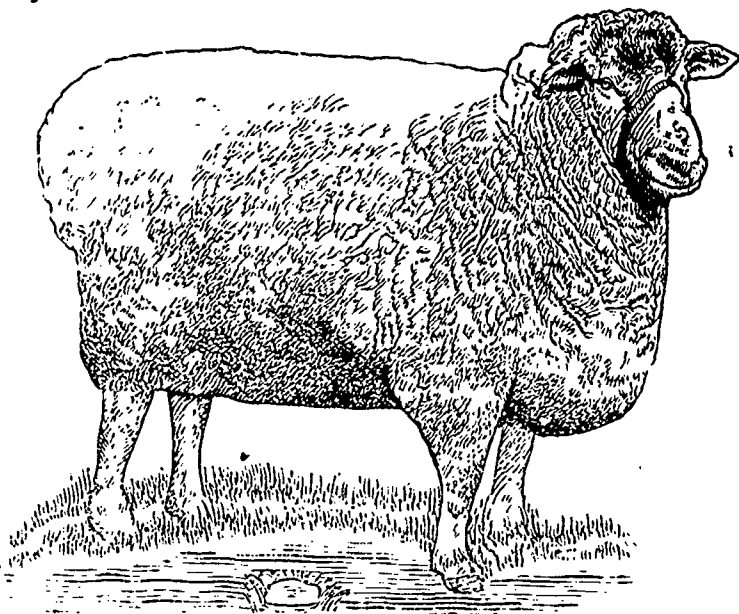
Cleveland Bay Stallion.—The heavy London "coaches," "landaus," and "chariots," the three carriages *de luxe*, were all drawn by these powerful beasts, when I first recollect them. The Queen had some twenty-five pairs; fine, upstand-

(1) With due deference to the writer, I must say that the consumer invariably pays the freight. A. R. J. F.

ing, showy horses, darkish bay, with black points, and good "knee action." The taste is now for a better bred animal, and I doubt if one could find a dozen pure-bred Cleveland stallions, though one searched Yorkshire through. I have only seen one, so called, Cleveland Bay in this country (at Durham), and he was a mere pony, comparatively speaking. They stood from 16½ to 17 hands high, and weighed from 1400 lbs to 1500 lbs, that is if my memory of their build does not deceive me; but I must confess that I never saw or heard of one being put on the scales. They never weigh animals in England, and a great mistake it is. I hear, however, that the question is being discussed, and will probably be seriously considered. All the cattle-dealers are strongly opposed to it.

COTSWOLD RAM.

Since the time when Edward the First made a present of Cotswolds to Alphonso, King of Spain, these long-woolled sheep have held their pre-eminence. On the bleak hills, with



Cotswold Ram.

an "eight months' winter, and four too cold for summer," the Hill flockmasters claim for their favourites the first position for hardihood and ability to defy the rain and wind that pass over the bleak Cotswolds. The Cotswold sheep are of two classes—white and grey-faced. For the latter, their owners receive a higher price in the meat market, and, in consequence of this, grey-faced rams are selected, with the heaviest fleeces, to match with the white-faced ewes. For the white-faces, pedigree breeders claim a purer descent, and rigidly weed out the dark-faced specimens. The heavy fleece of the Cotswold sheep is said to enable it not only to defy the cold, but to resist the wet, and enable the flocks to lie down and rest, however bad the "lair." The Hill farmers are generous feeders, and keep up the condition of their holdings, materially, by the use of oaks and corn to the sheep. Sainfoin and vetches are largely grown on the hills. The former is allowed to stand two or three years, the last crop being mown and stacked in the field, where it remains until the next crop of turnips, with which it is consumed on the land, from racks, by the sheep. If white turnips are grown, the crop is preceded by vetches, also eaten on the land. Long prices have been realised by the Cotswold ram breeders.

Amongst these we may mention that 210 gs. was given for one ram, 220 gs. for another, while 126 gs. and 100 gs. were paid for two others.

Thomas Harrow—at work as a pulveriser (See. p. 13).

Dawes' sale of Ayrshire cattle.—This sale takes place on the 27th of April. I hope the prices will be satisfactory. I see that at Mr Andrew Allan's auction, bulls averaged \$47, cows \$56, and 2 years old heifers \$33; hardly as much as grade cattle fetched at Mr Muir's sale, at St. Laurent, the week before. I foresaw something of this sort a long time ago, as any one may observe who takes the trouble to refer to p. 83, vol. 2—Oct. 1880.

The Vermont Board of Agriculture.

We copy from our excellent exchange, the "Vermont Watchman," whose agricultural editor, Dr Hoskins, is so favorably known in our province, the following article.

It speaks well for the agricultural spirit of Vermont, when a whole board of agriculture, secretary and all, will call and direct two days' meetings for agricultural discussions, in the different parts of the state, and for a whole winter.

It speaks well also for the individual members of the board, when each one can take up a distinct subject and do it justice. And as to repeating the same lecture over from place to place, there is no objection, as long as the paper is what it should be, and the audience, a new one.

We know something of the "wear and tear," and all the difficulties and troubles of such rambulations, having visited and spoken in more than three hundred different places, and we can heartily join in the commendations and encomiums addressed to the Vermont board by our able and just contemporary.

"We think a good word has been well earned by our board of agriculture, members and secretary alike, in their work during the winter just past. Any one who has had experience in riding over the State, holding meetings of two days each in a week, knows that there is work in it. Unless induced by "the honor of the thing," or a desire to see a good deal of the State and of the people, we see little to entice any one to accept a place on the board. The pay hardly covers the expenses and loss of time, to say nothing of labor.

Those who complain that the members of the board do not have a fresh subject studied up to address the people on at every meeting, little know the wear and tear attendant upon the mere getting around from place to place. Much of the travel has to be done at night, and eating different kinds of food, and sleeping away from home in a different bed every night, is pretty apt to get middle-aged men, such as the board is made up of, too much "out of fix" to do full justice to old subjects, much less to study up new ones. If the state could afford to pay members enough so that they could devote time when they are at home to study up subjects of interest to present at the meetings, greater variety might be given to the proceedings. But in fact, our experience in such matters has led us to the conclusion that one paper or address at a session is enough. These should be on practical subjects, and the rest of the session should be given to discussion. "All men know more than one man," and these discussions are usually the most interesting and useful parts of the proceedings.

As for the secretary, no man has worked harder, or with a

more earnest purpose of usefulness than Dr. Cutting has worked. Certainly no more capable man for the position is known in the state and it was with a knowledge of that fact that we labored earnestly and long to induce him to accept the place. He pleaded with us that we could not afford to neglect his business, that he knew he would be severely criticised, no matter what he did, and many other reasons, and we were truly glad when we heard that he had accepted. He is now ill, in consequence of his labors during the winter, and from the tone of his letters we fear he is also "sick of the job." But we trust rest will renew his courage, and that the consciousness of usefulness, which the approval of the most intelligent farmers of the state must give him, will be a stimulus (such as the little salary attached to his place would give to no man) to continue in the field. A man of such varied accomplishments and earnest devotion to useful work is hard to find. Let us cherish him."

By-Products of the Dairy.

Referring to reports of dairy yields, Mr. Arms, in a private letter, says: I notice that the dairymen figure up quite a margin on calves, pork, etc., etc., which, I think, does not come directly under the head of butter, but of farm products. In that line I can figure some myself, such as feeding new milk to lambs, calves and young pigs, but will content myself with a calf raised, also one fatted, both drinking skim milk until cold weather. The one killed (being one of the good-for-nothing for beef grade Jerseys) dressed three hundred twenty seven and one-half pounds at seven and one-half months old, with twenty pounds of rough tallow, which I think quite respectable for the despised race. The meat is most delicious, liked by those who ate of it as well as chicken. I noticed that Mr. Stevens' Shorthorn calves, mentioned in the last paper, dressed "about" four hundred pounds each, at ten months old. This "about" admits of quite a variation. I also sold during the year seven hundred seventeen pounds of pork and salted three hundred thirty pounds, which was made largely on milk (being grade Essex), besides pelts, etc.

DR. HOSKINS.

The cultivation of Corn.

While corn can be grown very much more cheaply on a large scale, and with machine culture, than in small plots with hand tillage, yet even where the latter method is practised, either from choice or necessity, a great economy can be effected by the application of improved rules. On large fields, by the use of the sulky plow, mechanical manure, and fertilizer spreaders, machine planters and cultivators, and tillage harrows, hand-work is entirely dispensed with, and a single

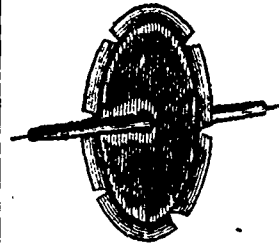


Stooking-horse.

