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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies—**EDITORIAL MATTER.** All editorial matter should be addressed to A. R. Jenner Fust, Box 109, Lachine, Que.—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

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DE OMNIBUS RERUS.

April 26th, 1888.

Cows in winter.—I see by the Country Gentleman's report of the meeting of the Hornellville Institute that most if not all the farmers present were in favour of confining milch cows to the stables throughout the winter. The Secretary, Mr. Woodward (pure Saxon, by the soul of Hengist!), has 74 cows, none of which have been out of the stable since Nov. 1st. He has repeatedly made experiments on the matter. Each cow, on an average, makes a gain of from 300 lbs. to 350 lbs., besides producing enough butter to pay for her keep. If he were to turn out his cows, he would put a blanket on each of them. Mr. Rogers keeps his cows stabled for weeks at a time, and always waters them in doors. Mr. Crozier, the Jersey breeder, of Long Island, keeps his cows in the stable from November until spring, and his cows and calves are always in very vigorous condition. The above farmers are all living in a very much milder climate than

ours, and if they find the udder of a cow suffer from exposure, how much more would it be likely to suffer in the latitude of Quebec.

Mr. Woodward observed that he had made his money by farming, and in his opinion it does not pay to plough under green-crops. "They are worth more as manure after passing through the animal." This is probably a badly reported sentence. What he meant to say was: they are worth more as food for stock, and what the stock do not assimilate will find its way back to the land as manure.

Mr. F. D. Curtis still holds the, to my mind, absurd opinion that cattle should only have two meals a day. This is the progressive one who sows his oats on the bare frozen ground without ploughing or harrowing, and is followed therein by, I regret to say, more than one farmer who ought to know better. However, I am happy to state that the fad will not last long, for already complaints of failures begin to arrive. Mr. A. N. Curry, of Menard county, writes to the Country Gentleman: "I tried Mr. Curtis' plan of sowing oats early and not covering. I sowed about two acres, that I had prepared last fall, on the 20th of February, on the bare frozen ground, and last week, when I examined them, they had all rotted!" Yes, I should think so.

Seed.—There must be something mysterious in the soil and climate of the State of New-York. Several of the farmers agreed in Mr. Woodward's dogma that not a grain over 1½ bushels to the acre of oats should be sown. I should like to know what the average yield from this very small quantity is. If the return is not greater in proportion than the return of the wheat-crop—13½ bushels (Winchester bushels too) to the acre, I should recommend the members of the Institute to at least double their quantity of seed. We are not absolute

fools in England, and I think our average wheat crop, which is more than double that of the States—in fact, it is more than three times this year—shows that we know something about farming; so, when people talk about growing great crops with less than half the quantity of seed we use, an Englishman naturally gets rather irritable. As for illustrative reasoning about such points, that serves no purpose: the practical results of the different quantities per acre is what we want. Fall wheat has plenty of time to tiller—spring-grain must grow up to ear at once.

Vegetable flavours in milk.—I have often mentioned in this Journal that one of the ways of getting rid of the turnip-taste in butter is to give the turnips to the cows immediately after milking, that the process of digestion may carry off the food-flavour during the twelve hours that intervene between the two milkings. A writer in one of my exchanges impugns my reasoning on physiological grounds, asserting that the digestive process has no such power as I attribute to it. I have no doubt about the point, as innumerable trials have convinced me that the flavour is dissipated, and if any one has a more hatefully susceptible nose and palate than I have, all I can say is, I do not envy him their possession. And now a Chester-county dairy-farmer writes to say that not only turnip- but garlic-flavour disappears after twelve hours.

"In this county, where butter and milk are the staple articles of sale, garlic abounds; scarcely a farm but has one or more of its fields set with it to some extent. It is the rule, when such a field has to be pastured in the early spring, to take the herd from it at noon, having been turned on it after milking in the morning. Though they are then so charged with it that their breath betrays them almost before one can see them, by sundown they will have passed it off through the lungs, and the milk when drawn is almost free. The next morning, if kept from fresh garlic at night, it is entirely so. If by some carelessness the herd is allowed to have a feed of it immediately before milking, the product is quite unsalable, either as milk or butter.

"Our butchers have a similar experience. They buy cattle fed for weeks where garlic abounds, keep them a few days on clean grass, and find the meat untainted; whereas a clean fed animal, allowed a night's feed containing garlic, and killed in the morning, will be thoroughly contaminated.

"Now certainly, garlic and turnips are different plants, but I would say to your correspondent that he can feed turnips in moderation immediately after milking without injuring his milk. It is done frequently."

J. L. B.

"Chester County, Pa."

Mangels.—It seems that the Messrs. Dawes have lost their mangels for the last two years from the attacks of some grub or other which their foreman does not appear to be able to identify with either the wire-or the cut-worm. As I hope to be here all this summer I will try to discover the beast, and find a cure for its ravages. Some two or three years ago, the mangel-crop of the county of Lancaster, E.g., was destroyed in like manner by a grub. This pest has disappeared from the district, and the roots are as productive as ever—the wurzel grows to a great size in the mild, damp climate of the North West of England. Whereas the average rainfall of the S. E. is 24 inches, that of Lancashire is 36 inches. If my advice is listened to—and I believe it will be—after the dung is ploughed in, 1 cwt. of sulphate of ammonia and 3 cwt. of salt will be sown broadcast, and harrowed in, the seed—at least 8 lbs. to the acre—sown on the flat at 24 inches, and a weighty roller will finish the job. And the following reasons guide me for this mode of treatment: the cut-worm does not like salt; the wire-worm does not care two straws for salt or

anything of the sort, but he likes an easy road to travel, and the roller will hinder his passing from plant to plant along the rows; thick sowing will afford plenty of plants for the pests to eat, and still some will be left for the crop; and, lastly, the sulphate of ammonia will push the young mangels on rapidly out of the reach of their enemies. (1)

If the damage is done by slugs, or any other leaf-eaters with a tender skin, quick-lime rapidly slaked and powdered over the rows during a still night will stop it. Caterpillars may be treated with Paris-green. In fact there is no beast that shall not suffer for his audacity if I can by searching find out his weak place. For this is an important matter, now that the Berthier beet sugar factory is at work again. If the vermin destroy mangels, sugar-beets cannot hope to escape, and it would be a pitiful look out for a farmer, after he had autumn-dunged a good bit of land for beets and gone to great expense in its preparation, to see the whole of the young plants destroyed in a week or ten days. A. R. J. F.

Experiments on Ensilage.—The experiments at Crawley Mill Farm, under the superintendence of Dr. Augustus Voelcker, of which we have already taken some notice,—see pp. 186, vol. IX, and 20, vol. X—were continued during the winter of 1886, '87. Whereas, in the previous experiments, the special object had been to determine the value of grass-silage as compared with a mixed food of roots and hay, in the present instance an endeavour was made to arrive at the value of the grass made into hay as against the same grass out green and converted into silage. Five and a-half acres of fair though not first-rate grass land were carefully measured off, and the grass was only cut as it was wanted for carting, none of it being allowed to remain on the ground for any length of time. Two carts, going side by side, were filled simultaneously, whereof one went to the silo and the other to a meadow where the grass was spread and made into hay. I may remark here that in a stack made from so small a bulk of hay as that yielded by 2½ acres of fair meadow—probably about 3½ tons—the quantity of side, top, and bottom-hay would bear a very large proportion to the interior hay, and in that proportion the experiment would be favourable to the silage as against the hay. In England, 20 tons would be considered only a small stack—they run in general from 40 tons to 120 tons, and in such bulky masses the proportion of waste is very small.

The weather for haymaking was all that could be desired, the hay cut on the 2nd of July having been carried and stacked on the 5th. The highest temperature of the silage was 94° F., and there was, with the exception of the first four inches, hardly any waste. Experts, having examined it, declared that it was the best yet made.

