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AGRICULTURAL REVIEW.

JANUARY.

Official Dep'nt.

BOARD OF AGRICULTURE FOR LOWER CANADA.

The Board of Agriculture for Lower Canada relies on the different Agricultural Societies for support in the endeavour to render the Exhibition of Products of the Soil at the Great Exhibition in London as complete as possible.

The Board is confident that the different Societies will sustain it with their aid and co-operation.

Each Society is asked for what is inexpensive and easy to obtain, but the general result will probably be considerable and important.

The Societies of Upper Canada are supporting the efforts and assisting in the work of the Canadian Commissioners by placing at their disposal the best samples of Agricultural Products in their counties.

The Agricultural Society of your County is requested, with a view to render complete our contribution to the great Exhibition in London, to place at the disposal of the Board, before the 1st February, the grains and products, a list of which is given below, choosing the finest and best specimens.

As soon as the greater portion of these are collected, you will please inform the Secretary of the Board of Agriculture in Montreal, and state the necessary particulars regarding the forwarding.

I am, Sir,

Your obedient Servant,

L. V. SICOTTE,

President of the Board of Agriculture for Lower Canada.

LIST OF GRAINS, ETC., ETC.

Half a minot of

Wheat,
Barley,
Pease,
Oats,
Buckwheat,
Indian Corn,
Rye,
Timothy Seed,
Clover Seed,
Beans,
Flax Seed.

} With the quantity of minots usually raised per acre marked.

¼ lb. of wool of the different sorts which the County can furnish.

Specimens of flax, unthreshed. A few handsfull.

Specimens of flax in its different forms, before being spun.

Specimens of best grain, unthreshed. A few handsfull.

Butter, not less than 10 lbs.

Sugar, not less than 10 lbs.

Hops, cheese.

Hay, 10 lbs., arranged so as to show the length.

N. B.—All other products that, in the Society's opinion, show the production as well as the good culture of the soil, should be furnished, with the necessary particulars.

The bags or sacks will be returned to each exhibitor, as well as all grain, which, upon inspection, is not considered sufficiently good.

The name of each exhibitor will be given and each article will be exhibited at the Great Exhibition with the owner's name attached.

BOARD OF AGRICULTURE FOR LOWER CANADA.

Montreal, 21st December 1861.

To the Secretary of the County of Agricultural Society.

I am directed by the Board of Agriculture for Lower Canada to acquaint you that your Society have to appoint four persons, to be Members of this Board, in place of those who retire by rotation, namely: O. E. Casgrain, J. C. Taché, B. Pomroy and J. O. A. Turgeon, Esqs. These gentlemen are nevertheless eligible to be re-elected. The Report of Election of these four members of this Board is to be sent before the first of February next to the Honourable the Minister of Agriculture, Quebec.

I am also directed to remind you that your Society must be re-organized in the third week of January next.

I have the honour to be, Sir,
Your obedient servant,

The Secretary of the Board of Agriculture.

OUR RAMBLES.

We have this month resumed our promised report of our visits to some of the more remarkable and systematic farmers. We in a former number rendered a short history of our visit to the farms of Mr. Boa and Mr. Lecourt, of St. Laurent near Montreal, and of the system adopted by them. We shall in the present number render an account of our visit to the farm of Mr. Fortier, a French Canadian, near Quebec, who without any aid but that of his intelligence and industry, has transformed a sterile tract of land into a luxuriant farm, yielding a net revenue of $1500. From the system adopted it is increasing in fertility, and it is after 17 years of hard work, industry, and persevering economy, that it has now arrived at comparative perfection. 17 years ago as before stated, the farm was cultivated according to the system then generally adopted—two years of grain crop followed two years of pasture without any green or hay crops for fodder.

A few and a poor race of animals formed the stock, and constituted the whole source from which manure was procured, and they furnished scarcely sufficient produce for his scanty use, according to the system then followed. The low lands near the *Priest's House*, gave annually 8,000 bundles of hay of poor quality, owing to the length of time they had remained untouched, and were partly covered over with moss and cow hay.

Mr. Olivier Fortier was the son of a farmer of the olden times, but endowed with intelligence and a mind full of vigour, he soon perceived that the system of agriculture then followed was not that which was required, for the neighborhood of Quebec especially, where the requirements were hay and green crops. The example of some old country farmers who lived in the vicinity, was not lost sight of by Mr. Fortier, who although not aspiring to a higher method of cultivation than theirs, at least followed what he deemed best for his particular locality. He was soon convinced that it was ruinous for farmers near large cities to grow wheat, barley, &c., and dispose of it at the market price in competition with farmers from a distance, where the price of land was lower, and the price also of labour less. This with the ease with which hay could be sent to market in Quebec, at seasons when farmers at a distance could not get there, owing to the bad state of the roads. This soon led Mr. Fortier to adopt the *meadow* as the best and surest means of an aggregate return. But the meadow required cultivation in an improved manner, it was necessary to get rid of the mosses or other weeds that prevented its growth. For this purpose he ploughed up the meadow, sowed it in oats, followed by a green crop of 4 or 5 acres which required much hoeing and tilling.

In the autumn, after the oats had been housed, the land was deeply ploughed so as to expose the soil to the influence of the frost and atmosphere, and in the spring as soon as the grain crops were sown, Mr. F. directed his attention to that part of the farm prepared to receive the green crops; this he cross ploughed, and harrowed, and rolled carefully until the sod was completely pulverized and broken down. It was then prepared for the drills, which were made with the common plough; 50 loads of manure was spread over each acre, in the drills, and then covered over. Upon the land thus prepared were sown mangold wurtzel, carrots, and turnips, in the proportion of one-third to the whole surface; the other two-thirds were at the end of June planted with cabbages. The mangold wurtzel, turnips, and carrots were sowed the 1st week in June. After so complete a preparation of the soil it may

be easily perceived that its fertility was greatly increased. We have seen it and can bear testimony to Mr. Fortier's success, and it is doubly honourable because it is the first French Canadian who has adopted a like system of agriculture—a system of amelioration perfectly systematic, and a model to which we can with confidence refer, and wish to place it before the eyes of all those farmers who desire to work for the advancement of agriculture.

One thing we would suggest, that the Board of Agriculture should award some mark of distinction to individuals who are pre-eminent in the improved methods of agriculture.

France for a long time has adopted this method as an acknowledgment of services rendered to the Industrial and Agricultural Arts, and to the country in general. Eight prizes of $1800 each are yearly given to those farmers who have distinguished themselves in this branch of improvement, and the government of the Emperor, who especially favours agriculture, has ordered a special decoration to be bestowed for such improvement, for it is no less meritorious to sacrifice a life of usefulness to enhance the riches of agriculture, than the more vivid and daring exploits of the soldier, and it belongs to the nineteenth century to place the soldier and the farmer equally high in their proper sphere.

Mr. Fortier finds in the green crops abundant and wholesome fodder for his milch cows, the product of which—milk—is readily disposed of in the city of Quebec; a certain quantity is converted into butter, and a portion for the raising of calves and for the fattening of pigs. The cabbages attain also a high price more especially in the autumn when the fall shipping are leaving for Europe.

The spring ploughing receives a grain crop with timothy and clover seed, ¼ of a minot of timothy seed, and ½ lb. of clover seed per arpent. The 1st year hay crop is magnificent, and, contrary to our experience elsewhere, we find that the 1st crop of clover is equal to anything we have seen, where the general rule is to sow 8 or 10 lbs. of clover to the acre, for the purpose of insuring an abundant crop the 1st year. The 2nd year clover diminishes, and the 3rd year it completely disappears; but here to the contrary the clover is abundant every year and often too rank. It is certain that the timothy alone exhausts the soil more than the clover, for the large leaves of the clover must absorb a larger quantity of gas or nutriment from the atmosphere, and the spreading roots must furnish to the soil after it is cut wherewith to enrich it.

We shall now proceed to show the method Mr. Fortier has adopted to spread the manure over his meadow after four years crop, and also the application of ley-ashes so generally adopted by the farmers in the vicinity of Quebec, and we would especially call the attention of the farmers near Montreal to the general employment of ley ashes. Mr. Fortier informs us that he uses 200 loads every year, or about 20 loads per acre. They are generally carted after the seed time until the hay commences, and at other seasons when time permits. They are placed in a heap and are spread over the meadow immediately after it is cut. A *tombreau* is driven slowly along, and a man with a shovel throws it right and left as he advances, the soluble salts of potash have time thus to become mixed with the soil before the autumn rains, and the effect is very soon apparent—the grass becoming of a deep green hue, the moss disappearing, and the following year the timothy shows a wonderful increase. The utility of this we may say artificial manure is so well known in Quebec, that at this time a load of ashes sells for 50 cents, while 15 years ago it was worth only 12 cents, and a year or two before this the potash manufactories were obliged to throw away their ashes into the river; some 1500 to 2000 loads are now sold annually to the farmers about Quebec.

At Montreal, we believe, ley ashes can be bought at 10 to 12 cents per load, and yet it is not employed as a manure. The residue of Mr. Redpath's sugar refinery also furnishes a manure of high value, but our farmers at present do not appreciate the value of it. We intend to recur to this subject in a future number, showing in detail their fertilizing value compared with common stable manure. With this method of cultivation, the meadows last for 8 or 9 years with a future rich harvest. We saw a piece of 3 arpents in superficies, which had yielded during several years 1000 bundles of 16 lbs. weight, but the average yield is 250 to 300 bundles. Oats after meadow terminates the 12th year.

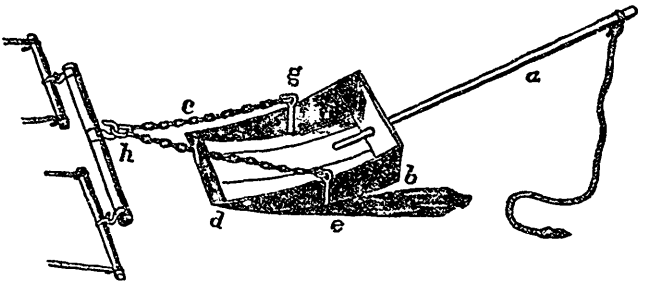
The system above alluded to is perfect in theory, and confirms the definition of theory, which is nothing more than practice explained by principles.

But to speak more in detail of Mr. Fortier's farm, we shall say it is divided into two distinct parts, in accordance with the nature and richness of the soil. The first part comprises the low lands near the river 5 acres wide by 15 acres in depth. It is composed of that soil called *argillo-silicus*, or "terre grise," it is the culture of this portion that we have already alluded to. The second part of the farm is a sand hill mixed with clay, originally covered with spruce when Mr. Fortier first took the farm, and it was of importance to put this part into a state of cultivation; it was at that time a succession of hills, and holes full of water and of aquatic plants.

Mr. Fortier here adopted the same rotation as before spoken of, modifying at the same time the choice of plants as culture or the land required; 1st year he ploughed it in the autumn, in the spring he levelled it by means of the horse shovel, an excellent instrument for the purpose. (See the wood cut.) The horses are harnessed to the whipple trees at *h*, a chain passing to *c* and *g* by means of which it is tilted over; it is guided by the handle *a*, and is elevated or depressed as circumstances may require. The soil thus levelled was left for about 15 days, by this time the weeds had sprung up which were covered by the second ploughing; in the autumn the manure was spread over it, and it received its last ploughing, and was then ready to receive oats, to be followed by meadow. Each year a new piece was laid out and the 1st year's product was really wonderful. After the 1st cut of grass Mr. Fortier applied the ley ashes which was followed by a yield of 300 bundles to the arpent for upwards of five years.

These are facts which we can confidently lay before our readers, and we shall no longer be under the imputation of only printing a Journal of theory.

We believe that the system adopted by



Horse Shovel.

the farmers of Quebec can be followed out here with certain modifications, without much manure or ley ashes, for instance, 1st year plough in green buckwheat; 2nd year sow oats and timothy seed; 3rd, 4th, and 5th years, hay; 6th and 7th years, potatoes upon old meadow; 8th year, oats; 9th year, pease; 10th year, wheat or barley according to the nature of the soil.

We shall continue in our next number some more observations on the Farm and Farmers in the District of Quebec.

AGRICULTURAL SOCIETIES.

To the Editor of the Lower Canada Agriculturist.