[The corn is placed in the angles between the pole and the stick, and when the stook is bound, the stick is pulled out and the horse is drawn forward to the place of the next stook].

man, with a pair of horses, can do all that is necessary to be done, up to harvest, on ten or twenty acres. In this way a skilful farmer may produce his corn at a cost not exceeding half the average cost of Western corn in Eastern markets. If there were any way to get rid of the rest of the hand work, in harvesting and husking, corn might easily be grown on our light soils for twenty cents a bushel. I am led by some experience and observation to believe that, for feeding purposes, it will yet be found entirely practicable to ensilage a crop of

corn at the time it would usually be cut up—when the grain begins to glaze—and in this way escape the cost of stooking, husking, shelling, and grinding, and have at the same time a much more concentrated and perfect feeding material than that made by ensilaging the coarse and immature stalks of the large southern corn, as is now practised. Experiments already made show that the ears, when cut up fine with the stalks, keep in a silo without either moulding or decaying.

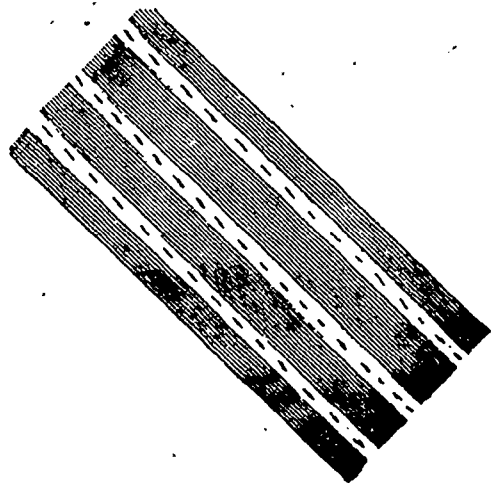


Wheel of Barrow-marker.

Their presence in the ensilage certainly adds much to its nutritive quality, and will make it very nearly if not quite a perfect food. The whole plant is thus utilized as feeding material at the least possible cost, and fed in the most accept able form to stock, being consumed without the least waste. I think we have, in this form, a cheap food which will go near to place us on an equality

with the West, making allowance for the cost of transportation in our favor.

But in this article I propose, (in accordance with your request, Mr. Editor), to speak chiefly of the economical culture of corn in small plots, as usually grown by farmers in New England and Quebec. Having been trained in this method, and heartily hating it from boyhood, I have always been wide awake to anything that would lessen the labor attending it, in my young days to save my "poor back," and later to spare my pocket. This is the way I would go to work to grow an acre of corn. In the fall I would choose a piece of green-sward that needed renewing, and draw out and spread upon it a liberal dressing of barn-yard manure. There is no need of being sparing in this application. In the first place you want as big a crop of corn as you can get, seeing that the plowing and hoeing will be the same and no more for 75 bushels than for 20 bushels. In the second

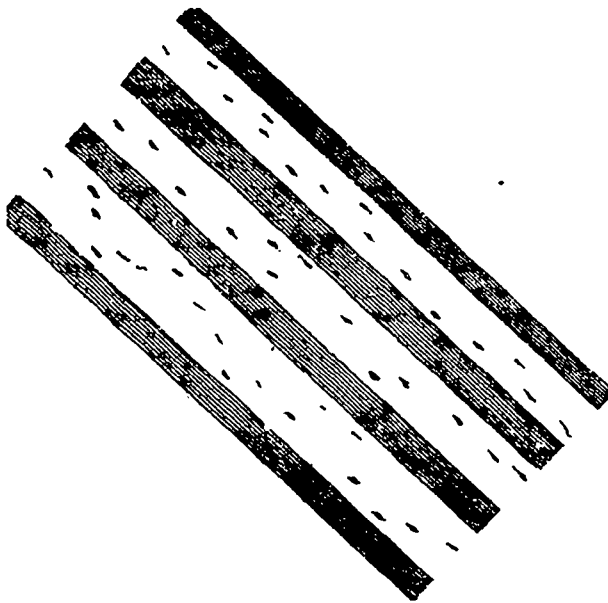


[Showing how nearly all the hoeing can be done with a horse-doe when the rows are straight and even.]

place, whatever is to be the succeeding crop, whether potatoes or grain, it will require and utilize all the fertility that the corn leaves. I draw out and spread my manure in the fall, so that the fall rains and the melting snow will extract its richness and distribute it evenly through the soil. Then any corn root, wherever it may ramble, will find pasture. In the selection of this plot we should choose a light soil, or if heavy then well underdrained, and the piece should be as nearly level as possible.

In the spring, plow the ground five inches deep, and, in light soils, lay the furrows flat, if you have a plow that will do it. Then you will have no trouble with grass. If plowed with lap furrows, a disk harrow or an Acme pulverising harrow is necessary, to make a good seed-bed. At any rate, harrow as smooth and level as possible. Before the last harrowing, if a first rate crop is wanted, sow on from 25 to 50 bushels of good unleached wood ashes. This is especially desirable for a light soil, and if the larger quantity is used, the grass on the land in after years will show its presence distinctly up to the line where the ashing ended.

The final harrowing having been given, then comes the planting. Every thing here should be so managed as to save labor. If you intend to use a horse-hoe or cultivator in tilling between the rows, much work may be saved by having the rows perfectly straight and at an equal distance asunder, so that the implement may run close to the corn. The easiest way that I know to secure this is to use a marker of some sort. The most general custom is to plant in hills. Many farmers try to have them in line only one way, but by cross-marking they may be had in line both ways, so as to be cultivated length-wise and cross-wise, and even diagonally, if desired. But unless the ground is very weedy, a larger crop



[Showing how much is left to do by hand, when the rows are crooked and uneven].

can be grown by planting in drills. After trying all ways, I have settled on what may be called a compromise drill, which combines the advantages of both hill and drill planting.

The land is marked off in rows 3 or 3½ feet asunder. To secure these perfectly straight, as well as at equal distances, is not very easy when the common marker drawn by a horse is used. I have taken a lesson from garden-work, and use a light wheelbarrow as a marker, removing the wheel and substituting a plank wheel with bevelled (V shaped) edge. Then I stretch a light line (made of wool twine or marline) where I want to have the first row. I run the wheelbarrow carefully by the side of the line, and the wheel makes a mark as straight as the line, and as deep as you want to plant corn, the depth being regulated by weighting the wheelbarrow. By making the circumference of the wheel a certain number of feet, and cutting out a notch at every foot, your drill will be spaced off so that a child can drop the seed at perfectly even distances and cover it with his foot. Two kernels should be

dropped close beside each of the marks made by the notches in the wheel. This is better than regular drilling, where one kernel is placed every six inches, because it leaves room to hoe between the plants in the row.

Thus the first row is made. To mark the succeeding rows there must be a strip of board, or a round stick, nailed across the wheelbarrow and extending on each side of the centre a little more than the proposed width between the rows. At the desired distance from the centre (which is opposite the wheel), drive in a nail, and hang upon the nail a light chain long enough to drag two feet on the ground. This chain will mark the place for the next row. When you get to the end of the first row return in the mark made by the chain, first shifting the chain to the other end of the stick to mark the next row. The chain must of course be shifted in this way at each turn. A man and two children can thus plant an acre of corn in an hour or two.

The corn should be cultivated and hoed as soon as it is up, and again at intervals no longer than ten days, until it meets in the row. Large weeds that escaped in hoeing should be pulled out by hand, and not be allowed to go to seed among the corn.

When the corn is cut up, a stooking-horse should be used, and the stooks firmly bound with straw near the top. It is not desirable to make large stooks. Taking five rows, and making the stooks in the place of the middle row, from 75 to 100 stalks is enough for a stook. Three weeks is usually long enough to let the corn stand in stooks. It ought to be husked early, so as to be well dried before freezing weather. The best way to preserve the fodder is to stand the stooks, after Luskung, upright on an open floor in a shed loft where the wind can blow up through them. Another way is to hang them across poles laid upon the "great beams" of the barn. In either of these ways they cure perfectly; but laid in piles they mould and become rotten. When large fields of corn are grown, the fodder may be stacked upon a raised platform, a "chimney" being made in the centre of the stack by filling a large sack with straw and drawing it up as the stack is built. There are several other ways of storing corn-fodder known to farmers, but generally enough care is not used in the preservation of this valuable feed. In feeding such forage to cows in milk better results are obtained by cutting it short, packing the pieces in a large box with meal or bran scattered among them, treading it all down hard, and wetting it with boiling water. The box is then covered, and fodder thus prepared at night will be found in the morning still warm and very acceptable to the cows, increasing the yield of milk considerably over the same quantity of feed fed to them in the dry state. J. HOSKINS.