Twelve Hereford bullocks, 2½ years old, were selected for the trial and divided into two lots. Cost a head, £16 2 6 = \$78.30. Each beast received, as additional food, daily:

3 lbs. decorticated cotton-cake.
5 lbs. corn-meal.

Both lots had water *ad libitum*, and one lot hay and the other silage, also *ad libitum*, and it is hardly necessary to say that the experiment was carried out with every possible care and attention to the most trivial detail.

The weight of the respective lots were almost identical: silage lot = 6768 lbs., an average of 1128 lbs.; the hay lot = 6759 lbs., an average of 1126½ lbs. They took at once to their respective foods, and, to use the technical phrase, were

(1) The sulph. am. has been used, but the land, dunged last fall, was drilled as usual, is now drying up as fast as possible, and the plants are dead!

A. R. J. F.

never once off their feed. The silage lot began with 38 lbs. a head a day, which rapidly increased to 45 lbs. up to 51 lbs. Of the other lot, 20 lbs. of hay a day was about the consumption from beginning to end of the experiment. There was a difference in the consumption of water between the lots, as might be expected from the two foods: hay-lot drank 70 lbs. a day, and silage-lot 41 lbs., and the result of the experiment, continued for 84 days, by which time the hay was finished and the silage all but done, was as follows:

	Receiving hay.	Receiving silage.
Total weight of bullocks, Dec. 16th, 1886...	6769 lbs.	6768 lbs.
" " " March 10th, 1887..	7748 "	7757 "
Total gain in 84 days.....	989 lbs.	999 lbs.
Gain per head daily	1.86 "	1.98 "

Well, pretty equal work, considering the vast apparent difference between dry and succulent food, is it not? But there is another point brought out in this experiment which is worthy of remark. the difference between sheds and boxes for cattle feeding. In each lot of 6 bullocks, 4 were kept in boxes about 8 x 10 feet superficial measure, sunk two feet deep in the ground, and never emptied until the expiration of the fattening time; the other two were in ordinary sheds, secure from the weather, and roomy enough to allow of the beasts walking about. The former practice is the one I have always followed, and, to speak frankly, I believe that there is no other system to be compared to it. Let us see how the result bears out my opinion:

Hay-Bullocks in boxes,— 2 1/2 lbs. a head daily.	Hay-Bullocks in sheds.— 1 1/2 lbs. a head daily.
Silage-Bullocks in boxes,— 2 1/4 lbs. a head daily.	Silage-Bullocks in sheds— 1 3/4 lbs. a head daily.

It is evident by this table that, whether fed on dry or on succulent food, the bullocks in the boxes did much better than the bullocks in the sheds. The Scotch say the system is not natural; that the *hammels* (1) are better, that room is wanting for so many different enclosures, &c. The Norfolk, Essex, and other Eastern counties' men say that they never could get their immense crops of straw trod into dung unless they fattened their bullocks loose in yards knee-deep in litter. This may be all very well to an untravelled farmer, but the fact remains, that a bullock kept in a loose box, with just room enough to turn in freely, will consume less food, fatten faster, and cost less for attendance, than a beast kept loose in a shed with one or two others and a yard to run into—the Scotch *hammel*;—in a large yard with from a dozen or twenty others to poke him about; or tied up by the neck in a narrow stall with hardly room enough to lick himself. A bullock in a box is always as clean as a new penny, and that with a very trifling quantity of straw—no beast, not even a pig, will lie in his excrement if he can avoid it—; he wants no currying or brushing, as he can lick himself all over until he gets nearly ripe, and then by putting his neighbour in mind of the old Saxon saying *gis gaff*, i. e. if you'll scratch me, I'll scratch you, he generally gets his wants attended to. As for the manure, I need not expatiate on the perfect state in which that is found when the box, after months, is emptied. No ammonia is lost, for, owing to the constant pressure, very little has been formed, and both liquid and solid excrements are all there, in their natural and most effective forms. There is no offensive odour given out; nothing can be perceived by the nose except

the pleasant smell of the cake, corn, or linseed, given as food. The beast thrives, because he is alone in his box, and yet has his friends on each side of them: that is, he can see them, but they cannot interfere with his food and rest.

Boxes should be made in double rows, with a passage down the middle, for the transit of food, &c., wide enough to admit the dung-cart. Eight feet square is large enough for any ordinary beast. The divisions should be of stout scantling—three bars are sufficient, and they should be far enough apart to allow a beast to get his head through, backwards and forwards, with ease. The manger should be so constructed as to admit of its being raised or lowered as the height of the manure in the box demands, and should, of course, admit of being filled from the passage without the feeder entering the box. No rack will be needed, if the best system of feeding is pursued, as any hay that may be given will be cut into chaff, and if the tenant wants more dry food, he can always eat some of the fresh straw of his bedding.

To return to our experiment: The result of this last trial at Woburn is in some ways remarkable. No one would have expected that a ration of perfectly dry food, such as was given in the hay, cake, and meal, with water supplied separately, would give a result so nearly equal to that obtained by the use of succulent food in addition to the cake and meal. And the results of the comparison as regards offal to carcase is noteworthy. Previous to being slaughtered, the bullocks were carefully weighed, and both live- and dead-weights were recorded:

	Hay-fed beasts.	Silage-fed beasts.
Average percentage of offal.	43.76	44.01 (1)

a difference of .25 (2 1/2%) per cent. in favour of the silage-lot—a perfectly insignificant amount when taken as a quarter of a pound in a hundred pounds. Mr. Voelcker puts the exact weight of a cubic foot of silage at 24 1/2 lbs. Generally, I believe it is reckoned to be 40 lbs. Mr. Barnard, if I do not err, makes it 50 lbs. The two latter weights are taken from ensiled corn, and the first from grass silage: can there be such an enormous difference between the two materials?

ARTHUR R. JENNER FUST.

THE ROYAL; 1887.

Guernseys at The Royal.—The year 1887 saw the Royal at Newcastle, a very long way indeed from the Southern counties where almost all the English Guernsey breeders live. In spite of that, the Guernseys made a good show, and attracted a fair share of the general admiration. I consider that Plutaroh, were he alive now and writing on farm affairs, would have drawn, as he was so fond of doing, a parallel between Southdown sheep and Jersey cattle, as compared with Hampshire-downs and Guernseys! Lord Coventry, the Senior Steward of Live Stock, speaks thus of my favourite breed:

"This very useful breed of dairy-cattle seems likely to gain a strong footing in the United Kingdom. There are already throughout England a number of first-class herds of Guernseys, and every year the ranks of their admirers become greatly increased. Much larger in size, and more robust than than the Jerseys, they also possess dairy properties of a very high order, while with careful cultivation they might soon attain considerable merit as beef-producers. The writer has seen Guernsey bulls crossed with the ordinary mixed-bred cows of the country with great success, the produce being large, handsome cattle, with really good meat-carrying frames, and excellent dairy properties."

The mixed-bred cows referred to above are what would be

(1) Small yards, with a shed to each.

A. R. J. F.

(1) It is hardly necessary for me to say that these bullocks when slaughtered were not what we usually term *ripe*. A. R. J. F.

called in this part of the world "Grade Shorthorns." Lord Coventry is recognised as one of the best judges in England of a horse, a foxhound, and a dairy-cow.