Dear Sir,—Having now received the third number of the *Farmers' Journal* in its new shape, and having attentively perused the contents of each number, I must say it is a most decided improvement upon its predecessor. I felt much gratified on reading the several valuable agricultural reports, particularly those of the counties of Missisquoi, Argenteuil, Beauharnois and the Island of Montreal. Reports of this kind must be of great benefit to every county. They show at a glance where improvements are judiciously carried on, and where merit is due. The systems that have been adopted by the above counties, contrast most favorably with those who spend their funds in holding a paltry grain and cattle show, such as the County of Quebec is in the habit of holding annually, in preference to giving prizes for well managed farms, growing crops, draining, &c. I shall explain a few of the abuses under the present system. For instance; why should prizes be given for such small quantities of grain as a bushel, or two bushels at most? The plan usually resorted to by the money catchers who compete for them (for I can call them nothing else,) is handpicking, rubbing, tramping, keeping grain from one year to an-

other, buying, borrowing and many other malpractices, too numerous to mention; such a system as this is no encouragement to agriculture in any shape or form. It is only calculated to encourage all manner of frauds. The last County of Quebec Agricultural show was a most complete farce; not a well bred animal on the ground, and no classification of the different breeds; every age and kind mixed up together, and no rules or regulations for to go by. And a great gang of people were pushing and crowding after the judges. True there was a few overgrown turnips upon the ground, but no one could say if they were the *bona fide* property of the exhibitor or not. From what I could learn, several of the adjoining turnip fields had been visited a few nights previous to this exhibition. And, further, to show the ignorance of the managers, dairy produce and agricultural implements were omitted. Now I would ask any one interested in the agricultural prosperity of this fine county, what benefit such shows are to agriculture? Only to a few prize catchers, upon whose farms the very worst systems of cultivation are to be seen. Then, why not the Committee of Management apply a portion of the funds to well managed farms, and growing crops, which is the only true way to improve our agriculture? The County of Quebec Agricultural Society has spent several hundred dollars these few years back, and I defy them to point to one single improvement they have made by their shows. They have not imported an animal of any kind, or a single bushel of grain. What animals we have of improved breed in the County we are entirely indebted to a few public spirited agriculturists, such as Col. Rhodes of Benmore, John Gilmour of Marchmont, and the late James Gibb, Esquire, and a few others. Mr. Editor, I would simply ask the question,—what has raised the standard of agriculture in the Island of Montreal, to its present high state of cultivation—from what I have seen from late visits? It can now compete with any part of Canada. The question is easily answered. In the first place it is solely attributable to such patriotic and energetic men as the late lamented John Dods, Esq., and James Logan, Esq., Wm. Boa, of St. Laurent, and several others whose names I do not recollect at present. And latterly the Montreal Agricultural Societies whose systems for the improvement of Agriculture in the importation of superior male animals and grain, and the giving of prizes for well managed farms and growing crops, is beyond all praise. I would urge upon societies the importance of supporting the present Agricultural Journal, which as a means of communication between Societies and the Board of Agriculture, and the diffusion of agricultural knowledge is worthy of all support. I would respectfully draw the attention of the farmers of the County of Quebec to be up and doing, and put men into the Committee of Management, who will attend to the interests of agriculture, which hitherto has not been done. Mr. Editor, I hope you may receive good patronage and support from the agriculturists and all who have the interests of Canada at heart. Mr. Editor, with your permission I shall return to this subject in a future number and, in conclusion, I wish you many happy returns of the season.

Your most obedient servant.

MATTHEW DAVIDSON.

St. Foy Road, County of Quebec.

As the daily press says "we must not be held answerable for the opinions of our correspondents." Nevertheless, we desire to court their patronage, and hear their opinions; and, whenever their communications are properly authenticated, they shall have all the prominence in the *Agriculturist* we can give them, and receive the most particular attention at our hands. Mr. Davidson writing us from Quebec tells some doubtless unwelcome truths. But he is a practical, and experienced farmer, who was probably himself an eye-witness, or has personal knowledge of what he describes. His comparison between this district, and that where he writes is very flattering indeed; long may Montreal carry off the palm. We await his further correspondence with some interest, and if the Society at Quebec have anything to say in defence, we shall also be glad to hear from them. We may mention *en passant* that communications for the French or English editions of the Review, should be addressed to the Editors, postpaid, drawer 250, Post-Office, Montreal.

WORKING HOGS.—The *New England Farmer* says: "We do not work our hogs, either in harness or on the manure heaps. Very well, but still we see no objection to letting store hogs root in the barn yard and pick up scattered grain, &c. On a farm where much grain is fed out, a few young hogs can be wintered in this way at a very trifling cost.

COTTAGE ACCOMMODATION IN THE COUNTRY.

Among other matters discussed at the meeting of the National Social Science Association held in Dublin last month, was the drainage of towns, and the proper application of the sewage to increase the wealth and agricultural produce of the country. The subject was introduced by Lord Talbot de Malahide, who presided over the department of public health. His lordship observed that "he would be ashamed of England's distinguished civil engineers if they did not solve this difficult question in our time." And yet it is emphatically the *questio vexata* of the age. We all feel the importance not only of securing efficient town drainage, but also of turning the sewage to a profitable account as a fertilizer of our soils. Its value as such is well known, and the subject has been very thoroughly ventilated—thanks to Mr. Alderman Mechi, among others: but hitherto engineers and chemists are alike puzzled to find out how it is to be done. The man who is to do it is only "the coming man" as yet. In Montreal the want of proper drainage and sewerage is terribly felt; but those who ought to move in the matter continue to fold their hands. There can be little doubt that, with care and precaution, the revenue that might be derived from disposing of the contents of good public sewers, would in a few years pay the cost of constructing them. But, so far as Montreal is concerned, it looks as if it would be reserved for the next generation to begin and finish any improvement of the kind.

There was another subject of much interest to which his lordship also referred. We mean the improvement of the dwellings of farm labourers. His lordship said:

"The amelioration of the dwellings of the town and country population belongs more to social economy, but, as it has attracted so much attention in our section, it may be well to give a short statement of the steps which are being taken in this country to improve their construction and sanitary condition. Sir William Somerville has exerted himself to obtain two acts of parliament for carrying out this object, particularly in the case of settled and incumbered estates. His last act, for obtaining loans from the Exchequer Commissioners for this purpose, places the superintendence of these erections under the Board of Works, who have lately framed some excellent plans and estimates. These measures were necessary for the purpose of clearing away some of the great difficulties which beset the question. Of course the state of the peasantry, although much improved within the last ten years by the joint influence of emigration and higher wages, is far from satisfactory; but it varies in different parts of the country. The Royal Agricultural Society of Ireland has offered four gold medals for the erection of the greatest number of newly built labourers' cottages within each province, the same number of gold medals for improved cottages in each province; a gold medal for the greatest number of newly-erected cottages in each county, a silver medal for the greatest number of newly-erected cottages within the district of each local society, and one for the greatest number of improved cottages within each local society. Besides this, there is the Leinster Challenge Cup for the person who shall have erected during the year the greatest number of approved labourers' cottages in any part of Ireland. The conditions for the erection of new cottages in most respects follow the requirements of Sir Wm. Somerville's acts. It cannot be said that our Royal Agricultural Society has, in this respect, been behind the spirit of the age. In erecting cottages there are many points which require consideration. 1. They must not be too expensive; for, in so great a work it is advisable to make the outlay as nearly reproductive as possible, and unless this is done it will not be in the power of a large number of landowners, however well disposed, to co-operate as they would wish. 2. They must not be too large. If they are so, instead of improving the condition of the inmates, you tempt them to take in lodgers, and make them over-crowded. For a married couple, without children, two rooms are sufficient, with the necessary offices. If they have children of both sexes, three are absolutely necessary. 3. They should have all, where it is practicable, a garden, not a large one, or more than a rood. This will enable them to be self-supporting, and be a great source of comfort to the inhabitants. I believe that most influential landowners in Ireland are doing something in the way of improvement. Lords Digby, Clermont, and Bath have led the way, but it must be some years before we can put ourselves on a level with our fellow-countrymen of Great Britain. With the erection of some respectable dwellings, sanitary measures must go hand-in-hand, and I have no doubt that visiting committees, if they steer clear of proselytism, will be able to work extensive good; above all, if the clergy of all denominations enter warmly into the good work the benefit will be rapid and incalculable."

Lord Talbot's definition of what labourers' cottages ought to be, should be taken as the rule by all who contemplate carrying on this important improvement; for it has not unfrequently happened that promising schemes have been nipped in the bud, simply from the expense—the needless expense—which has attended the erection of new dwellings of this class. In this country where timber is so abundant, and where new settlers are compelled to cut it down, most comfortable and sufficiently roomy

cottages can be erected, or existing dwellings improved at a moderate cost.

In a paragraph which appeared in a late number of the London *Times* it was stated that the long-agitated question of the bad condition of labourers' cottages in the agricultural districts was again attracting attention in Norfolk. At the dinner of the Docking Agricultural Association some excellent observations were made on the subject by Sir Willoughby Jones, who argued that it was to the interest of landed proprietors and farmers that an improvement should be made in the existing state of things. Sir Willoughby asked why had improved farm buildings sprung up all over the country? Because it was to the interest of the landowner to have first-rate improving tenants, and he could not have these unless he *gave them good* homesteads. Let them apply this principle to the labouring man. Until the present time it was f tile to think of doing so. Whenever they imported a labourer into a parish, they imported a "dead weight," who might ultimately prove a burden to the pockets of the ratepayers or the landowner, because the letting value of the land depended on the heaviness of the rates. Therefore, that the landowner should build cottages which would materially deteriorate the value of his own property was not to be expected, and the consequence was that they saw the number of cottages very slightly increasing. But now that the labourer became irremovable after three years' residence there was a new state of things. Supposing he as an occupier felt it would be greatly to his interest to have some good labourers in three or four cottages near his own homestead, so that he might not have to send some miles for a labouring man when he wanted him, and supposing three or four industrious families removed into those cottages which the landlord had built for them, at the end of three years they would be irremovable, and if they came upon the rates he should only have to pay the proportion that his farm bore to the whole union. Therefore the risk run was very small. Let them suppose the greater number of occupiers did this; those who did not would pay their proportion for every one who had done it. Where a man had not done it on his farm he paid his share of the rate for those who had introduced good and skilled labour near their own homesteads. This was a serious consideration, and when a few had begun the unfortunate man who had to send a long way for his labour would begin to look sharp. He believed a good cottage could be built for about £70, particularly where two or three were built together. He did not mean an extravagant cottage, on which money was thrown away; but a good cottage, with a 14in. gable and 9in. walls, and two bedrooms, and 30 yards of garden. If a cottage like this could be let for £3 10s. that would be 5 per cent. on the outlay, a half per cent. more than was got on good mortgage, while the return would be certain, because the cottage would be let to the occupier of the land, and not directly let from the landlord to the labourer. Now, where was there a tenant who could not get from a good labouring man either £3 10s. in rent, or an equivalent as part of his wages? Let them compare this with the cottages let for a far higher rent, and there was no doubt that the rent could be got. He therefore believed that three or four such cottages near a homestead would be a good investment for the landlord and the farmer. If cottages of this kind were cast over the country they would materially lessen the pressure on overcrowded parishes by carrying off a number of men who were now crushed and crammed together, and materially alleviate the sickness and demoralization at present existing.

Preservation of Ice.—The *Gardeners' Monthly* says ample experience has shown the absolute necessity of ventilation for the more perfect preservation of ice. Experience has elicited three points of *the first importance in* constructing an ice house: 1. An imperfect conductor of heat of moderate thickness to surround the ice. 2. Provision for drawing off the water of the melted ice. 3. Ventilation.

When water passes into the form of vapor, whether vaporized by heat in the form of steam, or rising at common temperature as an insensible vapor, it absorbs 1,000° Fahr. of heat from surrounding bodies. In the latter case it passes off with the air, and if the supply of fresh air be constant or continuous, it is easy to perceive that the cooling influence of evaporation must be very great.

If a piece of ice be wrapped in a single thickness of flannel and exposed to a current of air, not surcharged with moisture, the flannel will freeze fast to the ice, proving the surface to be below 32° Fahr., and little or no water will form. The flannel allows the little water that first forms to enter into its numberless pores where it evaporates from an almost endless surface of woollen fibres. Cotton and linen do not answer the purpose as well, because capillary action fills the spaces between the fibres with water, and evaporation only takes place from the moderate surface of the water.

Let us apply the principle of evaporation to an ice-house, of which the lump of ice in flannel is a perfect type. Experience has shown the advantage of surrounding ice with an imperfect conductor of heat, such as shavings, sawdust, charcoal and even pine boards. It has likewise shown that only a moderate thickness of these is necessary, just as a single thickness will, in a favorable position, actually keep a lump of ice dry. Now if they were used because of their non-conducting property, a considerable thickness would be required, in fact, many feet, and the greater the thickness the more complete the preservation of ice. Since this condition of thickness is proved by fact to be unnecessary, the non-conducting property is not the cause of the preservation of ice, if, *indeed*, it be of any influence whatever.