Dear Sir,—So much has been written in the way of instruction, in the different agricultural papers of Canada and the United States, for the benefit of cheese makers, that it seems almost superfluous to crowd anything more into print on the subject. But when we remember that there is a heavy loss to the country every year, amounting to hundreds of thousands of dollars, through faulty management of the milk, we feel justified in calling the attention of cheese makers to some of the causes of failure to produce a prime article.

The general rules of cheese making are supposed to be understood by all cheese makers, and if they were each one to give the formula in writing for making full cream cheese, we should see a striking uniformity in the whole, and we should be still in the dark as to the cause of such a wide difference in the quality of the product, all made from the same material, and by the same rules. A very wise man

once sang "Take us the foxes, the little foxes that spoil the vines" &c., and it would be an excellent motto for cheese makers if we simply changed "foxes" into "faults," and "vines" into "cheese," better still: "let us discover the little faults that spoil our cheese."

Milk should be left uncovered when first put into the can, in order to cool somewhat before starting on the road to the factory; and consequently, milk drawers should not be allowed to start too early. After milk is cooled to about the temperature of the surrounding atmosphere, there is nothing gained by leaving it uncovered, and if water or ice is used to cool it down to a low temperature, care should be taken, if the air surrounding it is not very pure, to cover it as soon as it is as cool as the atmosphere; for, as soon as the milk becomes cooler than the air about it, the impurities in the air, together with its moisture, are condensed upon the cooler surface of the milk, and the milk consequently partakes of all the bad odors with which the atmosphere may be tainted.

Arrived at the factory, great care should be taken when heating up the milk not to stir it too much: just enough to keep the cream from rising, and not enough to churn it, as is often done to such an extent that the butter gathers in lumps as large as beans at the side of the vat, to the great damage of the quality of the cheese, and loss in average yield. Now in regard to rennet, there is more cheese spoiled by the improper use of rennet than by any other means.

It is a great advantage to use the "Extract of Rennet" in every factory where the cheese maker does not know how to prepare, or is too negligent to take the proper care in preparing, the liquid from rennets; but the cost of rennets is not more than one fourth of the cost of the extract, and it will pay well to prepare rennet according to the following directions.

Have two rennet jars, of stone or glass, and these should hold from 15 to 20 gallons each, and, at least one week before the factory opens, take of the rennets what quantity you think will be required for ten days use, estimating one good rennet to be sufficient for 400 pounds of cheese, and put them in jar No. 1, throw in an ounce of salt for each rennet and fill up the jar $\frac{3}{4}$ full of pure water, blood-warm. Leave the jar in a warm place; rub the rennets thoroughly with the hands several times the first day; and the next day, add salt enough that there will be some left undissolved in the bottom of the jar; and then set it in a cool place.

Take especial pains, when rubbing the rennets, to notice if any are of a greenish color, and if so throw all such out, and replace with new ones; for one such tainted rennet is enough to injure the whole batch seriously, and spoil the cheese; for it is not reasonable to suppose, that a clean-flavored, long keeping cheese, can be produced if extract of carrion be introduced with the rennets, and tainted rennets are nothing more of less than such, and if wooden rennet tubs are used the taint will soon be just as bad.

The above may seem superfluous language to use in this place; but in the majority of the factories I have visited in the past years of my experience, the rennet liquid had the same abominable stench of decayed meat, and I am surprised that cheese containing it keeps as long and sells as well as it really does.

After the rennet has been prepared as above directed, one week, take jar No. 2 and prepare another batch in the same way, observing the same care, and follow this plan throughout the season; always using the oldest; thus the cheese maker has always the liquid rennet of uniform strength, and by preparing it in this way, will save seventy-five per cent on the cost of rennet, as compared with the use of imported extract.

I have taken up some space in this description, for I consider this the most mischievous of all the "little foxes that spoil our vines."

When the milk is all right, just so much rennet should be used as will secure the commencement of the thickening of the milk in 20 minutes, if set at 80° F; in 15 minutes, if set at 85°; or in ten minutes if set at 90°; for the same amount of rennet that requires 20 minutes in milk at 80°, will bring it in ten minutes at 90°. When the milk is not right, the judgment and skill of the cheese-maker must guide him. Care should now be taken to cut the curd at the proper time; for if cut too soft the whey will be milky, and if left until too hard, the curd will knot together, and there will be great difficulty in making a fine curd.

In applying the heat, use great care, and do not let the curd stick to the bottom of the vat and scald; as this is another very mischievous little fox, and he will get the start of the cheese maker just while some pretty girl is passing by, or there is something else to attract his attention for just a minute. I wish to bear on the points that are generally neglected, because there has not been importance enough attached to them in the past.

I will pass on to where the curd is salted, and, as the cheese maker says, *ready to put to press*. Take the thermometer, and try the temperature of the curd, and see that it goes to press as near 75 degrees as possible.

If put to press much warmer than that, it will mould so perfect & tight, that the gases cannot escape except by huffing, and cracking the cheese; and if much cooler, it will not mould sufficiently to be firm when cured.

I have often had my attention called by cheese makers to what was to them a mystery, and that was, that cheeses out of the same batch would be very different in appearance on the shelves, and it was owing no doubt to the fact that they put part of the curd to press too warm, then Mr. A, comes in, and stops and talks, while the cheese makers stand and listen, and the curd gets cold. No wonder they are not of the same quality. I lay down this positive rule. No cheese-makers should allow visitors in the factory in working hours: *loungeurs*, at no time.

When the cheeses are taken from the press, handle them carefully and put them on clean smooth shelves, and take care that the temperature of the curing room is kept down as low as 70°; though 60°, is still better if you want a mild and full flavored cheese. If the temperature of the curing room is kept as low as 65° the change on the curd need not be very high, and the whey may be drawn off sweet and this gives a better flavored cheese than can be produced where the curd must be soured sufficient to stand in a curing room, where the temperature varies all way from 70° to 98°, as is actually the case in some instances.

Why, I have seen cheese in curing rooms so hot that the fat was actually running out of them and standing in pools on the floor under the tables.

Now this can easily be avoided by making an under ground passage, and connecting it with the curing room by means of a box passage; when, by putting a good ventilator in the roof, and keeping the door shut, you may have an abundance of cool fresh air, just such as is needed for the cheese, and all at a very small expense. This question of keeping the curing room cool, is a very important one; for no matter how good a cheese may be up to the time of going into the curing room, it is easy to spoil it there, and I have seen as much as five cents per pound loss on cheeses that had no other fault, only they showed the effects of the heat in the process of curing. Let us now strive to correct our faults, and let "*excelsior*" be our motto, and by taking advantage of all our natural advantages, such as climate, feed, cows, and nearness to market, go on and gain the high reputation for our cheese that is within our reach.

J. M. JOCELYN,

VETERINARY DEPARTMENT.

Under the direction of D. McEachran, F. R. C. V. S., Principal of the Montreal Veterinary College, and inspector of Stock for the Canadian Government.