Kerry-cows.—These little animals have at last arrived at the dignity of having a class to themselves at the Royal Show. They are making their way in England as pet-cows, and for supplying milk where the land is too poor for larger cows. The charming Kerry, Irisino, from the herd of Martin Sutton of Reading, a portrait of which was given in the March number of this Journal, is an almost perfect specimen or type of the breed. There was good deal in that wonderful accident, La Major, the Rev. abbé Guérin's cow, that reminded me of the Keries. Has La Major left no descendants to perpetuate her dairy-properties? Mr. Whitfield, of Rougemont, imported a bull and a few cows of the Kerry breed some seven years ago. What has become of them? They would be very useful on light, poor soils like Sorel. In exposed situations and on thin soil they are unequalled as dairy-cows; and though small in size, average Kerry cattle fatten readily on good fare, and sell well when fatted. If I remember rightly, the Keries I saw at Rougemont in 1881 were of the *Dexter* variety. These are thicker in the body, shorter in the leg, and much more fleshy than the true Kerry: there has, in fact, been a cross at some time or other, and the Dexter is the fruit of it. In dairy-properties, there is not much to choose between the two sorts. In the classes for dairy-cows in general, a little Kerry, belonging to Mr. James Robertson, of Malahide, near Dublin, was *highly commended*: a great honour, indeed, when one considers that she was competing with milking-shorthorns, Swiss cows, and various cross-breeds! Moreover, the judges qualify the class as "an excellent one"! The first-prize was of course a shorthorn, though unpedigreed.

Jerseys at the Royal.—For several years past these beautiful animals have formed a striking feature in the Royal show, and at Newcastle their popularity does not seem to have diminished. There were 101 entries of the breed, and 21 prizes were awarded, of which ten went to English bred cattle, the Island men taking the rest.

The English style of Jersey seems to be of a stouter more robust type than those born in their native place. More like my friend, Mr. Reburn's, I fancy, than those little bags of bones I remember some forty years ago. The climatic conditions under which the one lives are very different from those that govern the abode of the other, and in consequence, the English breeders aim at producing an animal of a hardier character than the *Jersiais* like. A portrait of the original Jersey, such as I recollect her, may be seen at p. 28, June number, 1883, of this Journal. From what I have lately seen of the sales of Jerseys in both England and the States, the prices seem to be getting equalized, a good cow, of satisfactory pedigree, being worth from \$150 to \$180 in either country. The judges, Messrs. Charles Ph. LeCornu and William Ashcroft, append the following rider to their report.

"In concluding this report, we would observe that improvement continues to take place in the general appearance of the breed. Though giving preference to animals showing the fineness of the highest class of Jersey cow, we have not passed over those showing more size and development than is generally met with in their native island, provided always that they did not exhibit coarseness, and had good dairy qualities; whereas, on the other hand, we have passed by weedy animals deficient in stamina." In other words, the judges reward usefulness wherever they met with it, and thereby refused to be bound by that wretched mistake, a list of points drawn up by an irresponsible committee.

Judges and Stewards at the Royal.—It may surprise some of my readers to learn that an Earl was Steward of the Live Stock at Newcastle, and another man of title, Sir Fred. Bramwell, F. R. S., consulting engineer on the Trials of Portable Agricultural Steam Engines, at Newcastle. Our men of rank in England are not all born, *fruges consumere*, but many of them know how to cultivate the fruits of the earth as well as how to consume them.

Horse-shoeing.—Last year, for the first time, the Royal Agricultural Society of England instituted a competition in horse-shoeing. It is intended to be continued every year, and as the society holds its meetings at such widely removed places as Cardiff, South Wales, and Newcastle-on-Tyne, Northumberland, it is certain that before many years have expired every district in England will have had the opportunity of profiting by the exhibition.

The entries at Newcastle in this novel competition were 42 in number, divided into 4 classes:—1. Agricultural horses; 2. Dray-horses; 3. Hunters; 4. Roadsters. In each of these classes, five prizes were offered, varying from £6 to £1. Of the 42 competitors, 41 actually went to work, the absent one being detained by sickness.

Hunters form a class by themselves for this reason: the shoe of a hunter is liable to more accidents than the shoe of any other sort of horse. He has to gallop over all sorts of soils; stiff, slippery clay to-day, deep boggy land to-morrow, and in the chalk countries, he often has to pass over beds of flints which play the very mischief with his feet. Besides, if he has any tendency to overreach, and the *quarter* of the shoe is left a little long, in a big jump he is very likely to pull the shoe off altogether, and then his rider, if a humane man, loses the rest of his day's sport, unless he has taken the precaution to carry an extra shoe at his saddle-back, and can find a smith handy enough to put it on. Such a thing has happened to me more than once, and an awful sell it was, for of course we were having "the run of the season" when the accident happened. However, there is not much need for hunter-shoeing here, so if we ever start a horse-shoeing competition in this province—and I devoutly hope we shall—the hunters' class can be left out.

The report of the Judges at Newcastle is just what one might expect it to be: many good hammermen, first-rate workmen at the anvil, but utterly ignorant of the anatomy of the horse's foot. They pared, rasped, and burnt the foot too much. Others were the reverse of this, careful of the foot, using neither knife nor hot shoe, but bad hammermen. The great fault seems to have been—what it always has been in my recollection—fitting the foot to the shoe, instead of the shoe to the foot. (1).

As a rule, all over the world, men engaged in this business are very deficient in the knowledge of the situation of the nerves of the foot, and of the object which nature had in view when she provided the inside of the hoof with that ingenious cushion which we call a "frog." They cut away at it as if it were some brute matter, only there by chance, and of no consequence. But in truth it is a most important *buffer*, so to speak, and should be treated with profound respect, and never touched with a knife. Look at it, the next time you take a horse to the forge, and you will see that the horn that covers it is thinner and more delicate than that of any other part of the foot. The first stroke of the knife removes this thin horny covering altogether, and lays bare a surface totally unfitted, from its moist, soft texture, for exposure to the hard ground or the action of the air. In consequence of this ex-

(1) Precisely the way in which A. does when he asks for a shoe No. 8!

posuro, it soon becomes dry and shrinks; then follow cracks, the edges of which form rags; these rags are removed by the smith at the next shoeing, more rags follow, and so on, until at last the plump elastic cushion interposed by nature between the navicular joint and the ground, and so essential to the preservation of that very ticklish member from injury, is converted by the awkward routine-following lout of a smith into the dry, shrunken, unyielding apology for a frog to be seen in the foot of almost every horse that has been regularly shod for a few years.

The finest chestnut carriage-horse in London—I knew him well, and a splendid beast he was, barring his “lop-ears”—was utterly ruined by a swell-smith who would pare his frog: navicular disease attacked him, and he went incurably lame, to the intense grief of his mistress, who was as proud of her four chestnuts as of her four children.

I should be very glad if the committee which has the management of our next provincial exhibition would persuade Dr. McEachran to give two or three short addresses every day during the meeting to shoeing smiths on the anatomy of the horse's foot. He holds that “hundreds of thousands of dollars would be saved annually, in Canada alone, if the drawing knife and buttress were forbidden to be used in forges by any one but the fitter of the shoes. The sole or frog must on no consideration be pared,” &c. See “Journal of Agriculture” for March 1881, p. 171.

Black Tartar Oat.

This is the oat for practical purposes. I hear of it under different names: Australian, Russian, &c.; but it is the original old black Tartar, after all said and done. The Scotch refused to have anything to do with it for a long time, on account of the long awns of the husk. Stephens, in the Book of the Farm, abuses it shamefully! Nevertheless, its productive power is so great that it has forced its way into Scotland, and yields well there. I have seen, or rather I know of, 120 bushels an acre over a 40 acre field of this oat. It weighs about 38 lbs. the imperial bushel, and its qualities as a food for horses may be judged of by the fact that the trainers of race-horses at Newmarket, &c., will not buy the finest samples of Scotch oats as long as they can get Black Tartars. There is also a *White Tartar* oat of the same habit of growth as to the ear, but they are generally lighter than the Black. It was of the Whites that my farm-tutor, the late Wm. Rigden, of Hove, near the Brighton, grew 420 bushels on three acres of land! They only weighed 34 lbs. the bushel, though. Still 2½ tons of oats to the acre is not a bad yield!