All the substances employed around ice are porous, admitting the passage of air through them, or into their pores, and these pores present an indefinitely extended surface. A portion of water enters the pores without choking them, and thus an immense surface is offered for evaporation, which, be it remembered, only occurs from a surface. The entrance of dry air

into the moist pores and its exit, charged with the vapor of water, carries off the 1,000° Fahr. of latent vapor heat; and, by thus cooling the ice, prevents its rapid melting. Hence the advantage of ventilation for preserving ice; for when the door of an ice house is kept closed, the confined air becomes saturated with moisture, and cannot escape; evaporation ceases, and the external warmth, entering by radiation and conduction, is expended in freely melting the ice, in spite, too, of the non-conducting coverings and surroundings. Experience has shewn the necessity of draining off the water, which will be produced from the imperfections of the best ice-houses.

A porous, absorbent material, tolerably well-packed, offers the most favourable condition for the side of an ice-house, by offering the largest evaporating surface. The top covering cannot, of course, be packed; the bottom porous layers become so from the weight of superincumbent ice. If the house is constructed with stone walls, a layer of porous material must be put between them and the ice, and provision made for the air to pass to the bottom of the structure.

Have You an Ice-House?—"It can be made very cheaply," says the *American Agriculturist* "and when the luxury of ice in summer is once enjoyed, it will not be readily given up. If no better structure can be erected, build an ice-room in one corner of the wood house, or any shed where room can be spared. The north east corner is best. Set a row of upright posts one foot from the inner sides of a building and two rows of posts a foot apart, for the other two sides of the room; make the enclosure say eight or ten feet square. Cover these with rough boards or slabs, and fill the space between with spent tan bark. Lay down a loose floor, and cover a foot deep with straw. When ice is formed, select that which is pure, clean, and hard, cut it into pieces of convenient size, and pack it closely in the room. Leave six inches space between the ice and the sides of the room, and fill this with saw-dust. Also cover with saw-dust a foot thick, and fill up to the roof with straw. Packed in this way, ice enough to supply a family of average size has been kept safely the season through."

SILK CULTURE IN CANADA.

Three papers on silk culture and the fibre insects of Canada were read to the Botanical Society on 12th April last. Their publication has been delayed in consequence of the MSS having been taken to England, by mistake, among the papers of the President, who read them to the meeting.

The remaining portion of Principal Leitch's paper on bees has also been received by last English mail, and will be printed in course of a few days.

REMARKS ON THE SILK OBTAINED FROM LETTUCE-FED SILKWORMS, BY MISS GILDERSLEEVE.

The accompanying silk is the product of silkworms raised upon lettuce leaves. The experiment was tried with a view of ascertaining whether a substitute for the mulberry as food for the worms could be found which would be raised in this climate and attended with little trouble. Thus far, the experiment which has been tested for two seasons has proved most successful; the worms were healthy, very few of them died, and the silk produced fine, strong and glossy, as will be seen by examining the sample shown. Feeding silkworms upon lettuce leaves is by no means a new thing; it was tried in England more than forty years ago, and pronounced successful at the time; but the mulberry tree growing there, there was not the same inducement for the people of England to feed them upon lettuce as there is with us, who have not the mulberry, though, as the mulberry tree flourishes in several parts of Canada, it is possible it might be cultivated in this district; at the same time nothing could be found so simple and easy raised as lettuce. The kind known as "ice lettuce" has been found best adapted for feeding the worms, being tender and less liable to be bitter than some other kinds.

To those who might like to raise silkworms, and have not yet tried it, a few plain directions upon their management may not be unacceptable. As soon as the worms emerge from the egg, they are ready for food, and should be placed upon paper trays, and young and tender lettuce leaves given them, which must be carefully dried by being pressed between two cloths. Moisture is at all times to be avoided. While very young, they require their food changed about every two hours; and as they become further advanced, three or four times a day will suffice. A quantity of leaves may be picked before night and kept fresh in water till required, that they may be given to the worms just before their attendant retires for the night, though before being given they must be carefully dried and even pressed between the hands to secure their being free from moisture. When fresh food is given them, most of them immediately commence feeding upon it. Those that do that must be gently lifted off the stale leaves and placed upon the fresh; a camel's hair pencil has been recommended for that purpose while they are very young. The worms are subject to four sicknesses during their existence, which may be known by their becoming languid, refusing their food, and changing their skin each time, after which they again devour their food greedily. When ready to spin, which is in about six weeks after they come out, and may be known by their leaving traces of silk after them, they search for a place to form their cocoon. A piece of paper about four inches square, rolled round the forefinger and twisted at one end, forms a convenient receptacle in which to put the worm to spin. This has been found to be the best plan, as being somewhat in the shape of the cocoon, less silk is wasted by the worm in commencing work, and consequently the more silk is left to form the cocoon itself than when any other plan is adopted. In less than a fortnight after they commence spinning they finish their work; this may be ascertained by shaking them, when, if done, the chrysalis will be heard to rattle inside. The largest and finest cocoons are to be laid aside, to allow the moth to be developed; the

others are to be put in a basket, in an oven, to destroy the vitality of the chrysalis, which otherwise would cut its way through the silk; of course, care must be taken that the heat is not so great as to scorch the silk. When the moths come out of those that were laid aside, several of them may be placed upon a sheet of paper, which is to be loosely pinned together at the corners. The moths deposit their eggs upon the paper and die in about three days. The sheets of paper are then laid aside till next year, and kept in a cool place, as stove heat is liable to develop them.

Any persons desirous of raising the silk-worms may obtain their eggs by applying to this Society.

CULTURE OF THE VETCH.

The vetch or tare is cultivated in Canada West to a considerable extent. The following article on its culture is from the *Irish Agricultural Review* (Dublin):—

As the season for sowing vetches is now at hand, a few words on that crop cannot be out of place. To the tillage farmer this crop offers many advantages, because it affords an early bite of succulent food at a period when such is scarce; it can be sown at almost any period of the year with every prospect of success; and, where close tillage is the rule, it can be taken as a stolen or intercalary crop. Without vetches house feeding of stock could not be attempted. In short, on any purely tillage farm, success to the full extent cannot be obtained without a share of this crop.

The soil best adapted for vetches is a strong loam; drained land gives the most excellent crops, but, under proper treatment, good crops can be obtained of most arable soils.

The season for sowing vetches extends over the greater portion of the year, commencing in September, and continuing up to the setting in of bad weather in November; and again in the spring commencing in February and extending up to May. Later than this there is no need of sowing, as the turnip and other root crops would come in fit for use in October; besides, during the three preceding months there is generally plenty of grass for soiling. For our part, we give a preference to sowing the largest breadth in autumn, because they can be consumed in time to admit sowing a crop of turnips. However, after spring sown vetches, crops of buckwheat and mustard may be grown and consumed in time for wheat sowing. These crops will afford a good bite for sheep, besides enriching the land where they are consumed; or, if autumn wheat is not desiderated, a good crop of rape may be calculated on, affording an excellent bite for sheep, while the soil would be in a first rate condition for a crop of April wheat, oats, or barley.

Vetches when cut and placed in racks, yield a large amount of nutritive food for sheep but if it is not thus placed it does not yield half the profit if the sheep are folded on it, because, from its prostrate habit of growth, the trampling of the animals would render much of it unfit for use. It forms a capital summer feed for horses. It is also sometimes saved as hay and makes a good provender, but is rather difficult to save on account of its succulency. It likewise returns a paying crop of seed; but, of course, then its haulm is not near such good fodder as when saved before the seed ripens, and when the premature seed and all will be consumed by the animals. On a good dry harvest, vetches grown for seed have been known to pay well; but, from the precariousness of our harvests of late years, we could scarcely recommend the growth of the plant for that purpose.

The vetch is a gross feeder, and will return a proportionate amount of produce for any liberal treatment it might receive. On this account about twenty or thirty tons of farmyard manure should be ploughed in, and if any artificials be given, they should be of the ammoniacal kind, such as Peruvian guano, sulphate of ammonia, &c. The land should be autumn cleaned; and by manuring at this season we gain two ends, for we not only ensure the prospect of a good vetch crop, but when sowing the succeeding crop we do not want to dissipate the moisture of the soil at the dry season of the year by repeatedly plowing so as to prepare the land for the reception of the dung; all we require is to shake in some hand manure. If the crop is sown for the seed, however, no manure should be given. Another system of sowing vetches is in manured drills along with beans. The beans, from their stronger stalks, support the trailing vetches, and in the harvest the haulm of the vetches serve to bind the leaves in sheaves as well as to make the bean haulm more palatable as fodder. If necessary, both grains can be separated afterwards by the riddle when winnowing. A similar practice is pursued with peas, and with the most profitable results.

The quantity of seed sown depends on the season, as well as on the mode of sowing. About two bushels are required to the acre when sown in autumn by the corn drill, in rows at least inches apart; if sown broadcast, another half bushel will be requisite. In dry soils we prefer the drill, but in damp we recommend broadcast, and the earth to be shovelled up from the furrows in beds 10 or 12 feet wide. The winter or autumn sown will require an extra inch in depth of cover. A bushel and a half will suffice for spring sown with the drills, or two bushels when broadcasted. In order to keep the crop somewhat off the ground when used for sowing, a stone or two of wheat or rye should be sown with the winter, and a like quantity of oats with the spring sown vetches. A succession should be kept up during the seasons by sowing once a fortnight.

The variety of vetch usually cultivated in this country is the *vicia sativa*—common vetch or tare—of which there are two kinds known in cultivation, namely the summer and winter vetch, which bear a very close resemblance to each other. Some botanists think them convertible, and suppose that the difference only arose by cultivating one variety for a series of years in winter, and the other in spring; for they find that by gradually sowing one late and the other early, after a few years they become one and the same plant. For all practical purposes, however, care should be

taken by the farmer to procure the variety adapted to the season, because the variety cultivated as the "winter vetch" will stand the severity of our winters, whereas the other would not; and, again, the "summer variety" will grow much quicker and more luxuriant at that season than the other would.

There are several other varieties of vetches which would be worthy of extended trial. The Siberian vetch, which was introduced by Miller in 1753, was sufficiently hardy to withstand our most severe winters, yet grew to a height of seven or eight feet, yielding an exceedingly heavy crop. The Hopetoun, or white-flowered vetch is now the principal variety grown in Scotland and is reported by Professor Wilson to yield double the crop of the ordinary variety. It was found growing accidentally, about twenty years ago, in a field of common vetches. There are other perennial varieties of vetches which are cultivated in Germany like lucern; some in France, which grow like beans, hardy, and not requiring support. The Russian vetch is reported to yield double the crop of the common vetch, of very nutritious quality; while others, as the "Lentil of Canada," are cultivated for their seed, which is used as human food. From the favourable reports we have of some three or four varieties of vetches, it would appear that we should lose no time in introducing them—giving them a trial at least, as there is no climate more favourable to their growth.

MANURE.

MAKE MANURE AND SAVE IT.—We do not know which is most generally neglected, the making or the saving of manures. Few farmers ever seriously sit down to think how they can make manure. They feed their horses, cattle, sheep, and hogs, on a certain quantity of hay, straw, stalks, and grain. A portion of this they know is retained in the animal, or is dissipated into the air with the breath, and the remainder is ejected from the body, mixed with more or less water. This we call manure. Put on the land, it increases the crops. So much is known. But what more is generally known? What is manure? What is its value? Ask the first farmer you meet, and see if he has ever given the subject any serious consideration. Ask him if he plows under a ton of straw, if that is good manure, and he will tell you it is not worth much. Ask him if he feeds that ton of straw to cattle, if it is good manure then, and he will probably answer you yes. *But it is not.* It is as much straw in the one case as in the other. If the original straw was worth very little as manure, it is certainly worth no more after it has been passed through the body of an animal. The animal *adds* nothing to it. It may be in a better condition to apply to the land, but it contains no more plant food; in fact, it does not contain quite as much, for the animal has abstracted some portion of the food, although it is true that the greater portion of that which is removed has not much manurial value.