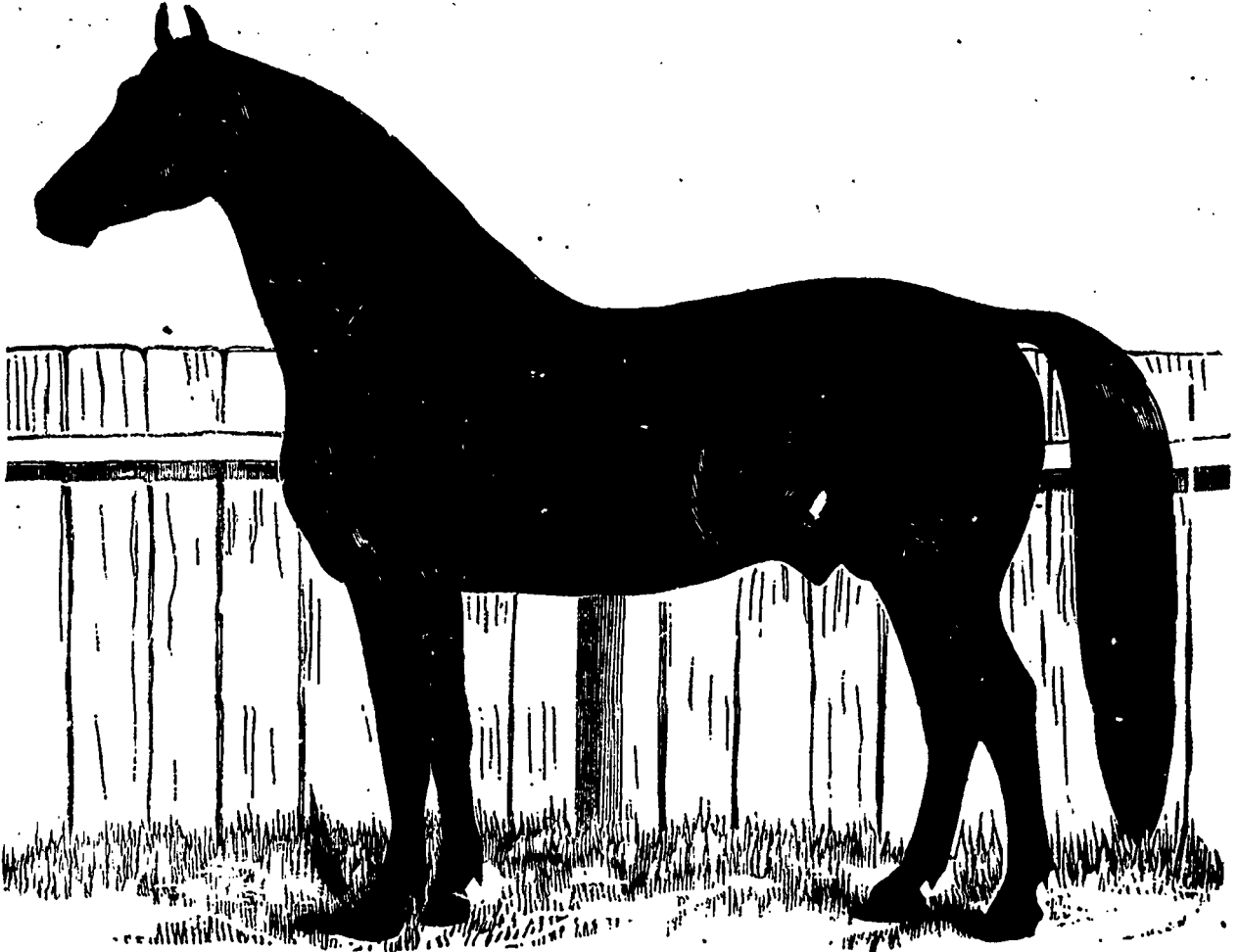
Verminous Bronchitis.

The occurrence of worms. *Filaria Bronchialis*, in the lungs of calves is not uncommon on low lying pasture-lands, which are subject to be flooded during spring and produce symptoms such as described in a former communication. Young stock should not be pastured on *such land* during early summer. The treatment found most successful is the inhalation of turpentine fumes by burning pine shavings over which a few ounces of spirits of turpentine have been poured, in a close pen with a free current of air judiciously admitted so as not to produce under irritation from the fumes, this

tourist in 1878 when the registration of Clydes was first commenced, will show not only the advantages of, but the necessity for, such a register, and, as we have before stated, it is much to be regretted that it was not so managed as to induce all the breeders to enter such of their stock as are eligible. We hope before long to see a Canadian Clydesdale studbook started on a correct basis, as nothing tends to give value to stock more than such a guarantee of pure blood as is furnished by a properly managed studbook.

The Breeding of pedigree Clydesdales.

Is the Clydesdale horse worthy of a pedigree? That is a question often asked in agricultural horse circles, and many



CLEVELAND BAY STALLION.

may be done once a week for a few weeks. Half ounce doses of turpentine should also be administered in six ounces of linseed oil every second day for a week. The calves should be kept dry and warm and be well fed, oil cake should be added to their food. After the cough and other symptoms of bronchial irritation have subsided, give them a dram of sulphate of iron in a pint of oatmeal gruel well sweetened by molasses night and morning for a week.

Clydesdale horses, (continued).

In our last issue we explained the unfortunate circumstances connected with the Clydesdales studbook in Scotland, the following article on the subject from the N. B. Agricul-

a discussion takes place over it. Some weeks ago we shadowed forth in these columns the stage of proceedings that had been reached by the council of the Clydesdale Horse Society, in the direction of recording the past and present ancestry of this noble type of work-horse. Those efforts are the results of the labor of a few individuals whose enthusiasm carries them along a thankless path, supported, no doubt, by a certain number of outsiders, who look on with favor as long as the wind blows in the right direction. So far as we learn, the men who are to get most benefit from this Society, the tenant-farmers of the West of Scotland, have as yet contributed little towards the good cause. We are happy to hear that the indefatigable secretary, Mr. Dykes, has succeeded in tra-

PARADE OF SHIRE - FALLOON'S - ENGLISH CARTHOUSERS.



MUSEMAN

ing the pedigrees of most of the horses whose descent was regarded as obscure when we last wrote on the subject.

Extensive breeders, with capital, energy, and plenty of backing, can always sell their animals; but it is the small farmers with one or two mares, generally animals of rare merit, that are to reap the greatest benefit. A recorded pedigree—a pedigree that stands on black and white, and owes nothing to the good word of anybody—will always bring its value; and, through the agency of a stud book, the purchasers of pure-bred Clydesdales will know where to find them, be they grazing among wide spreading oaks in a rich, verdant park, or dragging the plow on the sloping shores of Kintyre.

For the greater part of a century past, breeders of all classes of live-stock have run upon the idea of blood, and perhaps its true value was never better realized than at present. Over a hundred years ago Hubback (316), the famous bull that stamped every Short-horn he got with a marvellous likeness to himself, was born; and since then the old breed of Teeswater cattle have grown and been improved into the Shorthorns of the present day. The Brothers Colling began the great work, a work that was continued with untiring perseverance and matchless skill by Mr. Bates and Mr. Booth. The system carried out by all those gentlemen and their followers was, to continue on a basis of line breeding. They kept as far as possible to one strain of blood, or, at the most, they worked two or three strains through one another. So with Abram Renick, of Red Rose fame, and so with all breeders of famous Shorthorns. True, some men have sprung up to a showy notoriety through mating good animals together, but their existence has been, as a rule, short lived. If it had been true that it was only an animal of, to outward appearance, rare merit, that was suitable as a bull in a Shorthorn herd, no matter what his ancestry was, a herd book would have been of little use. But the value of a Shorthorn, at least, lies not in his good looks so much as the pedigree that stands below his name in the herd book.

The same rule applies to sheep. Bakewell is said to have improved his Leicesters by a system of in-and-in breeding. On the Cotswold hills the breeders stick to the system, and, amid the grassy glens of the Cheviot range, for generations, the flocks owe that extraordinary family likeness they possess to the influence of careful line breeding. Nor need we go farther than Merton to see the powerful influence of blood upon sheep stock, where there exists a flock of Border Leicesters far in advance of any other, simply through the potent influence of family blood.

If, then, recorded pedigrees are of such enormous value—in fact, the very keystone of the arch, as far as other classes of stock are concerned—is it not fair to infer that one powerful incentive to the improvement of our agricultural horses will be a stud book for the Clydesdale, from which class many of the stallions used both at home and abroad are drawn? How often do we see a wretched mother produce a noble-looking son when mated with a good horse; but when this latter horse is used as a stock-getter, is not the result generally disappointment and blighted hopes? It is a fact seldom disputed that, as far as appearance is concerned, the finest and best-looking Shorthorns are often produced by linebred bulls from short-pedigreed cows; but few breeders of any repute would use those animals. They are beautiful to look upon, but they do not leave that preponderating influence upon their stock which is necessary for successful breeding. In the same manner we could name many Scotch horses, Clydesdales so-called, that sprang from bad blood on one side or other, which, as stock-getters, have proved of no use, and have done an immense amount of harm.

When, however, the stud book is published, breeders can find out the horses which possess that nobility of ancestry

which will be potent in their veins, and which, in nine cases out of ten, they will impress upon their progeny. Let the breeders of Scotland take a lesson from their brethren—pick out the good and leave behind the bad results. Pedigree, we must remember, is not only a record of mere names, it represents the work of years. It is the outcome of long labor and skilful management, and it is a powerful check upon deceit and knavery. Hitherto, a stranger going to buy Clydesdales in Scotland had no check on the pedigrees. He was entirely at the mercy of the dealer or seller as to lineage. The practice of calling everything a Clydesdale, whether it was bred from a Shire, or a Highland pony, if it is only good enough looking, has at length filled the minds of many buyers of this far-famed class of stock with distrust. Nothing will so soon elevate the ideas of purchasers, or bring back confidence so readily, as the history and descent of a horse placed upon paper. Breeders and sellers are then upon their oath; and we pity the person who tries to palm off a false pedigree!