ARTHUR R. JENNER FUST.

THE POULTRY YARD.

Hatching Game Birds

Quite a business is done in England in hatching partridges, quails, pheasants and other game birds in inclosed yards. (1) The business is somewhat practised in this country. Not very long since we noticed that a poultry man on Long Island had agreed to provide 5,000 pheasants for a sportsmen's club. The birds hatched in this way are fattened and sent to the markets, or turned into the woods and pasture to be “hunted” (2), by so-called sportsmen.

Our illustration, page 89, shows an arrangement in vogue at Elsenham Hall, England, where many thousands of these birds are hatched each year. The little houses or boxes are 13 x 11 inches and 13 inches high in front. The front can

be closed at night by a sliding door. The pens are made of fine wire netting, 10 feet high and two feet four inches square. The top is hinged, so that the hen can be taken out that way if necessary. At Elsenham 124 of these boxes are in constant use.

Large hens, mostly Light Brahmas, are used for hatching the eggs. A nest having been made in the box with earth and hay, some bad eggs are placed therein and the hen is put on them, with the front door down. She is not disturbed until the next evening, when she may be let out to feed, the food and water being provided in the pen. A truly broody hen will at once, after she is done feeding, go back into the nest; and that being the case, she may have good eggs substituted for the first ones on the evening of the second day. Should she not appear anxious to return to the nest she may be replaced thereon; but if this has to be repeated a second time it will be better to remove her altogether, as she will be certain to prove an unreliable mother. At Elsenham it is customary to take the hen off for twenty minutes in the morning, closing the door, so that she cannot go back on the nest for that time, and to leave the front door open until the evening, so that the hen can go off at other times if she desires so to do.

The hatching of the eggs is finished by means of an incubator. This is a simple machine of water pipes and tanks heated by a stove. When the eggs begin to chip in the nest they are removed to the incubator, and three hours after hatching are placed in an open “mother,” where they stay two days.

The Huntingdon Dairymen's Association. (1)

This association held its annual meeting on the 10th of February. The weather was, as is usual at that season, unfavourable to travelling, being excessively cold, and the roads were drifted so deeply that many who had intended to be present were obliged to remain at home. Nevertheless, when the meeting was called to order in the afternoon, the new schoolhouse was well filled. I, very much to my regret, was obliged to refuse an invitation from the society to read a paper at the anniversary, but my health had been so queer for the whole of the autumn and winter that I dared not run the risk of catching cold from exposure.

Mr. Macpherson, of Lancaster, said a few words on the reduction of expenses in cattle-feeding. During a recent visit to Wisconsin, he found that the farmers of that state, by paying attention to the subject and experimenting with different kinds of food, had reduced the cost of feeding cows from 18 cents to 9 cents a day. He believed that ensilage was the coming food for dairy-cattle. (So do I. A. R. J. F.)

Mr. Sidney Fisher, M. P. for Brome, proceeded to address the meeting on *Ensilage*. He was not the first to try it in the province, for Mr. Mark Dawes had tried it, but unsuccessfully. (This I doubt very much, as only this autumn I saw a letter from Mr. Dawes saying that he was highly satisfied with his silo and would not give up the system on any account. A. R. J. F.) A bin of double boards, with tarred (2) paper between, was quite sufficient. As there was a tendency for the walls of the bin to spread, it was advisable to dig out a foot or two of soil, and round the excavation there should be a trench, filled with small stones, to prevent the surface-water from getting into the silo, in which case no boarded floor would be necessary. In England, grasses are ensiled, but here, corn is the best material for filling the silo. There is generally great difficulty in curing fodder-corn, but the silo

(1) Quail are never hatched artificially in England. A. R. J. F.

(2) In England *hunting* is employed to signify the pursuit of an animal with hounds but no gun. A. R. J. F.

(1) Held over till now.

A. R. J. F.

(2) I wrote to Mr. Dawes on the subject, but got no answer!

A. R. J. F.

gets rid of that trouble. Clover, pease and oats, rye, &c., have done well. His crop of corn has never been less than 20 tons, and he has grown 35 tons to the acre. Three tons of corn are equal in his opinion to one ton of hay. (Therefore if hay is worth \$8.00 a ton, as it usually is, a ton of ensilage corn is worth \$2.66, which I respectfully but firmly deny. A. R. J. F.). He sowed his corn in drills, 3½ feet apart, and 4 to 6 kernels to the running foot, and out it when the cars were in boiling order. After planting, the smoothing harrow is run across, and the slant-tooth follows when the weeds begin to show. Afterwards, the corn is horse-hood until the whipple-tree interferes with the corn. Cost of cultivation of 4 acres, taken from Mr. Fisher's regularly kept diary :

Plowing, 4 days, man at \$1 and team at \$1 50 a-day.	\$10 00
Harrowing, 1½ days, man and team.....	3 75
Drilling, 1 day	2 50
Planting, 2 days, 2 men.	4 00
Covering with harrow, half a day, 1 man and team ..	1 25
Harrowing	1 25
Cultivating, 1½ days, man and horse.....	2 62
4 barrels of superphosphate.....	19 20
Rent of land, 5 per cent. on \$75 value per acre.....	15 00
Seed, 5 bushels at \$1.60	8 80
	\$68 37

The expense of harvesting the crop was .

1 Man's labour 29½ days.....	\$29 50
1 Horse's " 19 "	14 25
	\$43.75

Thus, according to Mr. Fisher, the cost of the corn-crop for ensilage, from the first ploughing in the autumn to the silo amounts to :

Labour on crop...\$37.37 (allowing \$10.00 for the	
Superphosphate... 19.20	fall-furrow.)
Rent of land, &c. 15.00	A. R. J. F.
Seed..... 8.00	
Harvesting, &c.... 43.75	

123.32 = \$30.82 per acre about \$1 55 a ton.

The only fault I have to find with this calculation is that the land is supposed to be perfectly clean before the corn-crop is sown, no allowance being made for cleaning operations. Mr. Fisher speaks of only one ploughing, but I have added to his charges \$10.00 for ploughing the stubble in the fall. About the superphosphate: I should like to know its composition, and whether it is really phosphate of lime dissolved in sulphuric acid, or the mixed fertiliser generally sold under that name. At any rate, if ensilage can be secured at from \$1.50 to \$1.60 a ton, there is, no doubt, an end, as Mr. Fisher says, "to the bugbear of the Canadian farmer: that the winter eats up all he makes in the summer."

Mr. Holdsworth's experience had been that roots, as white carrots and mangels, were satisfactory; to which observation, Mr. Fisher replied that roots were equal to, perhaps better, than ensilage, but Canadian farmers are unable to get the labour to raise them in sufficient quantity. His roots cost him \$2.30 a ton (1) to grow. The cost of a cow's keep was

Morning, 25 lbs. ensilage	1½ cents.
5 lbs. composed of bran, 2 lbs., ground.	
oats, 1 lb., oil-cake 1 lb., cotton-seed meal 1 lb.	6 "
15 lbs. of hay in 2 feeds, none and evening.	6 "

13½ cents a day.