The vendor of a patent apparatus for steaming food recently told us that the increased value of the manure would of itself pay all the expenses of steaming hay, straw, corn-stalks, etc. The poor man was evidently in earnest, but we could not help laughing at him. We tried to explain that if the food did not contain the requisite elements to make good manure all the cooking in the world would not develop them. If a ton of straw or corn-stalks contain only 5lbs., of nitrogen, the manure made from it can contain no more. We told him that he might rot it, cook it, digest it, or do what he pleased with it, and he would only have the 5lbs., of nitrogen. He could not make rich manure by steaming food that does not contain the requisite elements. "You cannot make a whistle out of a pig's tail." "Yes, I can," he replied, "for a woman in our town has done it!" and he left, thinking that he had decidedly the best of the argument.

What we wish to urge upon the consideration of the readers of the *Genesee Farmer* is this; make rich manure, you must feed rich food. The manure made from 3 bushels of peas is worth more than that made from a ton of straw. One ton of clover hay will make manure worth as much as that made from four tons of straw or stalks.

We must not be understood as underrating the importance of straw on the farm. It is a valuable article, indispensable to the successful and economical management of cattle or sheep. But do not suppose that straw or stalks *alone* will make good manure. JOHN JOHNSTON whose successful practice we have so often referred to, is careful to preserve his straw, and have his yards well littered with it. But he feeds out large quantities of grain, oil-cake, clover hay, etc, and in this way makes rich manure. "What had you for dinner today?" asked Pat. "Beef and potatoes," replied his friend. "Faith," said he, "an' that was just what I had, barring the beef." Many farmers are just as careful to preserve their straw as JOHN JOHNSTON, and their manure heap is just as good as his, barring the nitrogen or ammonia of the oil-cake, corn and clover hay.

"What grains make the richest manure?" Beans and peas make richer manure than any other plants we grow. Corn, barley, oats and wheat about half as good. Clover hay next, but not far behind. Then ordinary hay which is quite inferior to clover hay, and then straw, stocks, etc. Pea and bean straw makes rich manure—one ton is worth three or four tons of ordinary straw for this purpose.

Having got the manure, save it. How is this best done? Some say, draw it out and spread it on the grass land as fast as it is made. Some are careful to preserve it in cellars; and others erect sheds. The great majority of farmers, however, keep it in open yards. This is the least trouble, and if the yards are properly constructed—the buildings are spouted, so that the manure in the yards gets no more water than the rain which falls on its surface,—it can be preserved in this way without loss. Let the droppings of the different animals be mixed together. Some farmers throw the horse dung into a heap by itself, and in this case great loss is sustained by excessive heating. Were it mixed with the cold, sluggish hog manure,

this would be avoided, and both would be improved.

Autumn application of Manure.—There is nothing connected with manure of more importance than its right application. Yet the whole theory is a very simple one. If diffused finely through the soil, it is useful; if not so diffused it is of course, precisely the same as if absent. The best way, consequently, to apply a given quantity of fertilizing material is in the state of solution—that is, as liquid manure, so that it will come in contact with every particle of soil. The worst way is to throw it in coarse lumps or masses over the ground, and by bad ploughing, half cover some of the coarse lumps, and leave others uncovered. If the season happens to be very wet, a small portion of the soluble parts may find its way into the soil, and ultimately be useful to the plants; if the season is dry, the uncovered parts may be of a little possible benefit as a mulch, and the covered parts prove positively injurious by rendering the soil drier, without giving it any rich particles.

But in ordinary practice manure cannot be converted to liquid, and then applied in water carts. The same result may, however, be attained in effect by a different and far easier management. Let the rains dissolve the soluble manure on the spot where it is wanted, and carry it directly among the particles of soil. This cannot be done in summer, when it will be dried up rather than dissolved. It is only to be accomplished by autumn and spring rains, or during winter thaws. That is, *spread manure in autumn whenever practicable*; the best farmers attach great importance to this practice. The finest fields of corn that we have seen this year were in nearly every instance raised on soil that had been manured the previous autumn on the sod; and after a few inches of the top soil was well soaked with the liquid manure thus furnished, (assisted in its downward progress by the roots of the grass,) and just before planting time, this grass was inverted to a moderate depth, and the corn planted upon it. The same advantages have resulted from autumn manuring for any other spring crop requiring a fertile soil, or in the preparation of land for the spring planting of fruit trees; or in enriching the ground around young trees already planted.

But the question occurs to many, "how shall we get manure in autumn? our animals manufacture it for use only during winter." In answer, it may be observed, that some manure is made during autumn, more particularly from horses; this should all be spread before or on the commencement of winter; another portion, and a very large one, consists of the droppings of cattle all through winter, mixed with cornstalks, straw, &c., and too coarse for spring application. This should be thrown into heaps to decay through summer, and if some soil, turf or muck, previously carted into the yard, should be mixed with the heaps, all the better for the preservation of all parts. If these heaps are sufficiently decayed by early autumn, they may be applied to wheat fields, after the land is ploughed, and before harrowing, as we have elsewhere described; but if too coarse still for this purpose, then they may be spread on land intended for spring crops.

Nearly all the benefits of autumn manuring may be secured, where cattle and other animals are kept in stables or warm basements, by drawing out the manure during the comparatively leisure time of winter, and spreading it at once on the land. The winter rains whenever they occur, and all the spring rains, will give it a thorough washing, and carry the liquid into the soil; but such places must be selected for this purpose as will not favour the accumulation of water into brooks or streams, and thus carry off the manure altogether. Grass lands are much the best for this treatment, by tending to retain the manure.

Nothing is better for gardens that are to be enriched for spring crops than autumn or winter application of manure; and newly planted trees, dwarf pears, strawberry beds, &c. receive a great deal of protection against cold by such coatings, which are to be turned in in spring.

Sulphite of lime for preserving cider.—One of our agricultural contemporaries that ought to know better recommends "sulphate of lime (gypsum)" for arresting fermentation in wine and cider. Had not the word "gypsum" been inserted we should have concluded that it was a typographical mistake—that the editor wrote sulph*ite* and the printer set it up sulph*ate*. But the "gypsum" put in to explain what sulphate of lime is shuts out this charitable excuse for a really flagrant blunder.

Sulph*ate* of lime (gypsum or plaster) is composed of sulphur*ic* acid and lime. Sulph*ite* of lime is composed of sulphur*ous* acid and lime. The difference between sulphur*ous* and sulphur*ic* acid is that the latter contains more oxygen than the former. Sulphurous acid has a strong affinity for oxygen and takes it from surrounding bodies, and thus changes into sulphuric acid.

When we burn sulphur in atmospheric air sulphur*ous* acid is produced. The well known practice of burning a little sulphur in the barrels previous to putting in the cider is based on this fact. The sulphurous acid so formed has a strong affinity for oxygen and takes it from the cider and thus arrests fermentation—for without oxygen fermentation cannot proceed any more than a fire can burn without air.

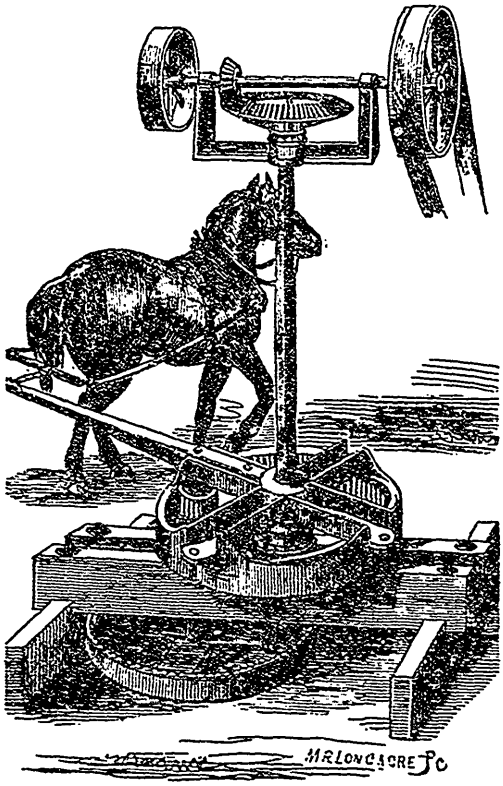
Sulph*ite* of lime has the same effect as sulphurous acid. In fact it *is* sulphurous acid, united with lime. The advantage of using the sulphite of lime instead of the sulphurous acid is this; there is no danger of getting too much sulphurous acid in the cider. The sulphite of lime is insoluble, and remains in the cider without action till it is required. When the cider begins to ferment the acetic acid that is formed unites with the lime and sets free the sulphurous acid. This sulphurous acid, as before stated, then absorbs the oxygen from the cider and arrests fermentation. All that we have to do, therefore, is to let the cider ferment to the extent desired, and then add the sulphite of lime, say four ounces to a barrel, and it will keep in this condition for any length of time.

ANTI-FRICTION HORSE POWER.

This valuable invention is a great improvement on the Horse Powers now in use; and is particularly designed for driving Farm Mills, Threshing Machines, Cotton Gins, Circular Saws, Morticing, Moulding and Planing Machines, &c., &c.

The entire weight of the Castings, runs upon *iron balls;* thus the smallest possible amount of friction is produced; *so small* in fact, that *three pounds* draught, on the end of a *ten feet lever*, will keep it in motion! thus the great advantage of this machine is, that the entire strength of the horses put upon it, *is available*, on the machine to be driven; or in other words, no power is thrown away; this will be appreciated by those using the ordinary Horse Powers.

The driving shaft makes 52 revolutions with one turn of the horse, or 156 revolutions a minute, as the horse will travel around a circle 24 feet in diameter three times a minute. This shaft has two pullies, one 16 and the other 30 inches in diameter. These pullies can be changed



Anti-friction horse power—Bennet Brothers, New York, No. 1.

for larger or smaller ones to obtain any speed required on the machine to be driven.

By this combination and arrangement of the internal toothed wheels and pinions the proper speed to be given to the driving pullies, is attained by gearing occupying a much less space than any of the "sweep" horse powers now in use, while the elevation of the driving shaft and pullies, and the facility with which they can be set at different angles to the bed of the machine, to operate different machines without changing the position of the power, or the machine to be operated by it, gives to it an advantage over any other motive power now used. The further advantages of simplicity and cheapness of construction, small amount of power required to operate it, and lessened liability of being broken or otherwise disarranged by use, and its portability—it being complete within itself, all of its shafts being attached to the machine itself, so that none of them are liable

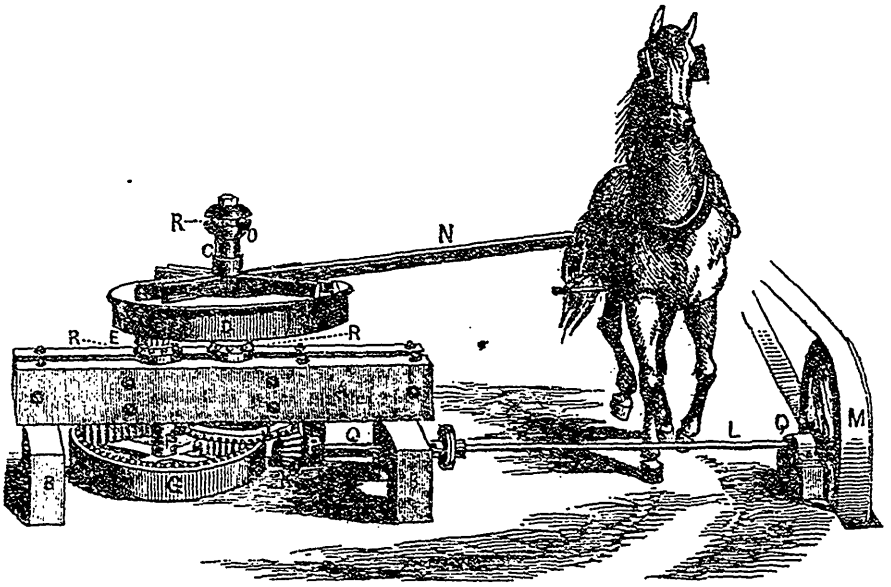
to be thrown out of line and become "bound" by the settling or the shaking of the building, as is the case with other powers, will be appreciated by all who have seen and used the expensive or complicated horse-powers now made and sold, and will commend it to the attention of all who wish a cheap, compact, and reliable horse-power, possessing advantages, as above named, beyond those of any other now before the public.

Two horses attached to the small power will do the work of a steam engine of five horse power. Six horses attached to the large power will do the work of a steam engine of twelve horse power.

These powers, having been in use for the last two years, have been thoroughly tested, and have proved to be all that can be desired.

From 25 to 50 per cent. in horse flesh is saved over the horse powers in general use. Every power sold is *guaranteed* to be all that we represent.

Price of Power for 1, 2 or 3 horses, $125.
" " 1 to 6 " $175.