Not many weeks ago, sitting in the company of a well-known breeder of these horses, our conversation turned upon a certain sale of this stock held in spring. Some of the mares went, in his idea, very cheap, and he concluded by saying, "If they could only have called them pure-bred Clydesdales, what a price they would have made!" And true it was, for every animal with the semblance of a pedigree, went very dear. Such and other facts are convincing that the value of blood has a least got fairly rooted in the minds of Scotch breeders of horses. It will only take some careful nursing to make this grain of seed spring into a mighty tree. But we must caution our readers that there is not a large supply of really good blood in the country. It is not the sire and dam of an animal being of rare excellence that can stamp it as of good and pure blood. You must go further back—back to the grandams and the great grandams, and see if they were well-bred and really meritorious animals. It is not necessary that they are line bred, or have that relationship in blood which some people like in sheep and cattle, but every dam, for generations before, should have been a fair, good animal, to entitle the produce of the present day to be called pure-bred, or, rather, well-bred. Such blood is very scarce, and the more reason it should be looked after. We will, from a well-known book, the following sentence as a guide for Scotch breeders who are only beginning the battle of blood and merit versus individual merit alone: "The immense value of absolutely pure blood is by no means factitious, as it is the only trustworthy means of getting a certain stamp of animal; but the very limited supply of this sort of blood will lead to dangerous results, unless great care is used."

What, then, is pure blood? that is the question; and a difficult question it is to answer, as far as the Clydesdale is concerned. From glimpses, however, at some of the pedigrees to be published in the first volume, we have reason to believe that there are horses that have been bred for generations in the west of Scotland, and have no crosses in their line. They are descended from horses that might be called the fathers of the Clydesdale. So far back, at least, do those pedigrees go, that we may safely consider the animals pure-bred Clydesdales. But we have little doubt that, sooner or later, for successful horse breeding, the system of in-and-in breeding which has elevated the character of the Shorthorns and most other classes of live stock, will come into practice. Till then many of the leaps will be in the dark.—*North British Agriculturist.*

THE PERCHERON.

Next in importance to the Clydesdale, as a draught horse, is the Percheron. Those of our readers who have visited Paris must have had their attention arrested by the magnificent large gray or black horses, mostly stallions, used in the omnibuses and commercial waggons, in pairs or fours, which go under the name of Percherons, and of which a large number have been imported into Canada, and are constantly being imported to the Western States, especially Iowa and Illinois, where they are called, Norman-Percherons or Percheron-Normans, and are by many considered superior to the Clydes. The experience of Canadian farmers however in crossing the native French Canadian mares, has not been favorable to them as sires.

The following extract from the report of the two officers of the French army, Baron F. de Kerbrech, Colonel of the twenty third regiment of Dragoons, and Captain Henri de la Chère, of the thirteenth regiment of Dragoons, who were commissioned to report on Canadian and American horses in the fall of 1880, will surprise many who have hitherto looked on Percherons as a distinct breed.

"The Percheron is used a great deal in the United States and Canada: if as a working horse, he renders good service; it must, be acknowledged, however annoying to our national pride, that as a stallion he is not much appreciated in Canada, and has not given much satisfaction in the United States either. There is not, we know, any Percheron race, properly so called, and the animals of this kind derive their name simply from the locality in which they have been raised, but into which some of them were only imported from neighbouring districts. The Norman horse therefore derives his individual qualities, not from his origin or his blood, but from the soil where he passes his first years,—from the grass and the grain he eats, the air he breathes and the training he receives in the place.

For these reasons he does not turn out well when brought as a breeder into a colder country, and put on less nutritive grasses than those to which he has been accustomed, and above all when he is crossed with cold blooded, that is, lymphatic, animals.

His offspring resemble him certainly; they have the same gait and the same bulk, but they have not the same constitution, and their backs and quarters are often deficient. Still, the Percheron stallion is used for covering a great many mares, and he is serviceable because his offspring are eminently adapted for draught purposes, and with such outlines of roads as are often found in America, nothing but a succession of frightful pits, ruts, and mudholes, the farmer requires horses of weight and great muscular power.

(To be continued.)

ASH-LEAVED MAPLE.

(*L'érable à Giguères.*)

A maple that grows fast enough to yield sugar at six years old!!!

This seems an impossibility; the first time I ever heard of it was from some perfectly trustworthy people, who, last autumn, brought some seeds of this tree from Minnesota, and had received most positive statements as to its wonderful precocity.

I can only find one person, Mr. Pierre Brissette, of Saint-Barthélemy, who can confirm these accounts of his own proper experience; he has grown the tree for several years, and distinguishes it by the name of *plaine au sirop blanc*; scientifically it is the *Acer Negundo*, called, in English, the *ash-leaved maple*, or *box elder*. The report from the West of its marvellous growth are fully confirmed by Mr. Bris-

sette; at six years from the seed, it attains the height of twenty feet, by six inches in diameter. The same gentleman says the seeds should be sown an inch and a half deep, and fifteen inches between the rows; the soil should be well prepared and well hoed, and after two years the young trees should be transplanted. Mr. Brissette has not actually made sugar from his young trees, but this spring he tapped some of the older ones, and found the sap both very sweet and abundant, and I trust before long to receive from him encouraging reports as to the quantity and quality of the sugar they produce.

In the interesting treatise by Mr. Chas. Gibb, of Abbotsford, on "Ornamental Trees," in the March number of the Journal, he speaks of the *Acer Negundo* or *ash-leaved maple* as a tree fully able to stand our severe climate. It is probable that they would be still hardier, if they were grown here from seed, instead of being imported as young trees from the Rochester nurseries.

Looking over my books for information, I observe that Michaux (N. Am. Sylva, vol. 1, p. 172) speaks of the precocious growth of the *érable à Giguères*, which, says he, is the name given by the French to the *Acer Negundo*; but he adds, that it is an error to suppose that sugar can be made from its sap. Nuttall, who, after a lapse of 50 years, published a supplement to Michaux's work (under the same title) says, positively, that the Croas Indians make sugar from the sap of the *ash-leaved maple*.

I have no time to make further inquiries, but we have enough information to make it worth our while to institute experiments on this tree: they need not be expensive, and the results promise to be important. All May is before us; and I believe that Mr. Brissette has plenty of seed to spare besides several thousands of young trees for sale at a moderate price.

I hope your readers will set about making experiments in this form of cultivation as soon as the weather will permit: life is short, let us not lose a year.

W. G. JOLY.

Quebec, 18th April 1882.

P. S.—I hear from M. Brissette that his trees have already given him enough sap to enable him to define the quality of the syrup, which, he says, resembles honey as to colour, but as to flavour it is very much superior. He has, not as yet, made any sugar, neither does he intend to make any this spring, seeing how very backward the season is. M. Brissette states that he has not seen any sugar made from this sort of maple, but the person who sold him the trees has made sugar from their sap, and found it white and of good quality: W. G. J.

Dear Sir,—In the last issue of the French Journal I find stated, in an article on vineiculture, over the signature of J. C. Chapais, that the Beaconsfield, or Champion, is 15 days later in ripening its fruit than the Hartford Prolific, though Messrs Bush, Son and Mussen, of St. Louis, who are generally admitted to be the best authorities in the States, say that the Hartford Prolific is 15 days later than the Champion or Beaconsfield. As regards the quality of the fruit (Beaconsfield), I will not pretend that there is not better fruit. Yet it fetched 10c per lb last season, and, as an early ripener, I have yet to learn that it can be beaten—By causing this letter to appear in both the French and English editions of your paper, you will confer a favor on your obedient and obliged servant.

JOHN NELSON, JR.

Montreal, 18th April, 1882.

FRUIT EVAPORATION.

Among the many recent improvements in the line of preserving food, there is none which promises to add more to the revenue of the farmer and gardener than the evaporation of fruit. All of us can remember what a laborious, unsatisfactory and unprofitable process drying apples, pumpkins and berries used to be; what hard work it involved, and in what a conglomeration of dirt and spoilt fruit it resulted. It was at best a bad job, and the best that could be said in its favor was that it furnished an excuse for an occasional paring-bee, and a poor substitute for green fruit in a season when nothing better could be had. Nobody ever got fifty cents a day drying apples or pumpkins to sell, and nobody ever bought them who, in our judgment, didn't get the worst of the bargain. But the invention of evaporators, by the help of which fruits of nearly all kinds are in a few hours put into a condition in which they will keep for months and retain all their original excellences, has worked a revolution in fruit preservation, and not only made it practicable to save a great many farm products which formerly went to waste, but put them within the reach of nearly everybody at all seasons of the year.