Mr. Fisher gives his cows, as I always advise, both linseed-cake and cotton-seed, and yet his butter is "of very fine quality, as the price it brings proves." Now, in the Amherst, Mass., creamery, I find these two feeding-stuffs forbidden:

Patrons must not feed any cotton-seed, linseed, or gluten meal, &c., &c." "Almost all creameries forbid feeding cotton-seed, and brewers' grains are generally prohibited. R. N. Yorker. These prohibitions are absurd, on the face of it, for many of them include cabbages, the very best of an food for milk-cows! I have many a time fed cows on cabbages, with meal containing 2 lbs. of linseed a day, and the butter has been all that could be desired. By the bye, if the creameries are so particular about the food given to the cows of their patrons, how comes it that the butter they turn out does not keep as well as that made by the better class of private dairies. Messrs. Ayers' buyer told me of this their weakness at Frelighsburg, some eight years ago, and now Mr. Henry Stewart confirms the above statement: "Winter dairying," says he, "is now an indispensable need because of the poor keeping qualities of the average creamery butter." And again: "There were farmers who used, before there were any creameries, to sell their ten, twenty, or fifty tubs of summer-made butter in the fall and winter, and such butter as, after having been kept in the sweet, fresh, cool dairy for four or five months, had all the fine qualities of the best grades of butter, which the butter of the creameries cannot retain a month." Precisely so; I am now eating—or rather my family is eating, for I have never touched butter since that I mentioned in the Journal last spring, made by Mr. Gylling, of Sorel—butter, made at Petit Métis last September, that is as fresh as a dairy; whereas all the creamery butter, they tell me, has a *gout fade* after being kept a few weeks.

But to return to the Huntingdon people. Mr. W. H. Walker, after Mr. Fisher's address, read a paper on mixed grasses for pasture which is so instructive that I shall reprint it entire. In reply to questions put to him, Mr. Walker said. "I have not the least doubt that if our clay land were under-drained, we could have permanent pasture. The grasses held well where the snow lay deep.

"What I am going to give you is my own experience in sowing mixed grasses for hay and permanent pasture. The spring following after Professor Brown gave us his experience of permanent pasture here at our convention, that is the spring of '86, I thought I would try for myself and see how mixed grasses would suit our soil here. I had a 3-acre field which had been well manured and plowed in the fall, which I thought would be suitable for the experiment. Hearing at our convention, from Mr. Drummond, of Petite Côte, that he paid at the rate of \$10 per acre to his seedsman in Montreal, for seeds to sow for permanent pasture, I thought I would try Toronto, and sent for list of prices, and catalogues were sent in reply. I chose that of Steele Brothers, a reliable house, in which prices were quoted at \$4.25 per acre. The 3 acres which I was going to lay down sloped considerably to the south, and had 3 different kinds of soil. The first acre at bottom of field was a heavy blue clay, the second was a lighter soil with a yellow clay subsoil and the top acre was a loam. I sent for 3 different mixtures to suit the 3 different kinds of soil. The land was grubbed, harrowed and water-furrowed before sowing and rolled after. I sowed across the ridges. It was sowed the 1st day of May. In a short time the seeds came up, and I thought, perhaps a little thick, for I think all grew. About the end of June I mowed it and allowed what was cut to lie on the ground as a mulch. It looked very well, more especially the meadow fescue, which is a most luxuriant looking grass, having the appearance of looking damp the driest day in summer. I thought to myself, well, now there is going to be a reaction in farming, and

better times are before us if we can have such fine succulent looking grass as that all summer. The 1st of September I cut it the second time, and from the 3 acres I had 3 good loads of hay which was greedily eaten and relished by all kinds of stock. I waited with patience to see how it would stand our winter, but what was my dismay to find in the spring that the 2 acres of seed sown on the clay soil was entirely dead, except the clover and the slight sprinkling of timothy, probably about 2 lbs. to the acre, which was in the mixture. The top acre sown on loam was a splendid crop, thick, tall, and of a fine quality, except the Alfalfa clover, which is a little coarse but liked well by cattle. (1, I am sure it turned out 3 good tons to the acre and a splendid aftergrowth grew up of the clover, which I cut about the end of August. But to go into it more minutely—Professor Brown sent down to Mr Sellar of the Gleaner, 8 different samples of seed true to the name, for any person buying seed to go to him and see for themselves whether the seed they had bought was pure or not, which he kindly handed to me to sow. The names of the varieties were timothy, red top, orchard grass, perennial rye, Canada blue, or June grass, meadow fescue, meadow foxtail, and yellow oat grass. These I sowed in plots alongside the fence where there was plenty of protection through the winter with snow. The timothy, red top and orchard grass did well and wintered well. The Canada blue did not come up well, whether the seed was good or not I cannot say; as it is one of our natural grasses here (2); it should have done well; what came up was all right in the spring. The rye grass and meadow foxtail are all good grasses and very early, they being in full bloom and ready for cutting on the 28th day of May. The yellow oat about half a crop, the other half dying through the winter, seems to be a good looking grass and very tender and a few days later than meadow foxtail. The meadow fescue plot looked splendid all summer, of a rich dark green color, and I would say of it, the grass of grasses, if it would only grow with us on our clay soil,—was entirely dead in the spring, except 3 stalks. I would think that any kind of land of a porous nature or underdrained would suit these grasses well, such as the uplands of Hinchinbrook, and the ridges of Godmanchester, and possibly the loam of Ormstown, if the clay subsoil is not too near the top of the ground."

Observe, please, first, that there is a difference of 135 per cent. between the cost of the seeds at Montreal and at Toronto; secondly, that the land was really well prepared and in good heart; thirdly, that the grass was mowed about seven weeks after seeding-down; that nine weeks after the first mowing, there was a good out of hay; and, lastly, that the grass on the heavy clay soil was quite destroyed by the winter, the grass on the loam was a splendid crop—three tons to the acre! I do not think I should have mowed the grass at all. I prefer feeding off with young stock.

A paper was then read by Mr Robert Ness on Clydesdale horses, and in the discussion that follow a suggestion was made that struck me very forcibly. Farmers' horses, we all know, are very busy in the spring and summer, and have, comparatively, nothing to do in the winter. "If the farmer," said Mr. Archibald Bell, "has good warm stabling, and is careful not to expose the mares, when nursing, to sudden chills, he would do well to let them foal in the fall, for it is disagreeable to put a nursing mare into the mow or reaper. I would have the foal come in September or October, and have it suckled a month longer than if it were dropped in spring."

ARTHUR R. JENNER FUST.

(1) Alfalfa, or lucerne, must be cut young.

A. R. J. F.

(2) And therefore will succeed the own grasses when they die out.

A. R. J. F.

LACHINE FARMS.

Dwight's Cholera mixture.—I mentioned, in a note, in the last number of the Journal, that Mr. Tuck, Messrs. Dawes' farmer, had been very successful in curing diarrhoea in calves with Dwight's mixture. Last summer, no less than 14 calves died, one after another, of this troublesome complaint. No fewer than three veterinary surgeons were consulted upon the matter: they visited the farm several times, but could do the poor beasts no good. The calves seem to have been taken ill suddenly, and to have died like a shot. About two months ago, a newly born calf was seized with violent purging, the usual remedies were resorted to without avail, Mr. James Dawes saw the patient and gave it up as doomed. Now, Mr. Tuck himself had been, some six or seven summers previously, a great sufferer from the "Choléra du pays," and had received great benefit from the use of the mixture mentioned at the head of this note. As the calf was given up by its owner, Mr. Tuck asked leave to try what he could do. Leave was freely given, and, at 11 P. M., a dose of one-third of a bottle was administered to the patient, then comatose, and, apparently at its last gasp. To cut the matter short: in the morning, when Mr. Tuck went his rounds, at about 5 A. M., the calf was up on his legs, hard at work at its dam's udder!!!

Now, one cannot draw any definite conclusion from this one case, but considering that this calf was the only one saved after being attacked by the complaint, and that after the failure of all the remedies exhibited by three of the leading veterinary surgeons of the Continent, I do think it is worth our breeders' while to try the effects of this mixture on their calves if they should at any time be afflicted with this fatal malady.