Anti-friction horse power—Bennet Brothers, New York, No. 2.

The above cut represents a Portable Horse Power for field purposes. It is made from the same patterns as the powers previously described; with the exception that the yoke "H" in the upright power is dispensed with, and the bevel wheel secured to the *top* of shaft running through the hollow column "C," is reversed and secured to the *bottom* of said shaft as in the above drawing. By this arrangement the driving shaft "L" is brought so close to the ground that the horses can easily step over it in making the circuit. It requires no bracing at the top as is the case with the upper geared power; permitting it to be transported from place to place without being taken apart; it being complete within itself, all its shafts being attached to the machine itself, and none of them are liable to be thrown out of line or become bound by the jarring unavoidable in the act of carting.

This under geared power is particularly designed for driving Threshing and Hay Cutting Machines, Circular Saws, Farm Mills, Rotary Pumps, &c. Its compactness, simplicity, portability, non-liability to get out of order; its durability, and the small amount of power required to operate it (being the same as for the power above described,) gives it an advantage over every other power before the public.

The driving pulley "M," makes 52 revolutions to each turn of the driving wheel "D," the same as the power above described. A pulley to give the machine to be driven the required speed will be furnished with the power.

To know what sized pulley to put upon the power, it is necessary for us to know

the diameter of the pulley on the machine to be driven, and the number of revolutions per minute it must have.

The powers are got up in the most substantial and workmanlike manner, and strong enough to resist the entire strength of the horses put upon them. The journals are all lined with Babbit's metals.

Reasons why these Horse Powers should have the preference over all others are:—

That they are adapted for a one horse or six horse power. They run with so light a draft that *one horse will do more work* than can be done with one horse on any other power, and do it more easily. If heavy work is to be done, the power is strong enough to resist the combined strength of six horses, and will do more work than can be done with eight horses on the ordinary sweep powers. They will last with continual use for many years, being made in the strongest and best manner, and having no weak parts cost nothing for repairs, the only expense being cost of oil. By this combination of gearing great speed is obtained directly upon the power itself, thus obviating the expense of putting up countershafting to get up speed, and saving the power required to drive it. It is a portable power and can be transported about the country from one place to another, the same as the endless chain powers, and can be used in the field as well as in the house.

GUANO ANALYSIS.

M. Malaguti, Professor of Chymistry at Rennes, has sent an interesting communication to the Academy of Sciences on certain fertilizing substances known under the generic name of Guano, of Patagonia. Shag guano, so called from a kind of cormorant which sailors at Cape Horn call Shags, somewhat resembles the guano of Peru; it is not very homogeneous, being mixed up with feathers, fragments of bone, and a few crystals of carbonate of ammonia. It has an ammoniacal smell, contains small quantities of oxalates, nitrates, chlorides, acid phosphates, about a third of its weight of triassic phosphate of lime, and about half its weight of organic nitrogenized substances. The quantity of nitrogen, the most important item in fertilizing matter, varies in this guano between 8 and 12 per cent. Lion guano, so called from the kind of seed called sea lion, found in the cavities of the rocks on the sea-shore, which those creatures frequent, is a mixture of the remains of amphibious animals and bones, fur, scales, and balls of a humic or earthy appearance, containing a large number of small crystals in the form of needles; also fragments of a yellowish rock, resembling sulphate of lime, crystals of struvite, and certain prismatic crystals of a brown colour which M. Malaguti has found nowhere described. The yellowish rock has the structure of an aggregate, far from compact, of small crystals. When calcined it turns to a brilliant white; its density, is 2·174, but is not uniform, the organic matter it contains amounting to 23 per cent., not being equally distributed throughout the mass. It contains moreover 57 per cent. of triassic phosphate of lime, 10 per cent. of acid phosphate of lime, and the rest consists of sand, sulphate of lime, and traces of fluorids of calcium. As for the brown prismatic crystals, they are not perfectly transparent on account of the earthy particles they contain. Their true crystalline form is difficult to ascertain on account of the manner in which they are grouped, sometimes in the shape of a cross, at others a fan, a spheroid covered with prickles, &c., their mean density is 2·267; they are partly soluble in water, imparting to it a certain degree of acidity. They contain 23 per cent. of organic matter, 51 of triassic phosphate of lime, 22 of acid phosphate of lime and pieces of silica, fluoride of calcium and alkalies. Penguin guano does not display such a heterogeneous composition as the preceding kinds, yet it contains some feathers, and bones, and a multitude of little white globules which pressure easily reduces to powder, and crystruc-struvite. The smell of the mass is somewh at ammoniacal. When moistened it becomes acid. If brought into contact with acids it produces a slight effervescence, which sometimes contain soluble salts, including nitrates, then a certain quantity of triassic phosphate of lime, aluminium, and iron; but no oxalates, or uric acid. It contains from 4 to 4·35 per cent. of nitrogen; all the phosphate it contains barely amount to 35 per cent., and they are chiefly phosphate of alumina, which renders this guano more soluble in acids before calcination than after. The white globules above alluded to are composed of this phosphate, containing 32 per cent. of phosphoric acid. The last kind of guano mentioned by our author is that quarried, so to say, from beds lying under a layer of sand sometimes three feet deep. When cut out, it is in the state of a plastic paste, which must be left to dry in the open air for three months before it is shipped to Europe. This kind also contains globules of phosphate of alumina; and though it does not contain crystals of struvite, it on the other hand has large rectangular pyramids of ammoniaso-magnesian phosphate. It contains from one to three per cent. of nitrogen, and from 16 to 39 per cent. of phosphates, but no remains of animals, such as bones, feathers, or hair. M. Malaguti believes it to be penguin guano modified by the action of ages.

Self Sucking Cows.—A correspondent of the Boston *Cultivator* confidently says a cow is not worth fifty cents less for this habit. He confines her head with a rope, and then splits her tongue about two inches, with a very sharp knife, making the two parts equal, and giving soft food for about three days, when it will be well, and the cow will feed as well as ever.

VALUE OF FARMERS' CLUBS, ETC.

At the recent annual meeting and ploughing match of the Oxton Farmers' Club (Notts). the Chairman, J. C. Nixon, Esq., said :—Such societies were important in every point of view. It was from unity of action by men brought together that the greatest results were achieved, and it was owing to the feeling which the men possessed who ploughed that day that they were working under the eye of their masters with whom they had been brought up, and whom they regarded with comparative affection— it was because they felt they were observed by their masters, or those who employ a like description of labour, that the work was so well accomplished. He was quite sure that it was from this unity of action they derived the amount of enlightenment which the country now possessed, as each derived advantages from consultation with others, and daily conversation. These societies, branches of the Royal Agricultural Society of England, had already produced great results, having conferred the greatest benefit on the manufacturers of beef, of mutton, and of the other kinds of food necessary for the sustenance of their fellow man while he trusted that at the same time, they had been attended with rich reward to the members. He did not know how this country could have got on had it not been for the unity of labour. Every man who benefited himself benefited the community also; they who did not neglect their duty, and *no man more neglected his duty than he who did not seek to cultivate the soil so as to produce the fruits of the earth in the greatest abundance. The cultivation of the soil was of the greatest importance, as it involved the employment of man's daily labour and the production of man's daily food*, and he who neglected the important task of making two or three blades of grass grow where only one grew before deserved to be discarded. He was like the man in Scripture who buried his talent, and was pronounced an unjust servant. But in referring to this class of persons, he was constrained to admit that there were very few of them in England. There was no place in England where the intellect of man was not engaged to bring about the most profitable result. For twenty five years and upwards he had been identified with agricultural matters in his business, and he had not failed to remark the advance which had been made and the wise use to which their talent had been applied by his agricultural neighbours. They had advanced considerably the welfare of their land, and had shed a halo around the domestic hearth. He dared to say that the agriculturists of this country had made a more marked advance in the social scale than the members of any other class of society. In making use of the word class he begged to be understood that he did not apply it in any offensive sense. Society should rather be one great family, and men and women should look upon each other as brothers and sisters. It was not possible that individual labour could accomplish such great results as men accomplished by unity. They could not improve their breed of stock, or make any great advance in agricultural science, without its being made known to the world by the agency of the electric telegraph, the iron railroad, and the press, and now, happily, every man had an opportunity of benefiting by the experience of his neighbours whether he lived at home in England or at the antipodes. The man who made two blades of grass to grow where only one grew before obtains himself the advantage of it; but others are also advantaged by his success. It was in that light they should look upon themselves as members of the great universal family, assembled there for a great and grand object. He had long been accustomed to hear of the pre-eminence of the Oxton farmers. The remark was frequently made in his hearing, "If you want to see good farming, go on Mr. Sherbrooke's estate." On that they saw one of the first principles of the unity of labour carried out to a successful result. Great results had been produced in the past, and he had no doubt that corresponding results would be obtained in the future. If they looked beyond the narrow limits of any particular society into the broad experience of the world, they would see that there was something to be learned from every one in the world, and they would experience the truth of what had passed into a homely proverb, that "two heads are better than one, even if one of them should happen to be a pig's." (laughter) He had made reference to class distinctions, and he could not perceive why there should be any between the manufacturer and the agriculturist. Theirs was a position of mutual dependence, and the difference only existed in the over-imaginative brain of some poor creature. It did not exist certainly in the intelligent mind; for every man of intelligence felt that there were two great sections of the human family, working for the benefit of all. The manufacturer could not prosper unless the agriculturist was doing well. Each was the customer of the other, and in this comparatively little island, blessed with the great and glorious privilege of mixed monarchical constitutional government, they should disclaim any attempt at disunion on any ground whatsoever. The next principle to be inculcated after that of the identity of classes was that of charitable feelings to all. When they got rid of the distinction of classes and acknowledged each man as a brother and as a member of the one great family, they had taken the initiative to that charitable feeling towards each other, which would not only enhance their comforts in this life, but add to their immortal happiness in the next. Societies such as that at which he had the honour of presiding were admirably calculated to promote charitable feelings, and on that ground were deserving of the best encouragement. It should also be remembered that when a man engaged at his daily labour was endeavouring to promote his individual benefit, he was also labouring for the advantage of the world. Intelligence, and that advantage which was the result of intelligence, like the bee, flies to the ends of the earth and leaves its sweetness behind it. It was impossible to destroy a good once done, and its fruits were everlastingly gathered.

In proposing the "Successful Competitors," Mr. Nixon proceeded to say—He attached the utmost importance to the combination of talent with labour, and his reasons for so doing must be apparent to every gentleman present who had servants successful in the trial of that day. He hoped that all employers of labour would be diligent in instilling into the minds of their men the necessity of accomplishing their task with as much judgment as strength. He remembered that when conversing some-time since with the respected vice-chairman at the door of his warehouse, that gentleman remarked that he saw no reason why the workmen could not do their work within the time allowed. It was not the amount of labour that was required, but the amount of judgment. It could not make very much difference to the ploughman to walk over the same distance of ground with judgment as without it. The ploughing of half an acre of land in three and three-quarter hours involved the necessity of walking over a considerable distance but let the man be walking to country wakes and he would accomplish a greater distance in much less time. The master's guiding intellect was necessary to show the man where he was going, and what he was to do, and to show him how much more advantageous it would be to perform the task with judgment than otherwise. Set a steam-engine to work, and it goes on as long as it is supplied with fuel and the steam-engine never knows why it works. Man was a great engine, and, if supplied with the coals of advice he went to his work animated by that great stimulus, the desire to excel. It was a great stimulus to the agricultural labourer to obtain prizes, and to be able to go home and tell his wife and children of the success he had gained. It was a great reward for the commander of an army to feel that he had raised himself to that proud position ; it was also a great reward to the admiral in the navy to find that he had obtained promotion by striving for it. From the lowest to the highest, emulation was the great incentive, and success the great reward. It was a reward for the clerk to move from the lowest to the highest stool, and it was also a reward for the studious curate to reach the appointment of village rector ; while the reward became of the highest importance when the rector becomes bishop. Of this latter there were numerous instances. He believed that every man who merited had received his reward that day. He believed also that the meeting would sympathize with those who were not fortunate. Education in labour was of the utmost importance, and he was led to suppose that there was more to be gained by it than by education in letters. They should, therefore, strive to educate their labourers.