Of the benefits of this new process, J. G. Bennett says in an interesting paper, in the *Rural New Yorker*:

In a properly evaporated fruit there is no loss of pleasant or valuable properties, but an actual increase of fruit sugar, from the fact that evaporation is essentially a ripening process, the development of sugar ranging from 10 to 25 per cent, in different fruits, as determined by chemical analysis. Instead of a retrograde transition awaiting our really unsurpassed fruits, berries and vegetables at their full stage of ripening, we have in the use of the evaporator a culmination of the same organic forces, and in a few hours the juices, which heretofore formed and perfected the fruit (but which after this hasten decay), are quickly matured, and the maximum development of sugar secured and the water evaporated, the change being analogous to the transition of the grape to the sweeter raisin or the acid green apple to ripeness, with corresponding delicacy. The cell structure remains unbroken and the articles when placed in the rejuvenating bath of fresh water return to their original form, color and consistency. Thus, a few ounces of pumpkin flour make a sauce or custard at all seasons, and rarely can any one distinguish a pie or a pudding of evaporated apples from that made from fresh fruit by sight or taste. The summer squash becomes an all-the-year vegetable for every climate and market on the globe. A large load of pumpkins may be driven in from the field in the morning, and the next morning shipped to the antipodes, in a barrel. The sweet potato which perishes so rapidly as to be unknown to most of the markets of the world, is reduced to an imperishable condition by pneumatic evaporation, and will soon become a familiar luxury on the tables and markets of the world and at all seasons of the year alike. Its slices, placed in cold water and brought to a boil for thirty minutes, are ready for the table or frying pan, and are in no respect inferior to the original vegetable. The northern potato, like the turnip, improves by evaporation, and for spring use, for ship stores and for exportation, leaves its original out of sight, occupies little room, and is proof against decay.

Sweet corn is rejuvenated. If taken strictly in the milk and treated before wilting, it will be as tender and sweet at the world's end as at the start. Green currants and gooseberries retain their favorite characteristics of flavor sealed up in them for travel and time. Forty pineapples have been compressed into a small cake which an infant might hold in its hand, and afterward resurrected as 40 pineapples. The

evaporated tomato is a remarkable product. No successful attempt has ever before been made to remove the condition of fermentation (water) from this fruit. The pneumatic evaporator reduces the whole pulp of the tomato to a condition like that of the dried fig. A bushel of the fruit after evaporation is compressed into a solid cube like plug tobacco, measuring four or five inches each way. Every pound of this makes eight quarts of tomatoes in the original state. Tomatoes may now be raised with advantage, like so many other things, whenever there is an evaporator at hand. The manufacture of evaporated fruit by the individual farmer and orchardist has popularized the industry, the future of which it would be difficult even to anticipate. With an apparatus of universal adaptation and suited to the wants of the large or small orchardist and fairly managed, the business is made both remunerative and pleasant. Few farm implements can be so continuously employed, beginning with the early summer berries, vegetables and fruits, extending its usefulness through the winter upon the fall crops, the daily wasting products of the farm suggesting its use and inculcating the maxim, "It is not what we make but what we save, that accumulates wealth."—*Mirror and Farmer*.

Brief essays on ornamental planting and native fruits:

by William C. Barry, Mount Hope Nurseries,
Rochester, N. Y.

A very practical paper, written by a man who understands his business, and seems desirous of making others understand it, too. The essay on draining is good up to a certain point, but the writer seems to forget that tiles, pipes, or any other conduit, would be soon stopped if laid down, even four feet deep, in a plantation. You cannot keep the roots of the trees from penetrating after the lowering of the water table. The deeper you drain the deeper the roots go. All drains in orchards, shrubberies, and woods, should be open ditches.

I am heartily with Mr. Berry in his onslaught on the shrub-clippers. The *ars topiaria* is almost as great a sin against good taste as the short dock to a wellbred horse's tail.

Cream sweet or sour for butter-making.

It seems to me that the superior quality of Devonshire butter, which is made from cream which cannot by any possibility be sour, should settle this question in favour of Dr. Voelker v. Allender. If the milk, in the Devonshire system, were turned in the slightest degree, the heat to which it is brought (200° F. to 208° F.) in the water-bath would coagulate the whole; and when the cream is separated from the milk it is churned at once, and so there is no chance of its souring. As to the flavour and keeping quality of butter thus made, any sceptic can obtain full information from Cap. E. Campbell, Manor House, St. Hilaire.

Hubbard's Newspaper and Bank Directory
of the World.

This unique and most wonderful work (2 v. 80. New Haven Conn. U. S.) contains,—besides the names, addresses and circulation of all the newspapers published in the World and of all responsible banks,—already a stupendous enterprise—a mass of most varied information.

The press,—its best writers,—fac-similes of the leading newspapers in most countries,—specimens of typography in 150 different languages,—highly finished maps of all countries in the world,—descriptive articles of each country,—important and most useful statistics,—such is but a short epitome of the salient parts of these beautiful and most complete volumes which must find room in every library, worthy of the name.

Price of Superphosphate.

Sir,—Can you explain how it is that superphosphate of lime can be bought in England at £3 5s. 0d. sterling per ton delivered at station, while in Canada, the home of immense deposits, it costs \$32 per ton at the works, in Brookville?

The English superphosphate is sold guaranteed as to percentage of phosphoric acid, while the Canadian is sold in a sort of "go as you please" style. If I can spare the time, I intend to make an analysis of some just received.

Can you also give me your views as to the best way of applying superphosphate to clay soil? I have used some every spring during the last 8 years on my farm, at Beloit, with very satisfactory results. Many years ago, very heavy crops of wheat were taken from the whole of the Richelieu Valley, and until the farms can be brought in to condition to support a much larger number of cattle than they do at present, there appears nothing for it, but the application of artificial manures, deeper ploughing, and a good rotation of crops.

Truly yours,
"Lincolnshire."

P. S.—I fully agree with you that more attention should be paid to sheep raising. They do an immense amount of good in many ways; besides they pay, if treated well.

December 12th.

In reply to "Lincolnshire," I beg to say that the only reasons I can give for the high price of superphosphates in Ca-

and applied as a top dressing for clover, pease, and other leguminous, or pod-bearing, plants. Thus, we find that the price of the manure resolves itself into this: a ton of 2000 lbs. containing 31.24 per cent. of insoluble phosphate, 7.92 per cent. of soluble phosphate, and 2.12 of ammonia, costs, in Canada, \$32; a ton of 2240 lbs. containing 26 per cent. of soluble phosphate, and 10 per cent. of insoluble phosphate, costs £3. 5., or \$16.00: add to this latter the value of the ammonia which is present in the former, viz. (at 12 shillings stg., a unit) \$6; and we have the true value namely \$22; but we have 240 lbs. more. We don't want the insoluble phosphate (it is always present though) because we can always add it in the form of ground bones, dry, or rotted with moistened earth.

If "Lincolnshire" wishes to show what the Richelieu valley can do with a wheat crop, let him try the following dressing harrowed in with the seed: three hundred lbs. of superphosphate and one hundred and fifty lbs. of sulphate of ammonia, from the Montreal Gas-works, to the imperial acre. The price of the sulphate of ammonia is 4 cents a pound. More on this subject in our next.

ARTHUR R. JENNER FUST.

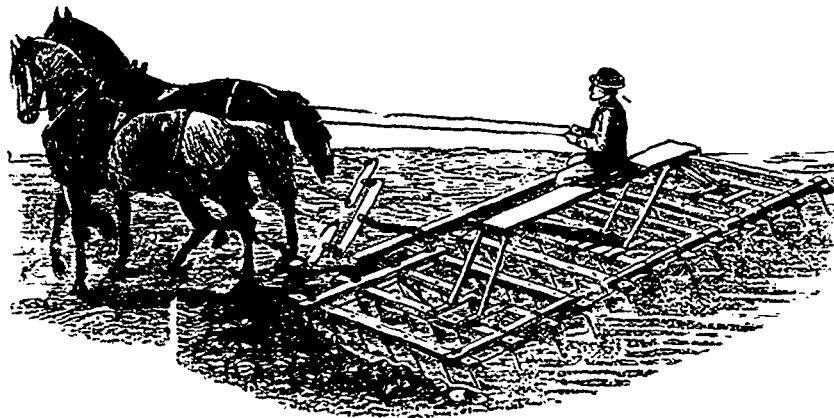
Paris, January 1882.

Attention is being drawn to Egypt as a country admirably suited for agricultural emigration. Despite the bad administration of the country, the advantages are many and real.