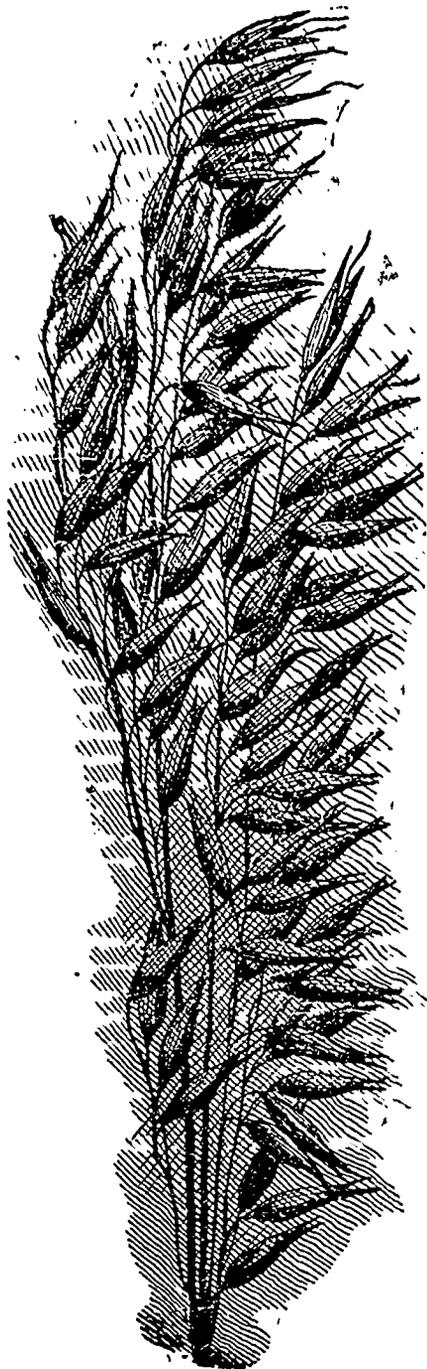
Mr. Tuck, who is a remarkably quiet, modest, and sensible man, is good enough to promise to keep me informed as to the future health of his young *protégés*. He will have lots of experience, as there are no less than 150 head of horned stock on the Dawes' farms.

By the bye, I considerably underrated the extent of the land in the occupation of the firm. Besides 300 acres of their own land, they rent about the same quantity of land from other proprietors.

Skim-plough.—Mr. Tuck laments, with me, the absence on these farms of what Kent men call *knives*, Hertfordshire men call *skimmers*, but the proper name of which is the *skim-coulter*. It is like a tiny mould-board and share in one piece, placed on the beam in front of the coulter, properly so called, and its office is to peel off a piece, about an inch and a half wide by an inch deep, from the land-side of the furrow slice, which, rolling over and over as the plough pursues its route, is finally cast into the open furrow and buried out of sight. If the plough is in the hands of a fair workman the operation of this skim coulter completely prevents every particle of grass from poking its nose out from between the crests of the furrows. A representation of one of these skim coulters may be seen in the engraving of Howard's plough, p. 140, vol. VI, of this Journal.

The grain on this soil gets laid, almost invariably, before harvest. The same thing, I was told by Mr. West, happens on the farms at Georgeville, on Lake Memphremagog. I am asked to suggest a cure. Well, I would if I could, but I cannot. All I can say is: sow deeper, and use a heavier roller; if that will not do the fault must lie in the soil, and as the strengthener of the straw, *soluble silicic acid*, is useless as an application, we must grin and bear the loss. It is a very curious thing, is this question of grain standing or falling when all but ripe. In Kent, if barley goes down in this way, the grain is fit for nothing but chickens' victuals; in Essex, Cambridgeshire, and Hertfordshire—on real malt-

ing-barley lands—I have seen thousands of acres, about the end of July, looking as if they had been rolled, and yet the sample of grain was surprisingly fine! There are certain soils in England the utmost crop of wheat producible from which never exceeds 32 bushels an acre. Add manure as you will, more straw perhaps may come, but not a bushel more grain.



TARTARIAN OAT.

Other soils, of much inferior apparent quality originally, can be forced up to yielding 40 bushels. The plastic clay in Kent will not grow malting barley; the plastic clay in Essex—the Thames divides the two counties—grows the finest Chevalier barley in the world with just the same treatment.

If malted, by way of experiment, 100 bushels of Kent barley will yield 104 bushels of malt; 100 bushels of Essex barley will yield from 108 to 112!

Mr. Dawes' man promises to sow deeper and to add weight to his roller this spring, so we shall see what effect the different treatment will have. The Berkshire pigs, here, are worth seeing. Their house is very nicely fitted up, with a boiler and steamer for cooking the small potatoes, of which I highly approve, and the mangels, of the cooking of which I do not approve at all. There is no fear of the Dawes' breed of Berkshire running out from breeding too closely. They buy young boars to put their sows to, and young sows to put to their own boars! In fact their rule throughout is, never to breed from near relatives in any kind of stock. This, however, may be carried too far.

Mr. Tuck I am happy to say, agrees with me in two important points: that the most profitable dairy cow, for well managed farms, is the shorthorn and that clover hay should be always put into stack. We had a good laugh together over the Frelightsburg idea that imperfectly made hay would stand less chance of firing in a close barn than in a stack. Mr. Tuck has had great experience in making hay for the London market. (See Journal for February, 1881.)

A curious fact in connection with the sex of calves: two seasons ago the cows on these farms dropped almost all bull calves, and this season, almost all have produced heifers.

ARTHUR R. JENNER FUST.

Report of the Minnesota Experiment Station, Jan. 1888.

—The establishment of this station seems to have been attended with considerable difficulty. The former piece of land selected for the farm, after having been bought, fenced, and ditched, turned out to be utterly unsuited to the purpose. It was, therefore, sold, and the proceeds devoted to the purchase of another farm, which, together with the appropriation made by Congress in accordance with the provisions of the *Hatch Bill*, may be supposed to have set the University of Minnesota at ease, at least as far as its agricultural department is concerned.

Experiments on the growth of Russian apples have been extensively carried on at this station, though not with great success. The orchard was planted in the spring of 1885 in the most exposed situation the farm afforded.

"It may be claimed that such a situation does not give the trees a fair chance, since any intelligent farmer would choose a protected location for an orchard, but the Russian apples were heralded as being absolute ironclads, and if there was a possibility of their growing on the open prairies of Western Minnesota, then surely they should withstand the greatest exposure that could be given them in this timbered region.

"The result of the winter of 1885-6 on the Russians, as heretofore reported, was the death of thirty-two and one-half per cent of the number planted. In the place of the thirty-seven trees thus winter-killed, others were set, of varieties not before standing in the orchard."

Besides those that were absolutely destroyed by the weather, the previous year's shoots of a great number of trees were killed back completely.

Of fifty-two Duchess trees planted in the spring of 1885, at the same time and in the same orchard with the Russians, half are dead, and of the remainder the new growth was killed back as badly as Antinovka, of which tree the new growth was entirely destroyed and part of the two-year-old wood on two trees.

"Of the sixty-five varieties noted, *not one* started growth from terminal buds in the spring of 1887. Those which killed back one inch or less, and which, in such situation as are or-

dinarily chosen for orchards, may fairly be presumed to be perfectly hardy in this latitude, are Green Streaked, Veronish Reinette, Fla' Voronish, Koursk Anis, Pointed Pipka, Titus, Grushevka, Red Pipka, Aport Orient, Arkad, Yellow Calville, Heidhorn, Gipsy Girl 56 Vor.), Blushed Calville, Hiberna and Ostroff's Glass.

"It is not fair to assert, however, that the remainder of the list is too tender for culture in Minnesota; nor, on the other hand, can entire hardiness be claimed for the above list.

"The foregoing notes merely tell the action of the varieties named under certain conditions, and, so far as location is con-

The experiments in wheat culture are very interesting to me, particularly those on shallow vs. deep sowing. But I fear, from the short time the farm has been under cultivation, the land has not been sufficiently exhausted by cropping to admit of much dependence to be placed on any experiments that may be made in the relative values of artificial manures.