Mr. Brett fully agreed with his friend, Mr. Nixon; that it was an imperative duty on employers to teach their servants to labour properly, and thereby best benefit themselves. At Calverton they found eight of the best men out of time. In another place only three and a half hours were allowed to plough the half-acre, and the men found it plenty of time to get through the work in. He should mention a circumstance within his own experience. He sent three of his men into an eighteen-acre field, and instead of doing it in six days, as they should have done, they occupied seven, thus putting him to an expense of £2. He told these men that he should not let them come to the ploughing match if they did not improve, and to-day he found that the first man managed to get through his half acre in three hours and four minutes, and the others in three hours and eight minutes. That showed that when a man was pushed to do a thing he could do it. He really believed that an account should be kept by the gentlemen of the club, and that a prize should be given to the man who ploughs the greatest number of acres within the year. He hoped that every individual member would take a note of what was done during the year, so that a comparison might be made at the end He was sorry to say that his men had not done sufficient to satisfy him. Every gentleman knew that an acre of sand land was not sufficient for a man's work in the day.—*From Report in Notts Guardian.*

INSECTS IN FOWL.

There are several kinds that infest the hen. By attending to the following remedy, they will be entirely kept clear. First of all, if in confinement in the dust corner of the poultry house, mix about half a pound of black sulphur among the sand and lime that they dust in. This will both keep them free from parasites, and give the feathers a glossy appearance. If infested with the insects, damp the skin under the feathers with a little water, then sprinkle a little black sulphur on the skin. Let a bird be covered with the insects, and they will dissappear in the course of twelve hours. Also, previous to setting a hen, if the nest be slightly sprinkled with the sulphur, there is no fear of the hen being annoyed during incubation, neither will the chickens be annoyed by them. Many a fine hatched brood pines away and dies through nothing else and no one knows the cause. Having had an ostrich under my care that was pining, I looked into his feathers, and observed thousands of parasites. I employed tobacco-water, also lime-water, under my then master's orders, to no effect. In his absence, I well damped him and sprinkled him under the feathers with black sulphur, when next day they were examined with a microscope, and every one was dead. Having had some macaws, also parrots that were addicted to biting off their feathers, I employed the black sulphur by well syringing them with water, then sprinkling the sulphur over their skins. If tame, sponge the skins, then rub gently, with the points of the fingers, with the sulphur, every other day, for about a fortnight, when the parrot or macaw will cease to destroy his plumage. It is not a remedy which has not been proved, for I have used it these two years with success.—JOHN DOUGLAS, *in the Field.*

SALT FOR SWINE.—A farmer in Germany states that he has found salt given to pigs when fattening very beneficial. He gives about one ounce to each pig per day.

HINTS WITH REGARD TO PACKING AND CURING PORK.—As the season for packing pork has now commenced, and many parties who may be tempted by the low price of hogs to pack, may not be able to secure the services of a competent and experienced party, we will endeavour to give a few plain practical hints to enable them to put up their pork in such a manner as to secure the best returns and the least possible loss in weight.

Cutting.—Having observed the precaution of leaving the carcass hanging until the animal heat becomes extinct, first separate the head close behind the ears, and chop off the snout and under jaw above the tusks, pare off the ears, and cleave the head through the centre, remove the brains, and, if large, divide the halves at the jaw,—next separate the neck close to the joint of the shoulder, which cut in two; proceed by separating the shoulders, cutting through the body, in breath about six or seven inches, divide in the centre, and cut each into pieces conformable to standard weight, cutting off the legs close above the knee joints. Next in order: separate the hams from the body at the hip bone, and in shaping the ham cut close to the crotch bone, leaving a tail piece of five or six pounds, and when it is designed to pack the hams they should be cut into two or more pieces, according to weight, and the legs removed close above the gambod joint. Lastly, turn the trunk open side up, and cleave through the centre of the back, then divide in pieces of about six inches, or taking in about three ribs. When the pieces are very thick they should be chopped across the middle. All pieces should weigh from four to eight pounds.

Barrels—Should be made of good and well seasoned white oak or white ash, staves 28½ in. in length, and head 18 in. in diameter. Two-thirds of the barrel should be covered with good hoops, and a hole bored with an inch bit or auger in the centre of the bilge for the reception of pickle. The heads should never be bored. Barrels should be well made else they will lose the pickle, and the pork become rusty or otherwise damaged, while the regulations of inspection require defective barrels to be condemned.

Packing.—Use the best Liverpool salt, as it answers well for curing, and is most convenient for transmission to the country. Spread a layer of salt over the bottom of the barrel, and place the pieces side by side, edgeways, as close as possible, supplying a copious layer of salt between each layer of pork until the barrel is filled, using the best pieces for the top. Fill the barrel with pickle as strong as it can be made, and when carefully bunged, it should remain on the bilge, with bung upwards.

The grades established by law are Mess, Prime Mess, Prime and Cargo.

Mess—Is made from side pieces of good fat hogs weighing two hundred and fifty pounds and upwards to the carcas.

Prime Mess—Is made from hogs of 225 lbs. One carcass of that weight, with lard and trimmings off, makes a barrel.

Prime—Is made from hogs of 200 lbs., or thereabouts, and consists of one and a half hog to the barrel.

Cargo—Is a grade but little used, and scarcely worth the attention of packers.

It is important to know that pork fed on the better qualities of grain, such as corn, pease, and oats, when packed at the usual season and pickled with the strongest pickle, will usually increase five to six per cent in weight: while that fed on soft grain and roots will gain little, if anything, and distillery fed will even decrease under the action of salt. All qualities, however good, will decrease in weight during the summer heat, and pork will always run short of the original weight if destitute of pickle.

AIKIN & KIRKPATRICK,

DREADFUL DISEASE AMONG PIGS.—We learn from all quarters that farmers are losing their pigs in great numbers by a disease which first appears in a redness behind the ears, and so severe is it that they do not survive longer than half an hour after it shows itself. The losses sustained this year by hay crops is comparatively trifling compared to that experienced by the ravages made by this disease among the pigs.—*Skibbereen (Ireland) Eagle.*

SWEET SIXTEEN.—Poetically, it is very well. Practically, I object to it. Has it ever "a decent dress," although the family sempstress works from morning till night of every day in the year, taking in and letting out, lengthening and shortening, narrowing here and widening there. The very first day a new dress is worn, don't "sweet sixteen" tear it, and that in a most conspicuous place, and in the most zigzag manner. *Could* she, "help it," when there is also a protruding nail or splinter lying in wait purposely for her, which by no foresight of her's could be walked around or avoided? Don't the clouds always seem to know when she has on a new bonnet, and the mud when she wears new gaiters? And when she wants her umbrella at school, i'snt "the nasty thing" always at home, and when she needs it at home, is it not always perversely at school? Don't "sweet sixteen" when she takes a notion to sit down and sew, always locate herself by the side of the bed, which she sticks full of needles, and going her way straightway forgetieth, till roused by the shrieks of punctured sufferers? Don't "sweet sixteen" always leave the street door open, and the gas in her room burning at high pressure all night? Does she ever own a boot-lacing, or a pin, or a collar, although purchases of these articles are made for her continually, if not oftener? Isn't her elder sister always your "favourite," and was she never known to like her breakfast, dinner or supper, or prefer wholesome food to saccharine and dyspeptic messes? Is she ever ready to go to bed of a night, or get up of a morning? Don't she always insist on wearnig high heels to her boots, which are constantly locating her feet where her head should be? Don't she always, though consulted as to the hues and make of the garments repine at the superior colour and fit of those of Adelina Seraphina Elgitha Smith's? And finally, although she has every thing she wants, or thinks she wants, isn't every thing, and every body, "*real mean, and so !*" *they are* FANNY FERN.

THE PRINCIPLES WHICH REGULATE THE BREEDING OF FARM STOCK.

By Henry Tanner, M.R.A.C., Professor of Agriculture.

The careful observer of nature has ample proof that her works are all carried out in accordance with fixed rules, and no one has better opportunities for securing this evidence than the agriculturist. A modification of circumstances may cause a variation in the results; still there is, throughout his experience, a thread of evidence which proves the existence of established laws. The importance of farm stock is daily becoming more fully recognised, and truths applicable to the whole class can be traced out and determined most satisfactorily by attention to individual specimens. The variation in the feeding capabilities of different animals is a fact which needs not to be enlarged upon; for every farmer knows that whilst some animals are such good feeders that they pay by an increase of weight for all the food which they consume, others, for the purpose of fattening, would be dear as a gift. Assuming, then, that such a difference exists, I propose to show and explain, as briefly as possible, the rules which govern the results required and the system to be followed in putting them in practice.

It materially lessens our difficulty to know that in the breeding of all varieties of farm stock—cattle, sheep, pigs, &c.—the results seem uniformly to follow the same fixed but simple laws. It is an old and approved maxim that "like produces like;" but this rule, though generally true, may be misapplied, when the error will be demonstrated by the contradictory evidence of practice and experience. If an animal is capable of transmitting any character to its offspring, it must possess that which it conveys, although at times qualities may predominate in the offspring which were almost latent in the parent. If, therefore, any quality or character is rendered hereditary, it must correspond with that inherent in the parent from which it descended. If, however, I breed from a female possessing certain qualities by a male distinguished by an opposite character, it is clear that the offspring cannot perpetuate *both* of these characteristics, and the result appears antagonistic to the maxim that "like produces like." This brings us at once to the consideration of one of the most important principles connected with breeding, namely, that although "like produces like" (for it can produce nothing else), still when the parents possess opposing qualities the preponderance is exercised by that one which possesses the hereditary tendency in the greatest strength. If, for instance, a cow having any special peculiarity of form is put to a bull having the opposite character, the offspring will assume the character of that parent which possessed the greatest hereditary powers in this respect, or, in other words, the greatest purity and unity of influence. If these hereditary powers are under our control, it is important to consider by what means they may be increased or diminished.

In breeding from a ram and ewe possessing a similarity of type, the produce of such an union will of necessity also possess the like character, but in a higher degree. Thus the result of breeding stock of similar character is that these peculiarities are not only perpetuated, but intensified, in the offspring. Provided that the parents possess similarity of type in any given particular, every successive generation thus produced acquires an increase of hereditary force, by which we mean the power of imprinting its own stamp upon its progeny. But in like manner as this power accumulates when there is a similarity of character, so also does it diminish when the parents have opposite or antagonistic characters. Suppose that a well-bred ram, by careful breeding through the several successive generations, has acquired strong and valuable hereditary powers (which, for illustration sake, we shall represent in figures), say equal to 100. If this animal be put to a ewe of a totally different character, say having hereditary power equal to 60, the result would be that the offspring would still possess the same character as the ram, because of his superior hereditary power; but the hereditary capability of the offspring would be reduced to, say, 100—60=40. Supposing the offspring to be a ram, at a subsequent period both the sire and offspring may appear equally perfect in form and general character; but the power of hereditary transmission being so much greater in the sire than this offspring (in proportion of 100 to 40), the former would be far more valuable as a breeding animal, although the difference in the capabilities of the two would be entirely hidden or latent. If you breed from animals possessing a similarity of type, the offspring will possess the same character, but with a greater power for the hereditary transmission of this

character. On the other hand, animals having opposite characters mutually weaken each other's influence, and the offspring only possess the power of hereditary transmission in a reduced degree.

This power of perpetuating character is not confined to any one quality, but it extends to every peculiarity of the animal, whether it be similarity of feature, configuration of the body, general habit of growth, disposition for fattening, the formation of milk, healthy constitution, predisposition to disease, temperament—all are alike hereditary, and are modified in their transmission by the mutual influence of the parents. It would appear as if every individual point of character were thus controlled and balanced according to the respective tendencies of the parents, and that the resultant character represented a series of balances, sometimes in favour of the male, at other times in favour of the female. The dam might succeed in communicating the general form to the body, but be unable to overcome the stronger power of the male over some certain portion of the body. The dam might be naturally deficient, for instance, in her hind-quarters and good in other parts, and under the influence of a sire having a powerful tendency to produce a good hind-quarter she may be compelled to yield to his superior influence. In certain points of character, where they corresponded, the influence would be increased. In some particulars the dam might predominate, and in other respects the sire might be most influential. Thus the hereditary powers of carefully bred stock will represent the maximum of good influences and a minimum of those which are undesirable.

In our wild animals we have natural laws operating whereby they are preserved from degeneracy. Thus their powers of vitality are preserved and constitutional disease reduced to its lowest point. Immediately the male has passed the prime of life and his natural vigour begins to diminish, he ceases to hold his position against younger males of more strength. Thus in the sanguinary conflicts amongst the male animals of wild species, in which the supremacy is contested, we see one means established by nature for securing the perpetuation of the species to the strongest and most vigorous males. In like manner, those of unripe age, as well as those which are the subjects of disease, are held in check by those which are vigorous and healthy, and the consequence is that a strong constitution is secured to their offspring. By domestication we interfere with the action of those natural laws. We seek to establish and perpetuate certain peculiarities of the animal system which are unnatural, but which are, at the same time, very desirable for our comfort and prosperity. There are three special objects which the general breeder seeks to attain with a view to direct profit, each of which requires a special mode of procedure, which cannot be departed from without loss. These qualifications are—

A liberal production of good milk;
An economical formation of *meat*;
And the preservation of purity of blood.