In point of climate, it would be perfection for the farmer. It never rains, hails, snows, or freezes. The water necessary for irrigation is stored in reservoirs, and distributed by canals, so, the cultivator can have the equivalent of rain when he pleases. The Nile marks the limit of fertility: where its waters reach not, there the desert commences. The soil, in great part derived from the sediment of the Nile, is relatively deep, and by a little amelioration in tilling, could be made to yield three times more than at present. Hand labor is abundant, and costs only half a franc per day, without food. Land can be bought out for 500 francs an acre, and farming pays about 5 to 6 per cent on capital.

The system of cultivation is simple: when the Nile commences to rise in the middle of June, rice or maize, etc. is sown: in autumn, wheat, beans, or clover, and in March, cotton or sugar cane. Agricultural operations can be effected at all seasons, since there are no meteorological drawbacks. No manure is employed, for the natives dry the excrements of animals for the purposes of fuel. The same kind of plough is employed to day as in the time of the Shepherd Kings, say 8,000 years ago: the soil is scratched to the depth of two inches: the plough is drawn by two bullocks, or a camel and an ass: no care is observed in the selection of sowing seeds: the grain is never cut till it commences to self-shell, consequently threshing operations are easily conducted: the latter are effected in two manners: by a kind of roller armed with knife teeth, when the grain is intended for human consumption and exportation; the second consists in trampling it under the feet of oxen, where the excrements of the animals also mingle.

Cotton is the most profitable product to cultivate: but it is very exhaustive, because none of it is ever restored to the soil: the fibre and oil are not exhausting products, but the seed, or cake, which contains the fertilizing soil elements, is also ex-



Thomas' Smoothing Harrow.

nada, as compared with the reasonable price for which they are sold in England, are: first, the want of competition among the makers of the manure; and, secondly, the very small demand. Mr. Lamb, of Toronto, the manufacturer, says: "Of all the material we handle that can be turned into superphosphates, we export 95 per cent. and only manufacture 5 per cent for use in Canada. We export more than 2000 tons of bones, annually, from Canada. Superphosphates we do not export, but make just enough to supply the home market. It would not pay to manufacture for export, as the price of sulphuric acid is higher here than in the States." v. Report of Ontario Ag. Commission, 1881.

Mr. Lamb's manure is bone-superphosphate, and judging from the analysis, which follows, it is a useful manure—at a price:

Insoluble phosphates	31.24
Soluble phosphates.....	7.92
Ammonia.....	2.12

The water, soda-salts, organic matter, and sulphate of lime, make up the 100 parts, and are valueless, except where plaster is wanted, and that had better be bought separately,

ported to other countries for cattle feeding. Mulberry trees could be grafted and so produce food for silk worms, while the vine could be made to yield fruit capably suited for raisins, and hence meet the want now much felt in the manufacture of wine. Every domestic animal has degenerated in Egypt, save the ass, owing to want of adequate food, suitable care, and healthful conditions. Green fodder is much needed in the warm weather, and trench-preserved food would admirably fill the void. Ordinarily, there is not more than one head of cattle for every 30 acres, while in farming districts in other lands, one beast is estimated for 1 to 3 acres. The drawback is the taxation, which amounts to about one-fourth of the total revenue of the land: some holdings, and where the soil is of identical quality, pay four times higher taxation than the other. But this is the result of mal-administration.

M. Lodureau, director of the agronomical station at Lille, has published his annual report on experiments with beets, to show that richness in sugar and relatively large-sized roots are not incompatible. These desiderata can be obtained by cultivating the plants at close distances, securing good seed, and selecting appropriate manure, superphosphate of lime especially. These conditions fulfilled, the meteorological drawbacks can be counteracted. A question has been raised, whether the pulp, the result of extracting the juice by the now general process (in France) of *diffusion*, instead of the old practice of pressure, demands an increase of dry matter, such as hay, chaff, cut straw, etc. The pulp from the press contains but 70 or 75 per cent of water, while that from *diffusion* is as high as 88 or 90. The augmentation of hay, etc. ought then to be about 25 per cent.

M. Desprez, on his farm of Cappelle, near Lille, established a laboratory ostensibly to control the richness of the root cultivated on 250 acres, grown simply for seed; some 2,000 to 3,000 analyses can be made daily, and the beet found richest in sugar is kept for seed: from 12 to 15 per cent of sugar is what is anticipated: roots yielding less are thrown aside. Indeed it is every day becoming more and more a certainty in beet-culture, that success depends chiefly on the quality of the seed. This secured, the roots ought to be purchased proportionate to their richness.

The French government organises and subsidizes a series of regional agricultural shows annually: they are official, and so have many drawbacks, one of the chief being the constitution of the juries. The number of jurors is five, being two too many, and the jury that awards prizes to sheep does the same towards pigs and barn-door fowls. In the case of black cattle, matters are still worse: the same jury accords prizes to several different races of stock. It is proposed to nominate jurors with a special knowledge of each class of animals exhibited. It would be well to exercise greater severity towards exhibitors who merely purchase stock to fatten and carry off a blue ribbon.

Normandy is the region for cider; it is questionable if the reputation of that beverage is, to-day, what it was. There is first of all, less care displayed in the manufacture of cider: it is left in the hands of irresponsible servants, who employ the nearest water at hand, that in stagnant pools, and even that where soiled linen has been washed. Next, there is no judicious selection in the trees to be planted; every kind that grafts readily is accepted: the proprietor rarely superintends the planting of his orchard. The best cider producers are those who have a special nursery for their fruit trees, and personally look after everything. It is asserted that the natural cider has so much degenerated, that numerous persons prefer that prepared in Paris by processes wherein not a single apple enters. The same observation can also be applied to wines.

M. Lemoine has conducted a curious experiment to determine the ratio between the food consumed by barn-door fow

and the quantity of manure produced. He enclosed a cock and six hens of the Dorking breed. A hen, it appears, consumes annually 374 lbs. of food, of which it excretes, 272 lbs.; the remaining 102 lbs. representing that serving for the sustenance of the body. The value of the manure was only 1 franc.

Agriculture has now its exclusive minister, having been separated from the department of commerce. Great things are expected from the change, and may be realized if the parliament will vote the necessary funds, and the new minister show himself to be equal to the occasion. It is not agriculture that will ever ruin the finances of a state.

A school for training shepherds has been established in Algeria, where the pupils are instructed in all that affects the breeding and rearing of sheep, as well as their diseases and their treatment. Several notions are also taught of gardening and forestry, as well as of the elementary principles of general education.

The phylloxera continues its ravages, and some vineyard proprietors flatter themselves to have conquered the foe. The government is certainly not niggardly in its grants to experiment on all agents reputed efficacious to destroy the scourge. A very complete history of the plague has appeared, replete with illustrations of the insect in all its stages: its mode of propagation, of attack, and of its ravages: healthy and diseased vines are so grouped that it is impossible even for a child not to take in the history of the calamity. The volume speaks to the eye, and must be invaluable wherever a vineyard exists, or natural history is taught.

The Tax on Tobacco.

From certain articles published lately in the newspapers, we gather that a good deal of discontent is felt in some parts of the province in regard to the duty on tobacco grown for sale. We are the more surprised at this discontent, knowing that, in several counties, the cultivation of tobacco has considerably increased since the amount of the tax has been diminished. In the districts of which we speak, the number of acres in tobacco increases yearly, and it is proposed to form companies for the manufacture, solely, of Canadian tobacco; a proposition which, looking to the large profits to be derived from the manufacture, and the economy of giving up the use of all foreign tobaccos, cannot but commend itself to the minds of all well wishers to their country.

"But," we shall be told, "before we can get rid of the necessity for importing foreign tobacco, we must make sure that we can grow as good in our own country." Can we? I think so, and the way to do it is, to offer valuable prizes at our provincial exhibitions for tobacco equal in quality to the best now imported.

Let us see, when once we have arrived at this point, how large a profit our manufacturers will make in dealing only with Canadian tobacco. For this purpose, let us consider the following extracts from the list of importations of the fiscal year, 1880:

Tobacco imported, 1880 (unmanufactured), 9,528,905 lbs.
Value of the above; \$805,096.

Duty on the manufacture of the above, at 20 cts. a pound, \$1,903,781.

Thus, if we could grow as good tobacco as the imported, we should keep in the country the \$805,096 which we now send abroad. Now, what difference would there be in the amount of the duty payable by our manufacturers under these circumstances? He who would pay 20 cts. a pound for the working up of foreign tobacco, would only have to pay 14 cts. if he dealt exclusively in Canadian tobacco. Thus, supposing the same 9,528,905 lbs. were in question, the duty would be only \$1,334,046.70; a difference in favor of the manufacturer of \$571,734.30.