The most striking feature of the above experiments in thick- and thin-sowing is that, in both seasons, the 4 pecks plot and the 8 pecks plot ripened at the same time. Now, when in England, I tried several times this very same diversity of seeding, and I invariably found that the thick-sown



ENGLISH HATCHING HOUSE.

cerned, it should be borne in mind that these conditions were decidedly the most severe that could be chosen.

"A comparison of the foregoing list with the Duchess will prove interesting. While the average of the Duchess trees did not stand the winter much, if any, better than Auto-novka, which killed back to old wood, there were a few trees that produced good growth from buds near the base of the one-year-old branches, and averaging twenty-two inches in length. The Duchess seems to have, in an unusual degree, the power of recovery from winter injury, and it may be that many other Russians will develop the same quality. The Duchess has long been known to winter kill in this latitude, but all apple growers regard it as a safe investment, and they take it as a standard of hardiness."

came to harvest at least 8 days sooner than the thin-sown. And the reason seems to me to be clear: the thin-sown has to tiller out to make sufficient stems and ears to yield a full crop; the thick-sown can shoot up into stalk without delay.

THICK AND THIN SEEDING.—1886.

No. of Plat.	Depth of seed.	Quantity per acre.	When sown.	When up	When ripe.	When cut.	Yield per acre.
7	1½ in.	4 pecks	May 7	May 13	Aug. 1	Aug. 6	1208 lbs.
8	1½ in.	.5 pecks	May 7	May 13	Aug. 1	Aug. 6	1012 lbs.
9	1½ in.	6 pecks	May 7	May 13	Aug. 1	Aug. 6	1096 lbs.
10	1½ in.	7 pecks	May 7	May 13	Aug. 1	Aug. 6	1162 lbs.
11	1½ in.	8 pecks	May 7	May 13	Aug. 1	Aug. 6	912 lbs.

1887.

5	2 in.	4 pecks	April 29	May 7	July 22	July 22	757½ lbs.
4	2 in.	5 pecks	April 29	May 7	July 22	July 22	877½ lbs.
3	2 in.	6 pecks	April 29	May 7	July 22	July 22	755 lbs.
2	2 in.	7 pecks	April 29	May 7	July 22	July 22	912½ lbs.
1	2 in.	8 pecks	April 29	May 7	July 22	July 22	877½ lbs.

Here, in 1886, we see that, whereas 4 pecks to the acre produce 20 1 bushels, 8 pecks produce only 15.2 bushels, but 7 pecks produce 24 bushels an acre more than 5 pecks, and not quite a bushel more than 6 pecks.

In 1886, the 7 pecks to the acre have it all their own way, and the full-seeding is the worst of the lot. We must not for a moment imagine that the difference of one peck of seed to the acre can account for the difference of 4 bushels between the two yields. There must be some occult reason, either the land, or the previous cultivation, or "something or other," as old women say when they cannot account for anything. I am a thin sower from the bottom of my heart, but long experience leads me to distrust on this continent less than six pecks an acre for *spring-wheat*, drilled, on good land in a high state of cultivation, and eight pecks on poor land badly farmed. If the managers of this station will go on with this course of experiment, for from twenty to thirty years more, they will, with care, probably arrive at some definite conclusion as to the quantity of seed suitable to their soil, their climate, and their exposure.

DEEP AND SHALLOW SEEDING.

1886.

1	1½ in.	6 pecks	May 6	May 13	July 30	Aug. 6	1260 lbs.
2	2 in.	6 pecks	May 6	May 14	July 30	Aug. 6	1300 lbs.
3	2½ in.	6 pecks	May 6	May 15	July 30	Aug. 6	1220 lbs.
4	3 in.	6 pecks	May 6	May 16	July 30	Aug. 6	1208 lbs.
5	3½ in.	6 pecks	May 6	May 17	July 30	Aug. 6	1288 lbs.
6	4 in.	6 pecks	May 6	May 18	July 31	Aug. 6	1360 lbs.

1887.

6	1½ in.	6 pecks	April 29	May 7	July 22	July 22	782½ lbs.
7	2½ in.	6 pecks	April 29	May 8	July 22	July 22	895 lbs.
8	3½ in.	6 pecks	April 29	May 10	July 25	July 25	687 lbs.
9	4½ in.	6 pecks	April 29	May 10	July 28	July 28	937½ lbs.
10	5½ in.	6 p cks	April 29	May 12	July 30	July 30	1030 lbs.

The trials of different depths of seeding, though not absolutely conclusive, yet, with one exception, are considerably in favour of deep-sowing. Although a great advocate for deep-sowing, I doubt if I should have had the courage to sow *spring-wheat* as deep as 5½ inches, neither do I think so great a depth necessary. In fact I doubt if the "Hoosier drill," with every possible appliance, could be depended upon for regularity of deposition at such a distance below the surface. Three and a-half to four inches are deep enough for fall-wheat, and 2½ to three inches for spring wheat.

Another point I should have liked to see cleared up: out of 100 grains of wheat buried 4½ inches and 5½ inches, how many came up? Unless the seed was very well dressed, I feel convinced that, out of the six pecks sown, at least half a peck, at those depths, never made its appearance. The difference between the time of appearing above the surface of the soil was not so great as might have been expected; for, whereas the grain sown one inch and a-half deep was up on the 8th

day, that sown five and a-half deep was up on the 13th day, a difference of only five days, which is quite immaterial.

I cannot say I should feel inclined to farm largely in Minnesota if the following account of the destruction of the experimental plots for testing the values of different sorts of grain is indicative of the ordinary accidents to which grain is heir in that state: Thirty varieties of wheat, eighteen of oats, and six of barley, were entirely destroyed by the flood of "chinch bugs" which swept over our grounds the first week of July, 1887!

The experiments on potatoes fail to teach anything, as the distance between the rows is not given, only the distance between the plants in the rows. At 13 inches apart, with 2,262 pounds of seed per acre, the crop was 262 bushels; at 12 inches apart, and 812 pounds of seed per acre, the yield was 237 bushels—only 22 bushels difference. The best of all was from the same quantity of seed, at the same distance—300 bushels an acre=8 tons imperial measure, which is a good crop, and one more often talked about than grown. In fact, the whole potato-crop was above the average, varying from 5½ tons to 8 tons an acre. Every thing above five tons is good. The seed for this experiment was treated in various ways, and, as usual, no one way turned out much superior to the rest:

1. Large whole seed; 2262 lbs. per acre!
2. Whole seed, with all the eyes cut out but two.
3. Large seed, halved lengthwise.
4. Large seed, halved cross-wise, butt-ends.
5. Large seed, halved cross-wise, seed-ends.
6. Large seed, quartered, butt-ends.
7. Large seed, quartered, seed-ends.
8. Large seed, cut in pieces containing two eyes each.

As far as yield in proportion to weight of seed goes—which has nothing really to do with profitable cultivation of grain or potatoes, any more than the proportion a crop of turnips bears to the two or three pounds of seed used—the plot No. 8 beat the rest out of the field, 551 pounds of seed producing 16385 pounds of crop, or 30 to 1. No. 1, with a ton (gross) or 40 imperial bushels of seed, only yielded 15,732 pounds of potatoes=6.9 tons.

Haras.—I guessed that this word had an Arabic derivation, and, at last I have run up against its origin. In the 17th century the Spanish kings established a royal breeding stud in Cordova, at *Al Haras*, the former post of the Moorish *mounted body-guard*. *Al*, I need not inform my readers, is the Arabic definite article. The word has nothing to do with *Harem*.

A. R. J. F.

DAIRY-MATTERS.