I shall endeavour to prove that we have these important points of character far more under our control than is generally imagined, and that from want of the consideration we often frustrate and impede our designs.

PRODUCTION OF MILK.

The milking character of our various kinds of stock takes a wide range even amongst females of the same class. Apart from the influence of food, we may remark that the supply of milk secreted depends upon the quantity of blood which the mammary glands receive, as well as upon their activity, whilst its quality is mainly dependent upon the internal organism of the animal. We find, as a rule, that those domesticated animals which exist under circumstances most nearly approaching to a state of nature, possess the greatest tendency *to produce milk*. The formation of milk is a provision of nature to supply food for the young offspring; it precedes the birth of the young animal, and is generally most abundant in those animals which breed most freely. If, however, by domestication we produce an animal possessing peculiar qualities which differ from the natural character of the dam in its wild condition, then the powers of reproduction are deceased and the energy of the system is also reduced for the formation of its accompanying product, milk. Although these two points of character—viz, a disposition to breed and an aptitude for the secretion of milk—usually increase and diminish similarly, yet there are good reasons for believing that, like other functions of the animal organism, we may materially increase the formation of milk even when the breeding powers are naturally weak. In producing animals which differ materi-

ally from the type of the animal in its wild condition, we find that natural barriers present limits beyond which we cannot pass, and consequently by degrees we approximate to instances of barrenness in the offspring. To meet this difficulty we have to adopt measures for giving increased vigour to the system, or, as we commonly term it, to strengthen the constitution of the animal; but what are the measures adopted for this purpose other than allowing the natural habits of the animal to exert their legitimate influence? in fact, retracing some of the steps previously taken in excess.

The formation of milk we have more under control than the powers of reproduction; for when the mammary glands have been brought into a state of activity by the birth of a calf or other young animal, then the continuance of the flow will be influenced by the hereditary character of the parents, as well as by judicious management. This hereditary influence must not be viewed as confined to the female, for I have not the slightest doubt on my mind that the constitution of the sire tells powerfully upon the offspring in this respect. A bull, the produce of a good milking family, has a tendency to convey this disposition to his offspring, and greatly to strengthen similar tendencies which may be hereditary on the side of the dam. On the other hand, the use of a bull descended from a bad milking family leads to the rearing of a class of stock possessing less value for the production of milk. In too many cases bulls have been preserved for use in ordinary dairies simply because of their symmetry or tendency to fatten, without due consideration of the milking character of their ancestry. With regard to the sheep also, I remember a very striking instance of the loss of milk in a flock, (previously celebrated for their supply of milk), being traced entirely to the use of a very well formed ram, bred from a ewe singularly deficient in milk. In this case all his stock, to the second and third generations, possessed or imparted this undesirable character. A large proportion of the losses in our flocks and much of the additional labour and expenses occasioned by ewes being short of milk may be traced to this cause. This deficiency of milk amongst our ewes is becoming a serious evil throughout the country—one, no doubt, which has accompanied the introduction of high-bred sheep—rather, let us hope, by oversight than as a necessary consequence. Amongst all classes of stock—cows, ewes, and sows—we find a great disposition for the accumulation of fat usually attended by a deficiency in the flow of milk; but there does not appear to be any reason why both of these points of character should not be combined in the same individual, as we shall subsequently consider more fully.

The quality of the milk bears an important relationship to the quantity which an animal produces. The richness of milk depends upon the quantity of fatty matter present, which is more familiarly known as cream and butter. The general structure of the animal body, together with its mode of living, also appear to control the value of the product. For the production of a rich milk two qualifications are necessary in the animal.

The first step is to separate and prepare the fatty and nutritious element of food, so as to introduce it into the circulation with as little loss as possible.

The second step is to separate a large proportion of these elements in the form of rich milk.

Any circumstance which causes a waste of the fatty and nutritive ingredients in the food necessarily causes the milk to be of inferior value. It is exactly the same with the formation and preservation of the fatty matter of the blood, whether its subsequent appropriation be as the fat of milk or the fat of the body; for that animal which can most economically convert the fat-producing matter of food into the fatty matter found in the blood has most successfully accomplished the first step. In the fattening of a bullock, as well as in the feeding of a milch cow, the fatty matter of the food has to be taken up into the blood, and it depends upon the organism of the animal whether it shall be subsequently deposited in the form of fat or excreted as the cream of milk. It is, however, evident that an economical preparation of the materials of the food is equally important for the formation of the fatty matter of the blood, whatever may be the form into which the animal system may convert it; and for this reason those animals which are best adapted for fattening are also best prepared to fulfil the first condition essential for the production of rich milk.

We have now to consider the influence of the animal system upon the rich fatty matter circulating in its blood. The for-

mation of milk is primarily dependent upon the activity of the mammary glands, which are naturally excited to action a short time prior to the birth of the offspring. The energy of these glands is naturally superior to the tendency which the animal possesses for the formation of fat; so much so, indeed, that when the food is deficient in oily matter fat which has been already formed is sometimes taken up again into the circulation and separated by the mammary glands into the milk. Thus we find that when these glands are acting in a healthy and energetic manner, the fatty matter of the blood is freely separated by their agency, and we have a rich milk produced. In very many instances these glands have assumed an unnatural and torpid condition, have become less susceptible of the energy usually imparted by the birth of offspring, and have been influenced by it for a shorter period of time. In such cases, although the food may have been well prepared, and the blood may pass on to yield its treasures to other parts of the body. Our great endeavour should, therefore, be to encourage a more active condition of these glands. These organs, in common with other parts of the system, are subject to hereditary influence, and much may be done in this direction to stimulate them to the performance of their natural functions, whilst a neglect of this agency will increase and perpetuate an evil which considerably reduces the value of much of our breeding stock. Not only may we hope that by judicious management these organs may again be raised to their natural standard of efficiency, but, like other parts of the animal system, become even more highly developed under the fostering care of man. Instances are by no means rare in which we observe in happy combination an aptitude for the formation of fat with sufficient energy of the mammary glands to produce a liberal supply of milk. Generally, in the case of cows, those that produce butter freely are subsequently found profitable for feeding for the butcher. With ewes thus distinguished the lambs thrive without extraneous supplies of milk, and they are equally disposed for laying on fat when no longer intended for breeding. This combination is equally observable in sows of a like description, which produce large, healthy, thriving farrows, and make a good return for the food given them.—*Journal of the Royal Agricultural Society of England.*

Cultivating Mixed Varieties of Wheat.

Selected samples of distinct varieties of wheat are now generally cultivated in Scotland. It may be questioned however, if the practice has much to recommend it beyond securing a pure variety for sale or for re-sowing. At one time the wheat usually grown was a mixture of a number of varieties of white wheats, including velvet eared, and occasionally bearded heads. There are districts in England and on the Continent where a mixture is still preferred. In some instances in England, red and white wheats are grown mixed, from the belief that the produce of grain is on the whole more uniform and larger, and the sample brings a higher price in the market, than when either the white or the red variety are grown separately. This is the general result in those localities where the wheat crop is liable to become affected with mildew. With more attention to the cultivation of wheat in Scotland, selection has been carried out, and the greater portion of the wheats in cultivation are true to their kinds. It is therefore important to ascertain whether, by cultivating genuine or unmixed varieties, the produce per acre is not impaired, and as a consequence the money return less, than when a mixture of varieties are grown. Several eminent physiologists state that a mixture of kinds of any of the seed-producing plants usually yield a large amount of seeds; and this opinion is very general among farmers where the growing of mixtures of the cereals and leguminous plants are carried out. It is supposed by physiologists that the different varieties spread their roots at different depths in the soil, and thus draw a larger amount of constituents of plant life from the soil. Perhaps something is due to the difference of produce in the different varieties, arising from the character of the season, climate and soil. There are several recorded experiments which support this belief, but more experiments are required to elucidate the question.—*North British Agriculturist.*

The Potato Disease.—There can no longer be any doubt that this destructive malady is caused by a fungus.

In the case of the grape vine mildew the fungus merely creeps over the surface, and sulphur will destroy it. But unfortunately the potato fungus penetrates into the tissues of the plant, and all the remedies which have been suggested, such as removing the portions when diseased, dry the tubers, &c., must be considered as palliatives rather than preventives.

The rapidity with which the disease spreads itself is shown in a recent German work, "On the cause and treatment of the Potato Disease," by D. De Bary. It is calculated that one square line of the under surface of the leaves is capable of producing 3,270 spores, and as each of them yields at least 6 zoospores (the number being sometimes as high as 16), we have 19,629 reproductive bodies from that small space. The quantity, therefore, yielded by a single plant is enormous and as the mycelium from the zoospores is capable of penetrating the cellular tissue in 12 hours, and when once it is established there and bursts through the breathing orifices or sto-

mates of the leaves, it perfects its fruit in from 15 to 18 hours, and since the zoospores are perfected and ready to germinate in 24 hours from their being placed in water, it is scarcely possible to calculate the myriads of plants that may spread from a single centre. As continued moisture is absolutely necessary for the germination of the spores and the production of zoospores, it will at once be understood how rapidly the disease is propagated in wet weather, especially if it be warm, and what a check to the disease a dry season must be. It will also be apparent under what circumstances the zoospores will have readiest access to the tubers, and that those which are nearest the surface have a less chance of escaping than those which penetrate deeper into the soil.

He shows that the disease is propagated from the tubers, and suggests that a spot of ground be specially selected for raising seed potatoes, where all the most likely means can be used to keep off the fungus, such as the instant removal of diseased leaves, and if necessary the removal of the stems, so that the zoospores can not be washed down to the tubers. A repetition of the process for a few years might banish the disease from the farm. A second hilling up to cover the tubers more effectually, and to throw off the water containing the fungus spores is also recommended.—*Genessee Farmer.*

Protecting Fruit Trees from Mice.—S. Edwards Todd remarks in the Boston *Cultivator:* "In localities where there are many mice, the most convenient and expeditious manner of protecting fruit trees from injury is to raise a little mound of earth around each of the trees, a foot or more high; and if sods are used they must be well pressed around the trees, so that no holes will be left between them where the mice may enter and gnaw off the bark. Pieces of tin or of sheet iron may be bent around such trees as are in a lawn, where it would be objectionable to dig up the earth about them. Another very effectual way would be to wrap pieces of poor and cheap cloth around them, near the ground, and smear them with coal-tar; coal-tar if applied directly to the bark of young trees would, probably, injure or kill them.

ENGLISH RIVER PLOUGHING MATCH.

The English River Ploughing Match took place on Thursday, the 24th ult., on the farm of Wm. Wylie, Esq., Norton Creek. The day was favourable. Twenty ploughs started; and much credit is due to the ploughmen for the manner in which they performed their work. By the kind attentions of Mr. Wylie, the ploughmen and others were well supplied with refreshments during the day. An excellent dinner was provided by Mrs. Wylie, for the judges and directors, and ample justice was done to the good things by them, and also by a great many invited guests. The following is a list of the prizes awarded:

Senior Class.—John Reid, 1st prize; Henry Benny, jr., 2nd; John Lett, 3rd; Daniel Currie, 4th; Thomas Stewart, 5th; William Gruer, 6th

Junior Class.—Joh Wilson, 1st prize; John Stewart, 2nd; Hugh Craig, 3rd; James Stewart, 4th; Alexander McKellan, 5th; William Knox, 6th.

The annual ploughing match under the auspices of the Farmers' Union Ploughing Association, County of Beauharnois, came off on Saturday, the 2d day of November, on the farm of Mr. Duncan Cummings, 4th Concession of North Georgetown. The day was fine, but I am sorry to record that there was so few competitors in the junior class. However, those who did attend, entered upon the contest in right good earnest. The following is the list of awards:—

Senior Class.—1st James Reid; 2d Samuel Alexander; 3d David Reid; 4th Dun. McCoig; 5th David Maxwell; 6th Louis Leduc.

Junior Class.—1st John McCoig; 2d Dougall McCoig; 3d Donald Cummings.

After the prizes were paid to the ploughmen all sat down to a most capital dinner, prepared by Mr. D. Cummings, to which the keen appetite of the ploughmen did ample justice.