In this way, our farmers would sell for \$805,096 of tobacco more than they do now, and, on their side, our manufacturers would realise on the same tobacco an extra sum of \$571,734.30. This calculation refers only to tobacco imported in leaf and duty free.

But, if we take into consideration the possibility of making all our cigars and snuff out of home-grown tobacco, the profit to be realised will appear much greater.

Cigars and cigarettes imported in 1880,—93,300 lbs.

Value of the above \$169,071.

Duty on the above \$82,187.

These cigars and cigarettes pay a duty of 60 cts. a pound, and an additional 20 per cent. *ad valorem*. Thus the entire cost amounts to \$251,258. Could we grow as good tobacco here as they are made of, the country would save \$169,071, which would be divided between our farmers and our manufacturers. It is true that the latter would have a duty of 30 cts. a pound to pay, but that would not nearly amount to the \$82,187 chargeable on the same cigars and cigarettes if imported in a manufactured state; that is, 93,300 lbs. at 30 cts. only comes to \$27,990.

The quantities of snuff and other manufactured tobacco imported last year are as follows:

	Value.	Duty.
Snuff..... 13,913 lbs.	\$3,108	\$3,867.
Other tobacco.. 152,144 "	\$52,516	\$44,591.
Total... 166,057	\$55,624	\$48,458

This class of tobacco pays 25 cts. duty per pound, and 12½ *ad valorem*; and thus, if it were grown and made up in Canada, an amount equal to \$55,624 would be saved to the country, divisible between the grower and the manufacturer, the latter having only \$23,247.98 of duty to pay, instead of \$48,463 which would be chargeable on the imported article.

In order to seize at a glance the advantage of growing and manufacturing our own tobacco, let us look, once more, at our tables:

Total tobacco imported, 1880:	Value.	Duty
9,787,262	\$1,029,781	\$2,036,431

Here, we see 9,787,262 lbs. of tobacco which should be grown by our farmers, and manufactured by our own workmen; and still the government would receive an amount of duty approximating to \$1,385,284.68, according to the sort of tobacco manufactured.

According to these figures, the tobacco imported costs:

Value to the foreigner.....	\$1,029,781
Duty to government.....	2,036,431

Total cost..... \$3,066,212

But grown and manufactured in the country, the revenue would receive a duty approaching \$1,385,284.68, and if this sum be subtracted from the total cost of imported tobacco:

Cost of imported tobacco.....	\$3,066,212 00
Duty on the same if home grown..	1,385,289 68

A balance remains to the grower and manufacturer of... .. \$1,680,922 32

That is to say, if good tobacco could be grown here, the profits, in spite of the duty, would be large, and at the same time the revenue would receive a sufficient amount.

To those who cry out against the tax on tobacco we say this: All the world, politics apart, must admit that the government of a country cannot be carried on without a revenue, and that this revenue should be raised, by preference, from luxuries, such as spirits, tobacco, &c. From which principles, considered in connection with the figures we have quoted, the deduction is clear, that the cultivation of tobacco, in spite of the duty, is a source of riches to our farmers.

WESTERN ONTARIO.

The weather in this part of the country through the past winter months has been very remarkable for the large number of warm, clear, fine days. The great drawback has been, the want of sleighing for the movement of heavy loads. There was a large acreage of wheat sown last autumn, and with the exception of that which was sown late, this crop never looked better at this time of year. All that was well put in, on good wheat land, is as sound as when winter set in. Of course there is yet time for a good deal of injury to be done, by alternate thawing and freezing. Still the prospect is good for next year.

THE DAIRY.

As regards the future prospects of this important industry very little can be said at present. I was very much pleased with J. M. Jocelyn's article in the March number on lard cheese. He hits the right nail on the head when he compares that business with counterfeiting and forgery. It certainly is a great imposition on the public to pass off an article depreciated by the difference between four pounds of genuine butter and one and a half pounds of lard of questionable quality, simply because the consumer does not know it. At the present time Canada is doing an honest business, and it is to be hoped will continue to do so. The success of the two past years has had the effect of increasing the value of stock considerably. At public sales, a fairly good young cow brings from 40 to 50 dollars. Some extra have run as high as 70 dollars.

These prices are based on the continuance of high prices for cheese, which should not be expected. One extreme follows another with great certainty, and the dairyman who looks for these fluctuations and is prepared to meet them, is the man who will not be discouraged or disappointed. A persistent, even course of good feeding, will, in the end, always ensure success. An exceptional state of things exists at present as regards

HIRED HELP.

A great many young men have left during the last two years for the U. S. or the North West. The consequence is, wages are very high, 18 to 20 dollars for eight months, and 200 dollars per year, are being paid, with board and washing; and the supply is not equal to the demand, even at those rates. It is to be hoped, a few emigrants may find their way into this part of the country this spring. This account does not apply alone to male help, but good girls to do house work are even more difficult to obtain.

Innerkip, March 10, 1882.

F. MALCOLM.

CHURNS.

The best churn, where few cows are kept, is the six sided, oscillating box-churn, with no dashers. On a larger scale, the old barrel-churn, will answer all purposes. It has been used for centuries in Normandy, and the construction is so simple, that any common cooper can make it. Three cross-pieces run the length of the barrel, formed as in the cut. The churn should not be more than half-filled with cream, and a hole should be made, with a wooden plug, at the side, to allow the churner to see when the grains of butter are formed.

Mrs. Whitfield, at Rougemont, uses an immense oscillating churn, worked by horse-power, which answers admirably. Her dairy contains the milk of about 80 cows.

The Messrs. Johnston write me word that their "Gleaner and Binder" is not yet sufficiently perfect in its work to be ready for distribution. I hope to be able to get one sent for exhibition at the provincial show in September.

A. R. J. F.

Sheep for exportation.—Mr. Hall, of Liverpool, says on this point: Large numbers of Canadian sheep pass through my hands. *They do not rank well on the English market.* The reason is that most of them are rams, and old, suckled-out ewes. Some of them you can get fat, but they won't take on much flesh, and the consequence is that they are light on the loin, and mutton of that sort does not sell well. A thing you ought to implore your farmers to do is to castrate their ram lambs. When they are four or five months

old they begin to run after the ewes, their flesh becomes tough, coarse, and strong-flavoured. If you sent over a mixed shlipload of sheep, and at the same time sent a thousand well selected wethers, there would be, I think, a difference of \$2.50 a head in favour of the wethers, and you would have twenty buyers for them where you would have one for the others—all the best buyers would be after your sheep. Ont. Ag. Commission.

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Calicoes, Linens, Woollen Goods, Silks. Feathers,—Ribbons,—Flowers, à la mode. SPECIALTY. Celluloid collars and wristbands.

A Complete Assortment.

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Ed. A. BARNARD,
Director of the Illustrated Journal of agriculture.

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SPLENDID HALF-BRED, MASTIFF & ST. BERNARD, puppies for sale; very large and powerful; gentle, but excellent watch-dogs, and very intelligent.
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[Southern Seed Corn, \$2.00 bush. (\$2.50 single) bag and cartage free].

We have read this book with great interest, and highly recommend its perusal to all farmers.
Ed. A. BARNARD.

FOR SALE—THE AYRSHIRE BULL "Frontenac," first prize two-year old bull at the Provincial Exhibition in 1880.
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THOROUGHbred SHORTHORN (registered) Bull and Heifer calves for sale, also Poland-China pigs.
Mapleshade,
La Colle, March 28d 1882. J. B. MASTEN.

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Address: E. S. MANNY,
Beauharnois, P. Q.

LOGAN'S FARM, MONTREAL. THOMAS IRVING offers for sale a few bull and heifer calves, from his celebrated herd of Ayrshire cattle: all entered in the Canadian Ayrshire herdbook. Also, several ewes and rams of the Border-Leicester breed.

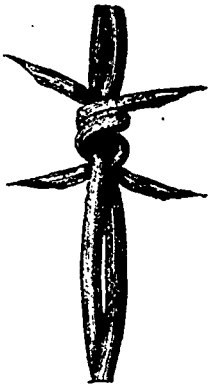


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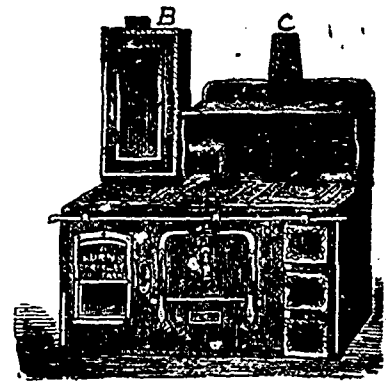
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