After the cloth had been removed, the President gave the usual loyal toasts—"The Queen;" "Prince Albert and the Royal Family;" "The Governor General;" and, afterwards, "Paul Denis, Esq., M. P. P. for the County of Beauharnois;" and "Henry Starnes, Esq.. M. P. P. for the County of Chateauguay," to which Mr. James A. Bryson responded in a kindly manner. Next, "James Keith, Esq.," coupled with the name of "J. M. Browning, Esq., and Directors of the Agricultural Society of the County of Beauharnois," which was very appropriately responded to by Messrs. John McNiel and John McCoig, at the same time giving a full account of the organization of the "Farmers' Union Ploughing Association," and its prospects. Mr. and Mrs. Cummings were next complimented for the kind and hospitable manner in which they entertained the company. It being Saturday night, the company broke up at an early hour, and they all "gead toddling hame, highly pleased."

At an agricultural dinner the following toast was given:—"The game of fortune: shuffle the cards as you will, spades will always win."

COLONISATION.

The Emigration Service—Some of the Results for 1861.—The number of emigrants arrived at Quebec during the present season was 18,295. Of these 3,855 belong to the agricultural class; 816 are classed as artisans; and 2,519 are either labourers or without a regular avocation. Of professional men there arrived 39; clerks and traders 300:—making in all 7, 440 male adults. Of female adults there arrived 5,350; of minors, male and female, 4,556; and infants in their first year 913:—making a total balance of 10,819 souls. Of the whole number, 8,814 were Norweigans; 3,209 were Germans; 10 were Frenchmen; and the balance were natives of Great Britain and Ireland. What proportion settled in this country during the year 1861—unusually favourable to the claims of Canada—we do not yet know, but we learn from the Hamilton *Spectator*, that upwards of 8,000 emigrants passed through that

city on their way to the Western States prior to the beginning of November.

CANADA.

Return of the Number of Emigrants embarked, the total number landed at Quebec, with the number of souls from each Country; also the number of Vessels, tonnage, and the average length of passage during the Season of 1861. Nationalities, Occupations, and Destination.

Whence.	No. of Vessels.	Tonnage.	Average Days on Passage.	Cabin Passengers.	Steerage.	Distribution of the Steerage Emigration landed at Quebec 1861. U. States.	Distribution of the Steerage Emigration landed at Quebec 1861. Canada.	Nationalities.	Occupations.	
England. Steamers	31	54,840	12½	1492	5007	1800	6712	3579	Farmers, &c.	3766
England. Sailing Ships	38	32,458	38½	19	1265	.....	1176	.....	Common labourers	2327
Ireland	14	7,272	38	1	412	.....	.....	.....	Mechanics	816
Scotland. Steamers	9	9,167	15½	96	941	980	.....	3160	Professional Men	39
Scotland. Sailing Ships	6	3,941	35½	9	66	7981	.....	2011	Servants	31
Germany	9	5,815	50	....	2000	.....	.....	2182	Clerks, Traders, &c.	300
Norway	40	18,162	50½	47	8793	.....	10	8814	Miscellaneous and Unenumerated	185
Prussian Poland	....	....	....	....	....	....	600	27		
France	....	....	....	....	....	....	.....	10		
United States	....	....	....	....	....	....	.....	12		
Canada, &c.	....	....	....	....	....	....	.....	371		
Total	147	131,665		1664	18484	10761	8498	20166	Total Souls	7464

THE WEATHER.

(Compiled from the records of the Observatory, Isle Jesus.)

November, 1861.

The month of November was rather mild, and was remarkable for the slight variations in the temperature. The mean degree of heat for the month was 33°60, which is a little below the mean temperature of last November, but the monthly range (which is the difference between the highest and lowest temperature,) was much less than the monthly range of November of last year; the highest temperature this November was 48°3, and the lowest 19°7, giving a monthly range of only 28°6 degrees, while the range of temperature for last November (1860), was 59°4 degrees, the highest temperature being 71°4, and the lowest 12°0. The mean of the barometer was but a tride less than the mean of last November, it was subject to several fluctuations which have been frequently observed here in November as elsewhere, and has been termed the *great symmetrical wave of November*. Rain fell on the 3rd, 4th, 9th, 11th, 12th, and 29th days. The amount of rain was much less than the amount of rain which fell in last November, but the amount of snow was more than three times as much as the snow of November, 1860. Snow fell on 2nd, 16th, 23rd, 24th, 28th, 29th, and 30th days. Cattle were grazing in this neighbourhood until the 23rd of the month. The rivers were quite free from ice. The snow birds were seen here for the 1st time on the 17th day. Crows left us on the 7th day. The sleighing commenced generally hereabouts on the 23rd day.

Below is a record of the various instruments in use.

		Inches.
Barometer...	Highest, the 2nd day,	30.201 "
	Lowest, the 39th day,	29.299 "
	Monthly Mean,	29.714 "
	Monthly Range,	0.302 "
Thermometer	Highest, the 4th day,	48°3.
	Lowest, the 22nd day,	19°7.
	Monthly Mean,	33°60.
	Monthly Range,	28°6.

Greatest intensity of the sun's rays, 77°7.

Lowest point of terrestrial radiation, 17°4.

Mean of humidity, ·687.

Rain fell on 6 days, amounting to 1·023 in., it was raining 32 hours, 52 minutes.

Snow fell on 8 days, amounting to 11·51 inches, it was snowing 54 hours, 29 minutes.

Most prevalent wind, N. E. by E.

Least prevalent wind, S.

Most windy day, the 3rd day; mean miles per hour, 2.25.

Least windy day, the 12th day; mean miles per hour, 0.65.

Aurora Borealis visible on 3 nights.

The electrical state of the atmosphere has indicated feeble intensity.

Snow birds (*Plectrophanes Nivalis*) 1st seen 17th day.

Imperfect Solar Halo on the 18th day.

Perfect Lunar Halo on the 10th day.

Crows left here about the 7th day.

PRICES CURRENT.

GRAIN PER BUSHEL.

FOREIGN.	Wheat. 60lbs	Barley. 48lbs	Oats. 34lbs	Corn. 56lbs	Rye. 56lbs	Peas. 60lbs
New-York	1.11	0.61	0.34	0.50	0.60	0.00
Chicago	0.75	0.00	0.16	0.23	0.26	0.00
Toronto	0.90	0.65	0.30	0.40	0.00	0.42
London	1.65	0.96	0.90	1.00	0.00	1.00
Paris	1.90	0.70	0.65	1.00	0.88	1.40
LOWER CANADA						
Montreal	1.00	0.48	0.27	0.46	0.60	0.61
Quebec	0.00	0.00	0.30	0.00	0.00	0.86
Three Rivers	1.10	0.45	0.26	0.90	0.75	0.75
Sorel	1.10	0.50	0.26	0.75	0.00	0.70
Ottawa	1.05	0.60	0.29	0.45	0.55	0.45
St. Hyacinthe	1.20	0.46	0.27	0.76	0.00	0.77
Sherbrooke	0.00	0.00	0.00	0.00	0.00	0.00
St. Jean	1.10	0.46	0.25	0.70	0.00	0.62

FLOUR.—Montreal Market.

Double extra	5.75	Superfine No. 2	4.12
Extra	5.05	Fine	3.30
Fancy	4.72	In bags.....112 lbs.	2.40
Superfine No. 1	4.55		

BRAN.—Different Markets.

	qtls.		qtls.
Montreal	0.70	Three Rivers	0.00
Quebec	0.80	Sorel	0.00
Ottawa	0.00	Sherbrooke	0.00
St. Hyacinthe	0.00	Iberville	0.00

BUCKWHEAT.—Different Markets.

	qtls.		qtls.
Montreal	0.55	Sorel	0.55
Quebec	0.00	St. Hyacinthe	0.55
Three Rivers	0.45	Sherbrooke	0.00
Ottawa	0.00	St. Jean	0.50

CANADIAN BEANS.—Different Markets.

Montreal	1.50	Sorel	1.10
Quebec	0.00	Ottawa	1.10
Three Rivers	0.00		

POTATOES.—Different Markets.

Montréal	½ m'ot 0.70	Sorel	½ m'ot 0.64
Quebec	" 0.34	St. Hyacinthe	" 0.40
Trois-Rivieres	" 0.61	Sherbrooke	" 0.00
Ottawa	" 0.60	St. Jean	" 0.40

GREEN CROPS SEEDS.—Different Markets.

Red Clover	per lb.	0.8
Vermont Clover	"	0.15
Dutch or White Clover	"	0.25
Timothy	per bushel.	1.70
White Vetches	"	1.00
Black Vetches	"	1.00
Mangold's seed	"	0.20
Carott's seed	"	0.40
Turnip seed	"	0.4

HAY AND STRAW.—Different Markets.

	100 lbs. hay.	straw.		100 lbs. hay.	straw.
Montreal	6.00	5.50	St. Hyacinthe	4.00	2.00
Quebec	7.00	6.00	Sorel	0.00	0.00
Three Rivers	5.00	3.00	Ottawa	6.00	4.00

MANURES.—Montreal Market.

Peruvian Guano	100 lbs.	3.80
American Guano	"	2.50
Animal black	"	1.50
Plaster	brl.	1.00

OIL-CAKES.—Montreal Market.

Linseed cake	cwt.	1.80
Linseed cake pulverised	"	2.00

MAPLE SUGAR.—Different Markets.

Quebec	lb. 0.07	Montreal	lb. 0.09
Three Rivers	" 0.07	Sorel	0.09

ANIMAL PRODUCTIONS.

MEATS.—Different Markets.

	Beef. lb.	Veal. qr.	Mutton qr.	Pork. lb.
Montreal	0.09	1.00	0.75	0.10
Quebec	0.09	0.00	0.00	0.09
Three Rivers	0.06	0.00	0.55	0.11
Sorel	0.09	0.45	0.45	0.10
Ottawa	0.10	0.00	0.00	0.10
St. Hyacinthe	0.06	0.43	0.00	0.11
Sherbrooke	0.00	0.00	0.00	0.00
St. Jean	0.00	0.00	0.00	0.10

CATTLE.—Different Markets.

	Montreal.	Quebec.	Three Rivers.	Sorel.
Oxen per 100 lbs.	6.00	0.00	5.50	7.40
Milch cows	21.00	0.00	18.00	18.00
Calves per head	5.00	0.00	0.00	0.00
Sheep "	4.50	0.00	0.00	0.00
Lambs "	2.75	0.00	0.00	0.00
Hogs per 100 lbs.	5.00	0.00	7.00	8.00

BUTTER.—Montreal and Quebec Markets.

Fresh butter per lb.	0.20	0.18
Salt butter "	0.11½	0.15

CHEESE.—Montreal and Quebec Markets.

Rafiné, per lb	0.15	0.00
American	0.07	9.00

HIDES.—Different Markets.

Montreal...100 lbs.	5.50	Quebec.....100 lbs.		6.00
Three Riv's "	0.00	Sorel.....	"	0.00

HORSES.—Montreal Market.

Saddle and hack horses	$120.00
Farm horses	80.00
Old horses	25.00
Horses sold at auction	30.00

WOOLS.—Different Markets.

Montreal	lb. 0.25	Quebec	lb. 0.00
Three Rivers	" 0.00	Sorel	" 0.00

EGGS.—Different Markets.

Montreal	0.14	Ottawa	0.00
Quebec	0.12	Sherbrooke	0.00
Sorel	0.11	St. Hyacinthe	0.09
Three Rivers	0.10	St. Jean	0.09

FISH.—Montreal Market.

The string of 4 lbs.		The pair.	
Carps	0.12	Eels	0.25
Perch	0.20	White fish	0.25
Bass	0.20	Pike	0.25
Dores	0.38	Sturgeon ½	0.22

FOWL.—Montreal and Quebec Markets.

	The pair.		The pair.
Ducks	0.45	0.00	Pigeons 0.17	0.00
Geese	0.85	1.00	Fowls 0.40	0.00
Turkeys	0.90	1.75	Chickens 0.25	0.40

GAME.—Montreal and Quebec Markets.

	The pair.			The dozen.
Ducks	0.30	0.00	Wild pigeons.	0.75	0.00
Plover	0.29	0.00		The pair.
Partridges	0.55	0.50	Hares	0.12	0.12

FRUIT.—Montreal Market.

	The barrel.		The barrel.
Apples fameuses	3.00	Pears common	2.00
Apples grises	6.00	Plums per bushel.	4.00
Apples American	3.00	Grapes per lb.	0.80
Pears bons cretiens.	12.00	Melons the piece	0.2