The following is a translation of certain paragraphs in an address made by M. J. O. Chapais to the Dairymen's Association at their last meeting, at St. Hyacinthe, on the 11th January, 1888. (1)

Of the relations of the Proprietor of a factory with his manager.—It may be said with truth that the prosperity of a factory depends upon the skill of the cheese-maker who is at its head. The selection of a suitable manager, then, must be of the greatest importance, both to the proprietor of the factory and to its patrons. If the former understands his business, as indeed he ought, he will possess the qualifications necessary to enable him to choose a manager for himself. Should he, on the other hand, be ignorant of the business, he must exact from the candidate for the office a certificate not only of his capacity, but also of his trustworthiness. It is no good for a manager to be a good workman, if, at the same time, he is lazy, quarrelsome, sottish, whimsical; the

(1) Kept back until now by accident.

A. R. J. F.

business will not prosper if he have defects of temper and behaviour of this description, and it will not be long before there will be disputes of all kinds between him, the proprietor, and the patrons. When once the character of the manager is established to the satisfaction of the proprietor, the latter should have a written contract drawn up between himself and the manager, by which the latter must bind himself to make no goods but those of the best quality, under pain of summary dismissal "without recourse." This power of instant dismissal is indispensable, for the losses caused to a factory of even moderate size by the want of skill on the part of the manager amount to a considerable sum in a very few days, and it is a matter of great importance that the proprietor should not have to keep a bad workman for days after his want of capacity, or his want of industry, has become evident. In such cases, in the immediate dismissal of the man lies the only chance of safety. The manager must be held responsible for all losses that arise from his own fault, and be liable to recoup the losses to the patrons out of his salary; to insure which, his wages for one month shall always remain in the hands of the proprietor. To say, that a proprietor must always distrust a manager offering himself for a low salary, may perhaps be unnecessary. A skilled operator is always worth his price, and it is better by paying a high salary to secure the right of exacting a strict contract from him, than to pay a low salary, and thereby to be compelled to accept a loose contract, to the disadvantage of the proprietor. A capital plan exists in some factories, by which the manager is paid, in addition to his salary, a certain percentage on all cheese that fetches "the top of the market." I have seen this practice operate greatly to the advantage of both manager and proprietor.

That the manager should always feel himself under the observation of the proprietor, is absolutely necessary. His assistants should be selected by the manager, for he will generally be the best judge of the men whom he has to manage, and it will aid in the smooth-running of the establishment to let him have his own way in this matter. (1)

In any dispute that may arise between the manager and a patron, the proprietor, who is situated as a judge between the two parties, must not decide in favour of either from fear of incurring his displeasure. He should strive to arrange matters pleasantly, and avoid as much as possible lowering his manager in the eyes of the patrons in general, on account of some, probably, trifling fault.

Of the proprietor in his relations with trade.—In his special department, the proprietor of the factory has necessarily to enter into transactions with certain firms: the choice of these firms is not a matter of indifference. If it be unwise, as I said before, for the proprietor to behave stingily in his bargain with the manager, it is equally unwise in him to seek for cheapness alone in his purchases for his factory. He will want rennet, colouring, salt, calico, boxes, tubs, in addition to the material he manufactures. He owes it to his patrons, to his manager, to his own reputation, to purchase none of these things except they be of the best quality. If he is not a good judge himself of these articles, he should entrust the purchase of them to his manager; thus making him answerable for their quality, and rendering it impossible for him to plead

the inferiority of the matters in question as an excuse for having made bad cheese or bad butter.

Of the manager—his qualifications.—The manager, it is hardly necessary to say, must be thoroughly skilled in every thing pertaining to his work. I may add, that skill in his trade will not, alone, answer the purpose: he must be devoted to it, make a study of all the new inventions connected with it that are brought forward yearly, learn the use of all the systems of management in vogue, and of all the new machines invented, that he may be able to work with them if requisite, and not run the risk of losing a good engagement through ignorance of these things. He must know how to read, write, and calculate; know English and French, and be acquainted with everything necessary to render him independent in his factory, so that he can direct his assistants properly in the performance of their duties, and never find himself at their mercy, or exposed to their criticisms, through errors which will infallibly cause them to lose confidence in him, and thereby lead them to be guilty of insubordination.

And if, as I have previously observed, the proprietor owes certain duties to his manager, no less is the manager bound to the discharge of certain duties towards the proprietor, which duties he cannot properly discharge, unless he possess the five following qualifications: courtesy, honesty, activity, cleanliness, and sobriety. Whatever other qualifications he may possess, if the manager is rude, dishonest, lazy, filthy in his habits, or intemperate, he will never be worth his salt. The *honesty* of which I speak does not consist alone in not stealing the milk, the butter, or the cheese of the factory; but in regarding himself as the proprietor's representative in the establishment; in treating his interests as if they were his, the manager's, own; and, in protecting them, always within the limits of justice, when any conflict of rights arises between the proprietor and the patrons. His *activity* should be exercised over every part of the work, from the most important down to the most trivial detail. It involves an incessant watchfulness over the operations of manufacture, especially of those which are performed by his assistants. *Cleanliness*, in dairy-work, is half the battle. It must be scrupulously exact. The factory itself must be kept in a condition of regular and absolute cleanliness. Every source of foul odours, every cause leading to putrefaction, must be peremptorily expelled. Sour milk, dirty vessels, stagnant water (*slops*), the fumes of tobacco, all must be banished from the factory. During working hours, at least, the manager must be tidy in his dress, and clean as to his person. *Sobriety* does not alone imply abstinence from strong drink, which interferes with the quickness of perception, induces laziness, and causes the committing of gross faults during the making of the articles in question; but it also implies the absence of bad habits, such as smoking, chewing (*and spitting*) in the factory. It embraces, also, the *moral* sobriety which forbids the use of oaths, bad language, and the habit of giving orders to the assistants in a rough and brutal manner, a habit which, more than anything else, tends to create bad feeling between the manager and his assistants, than which nothing is more injurious to the proper working of a factory. To sum up: when an inspector, in the discharge of his official duties, enters a factory, he should neither see, smell, nor hear anything to inform his eye, his nose, or his ear, that anything abnormal or irregular exists in the establishment.

The manager—how he should behave to his assistants.
—I remarked, just now, that the proprietor ought, as far as he conveniently can, to leave the hiring of the hands to the manager, to secure as much ease as possible in the working of the factory. Anyhow, whether they be hired by the one or the other, there is only one way in which the manager can

(1) Very right, indeed. Also, beware Mr. Proprietor, of forcing a private pet of your own on a manager who knows his business. I saw once a most thriving factory broken up from this folly. The principal director had a pet who, he insisted, should assist the manager. The latter, a most valuable servant, did not choose to submit to what he felt was an unworthy style of treatment; he sent in his resignation; the customers he had brought with him deserted the factory, and down it went.
A. R. J. F.

direct them properly: let him intrust no operation to their care except such as they can execute properly, and never allow them to endanger the well-being of the factory by their ignorance or carelessness. If he has any apprentices, he should impart to them all his knowledge of the system of manufacture, and strive to teach them their duty in such a manner that they may do him credit. For he may make up his mind to one thing: if any one whom he has taught fail as a maker of cheese or butter, the first excuse the man makes will be: Oh, I was never properly taught by Mr. ——. The manager ought to see that his men are honest, sober, active, and orderly as long, at least, as they are under his immediate control. His orders should be given with firmness, but at the same time with mildness, and, if he wishes to preserve his authority over the men, he should be careful not to have to correct any orders given by mistake, neither must he ever allow any order once given to be neglected on purpose or from evil design. One act of disobedience brings others in its train, want of respect follows, and a good understanding between the manager and his assistants is soon at an end. All that I have insisted upon implies an increasing watchfulness over his men on the part of the manager.

The patrons—their relations with the proprietor.—Of all the duties owed by the patrons to the proprietor of a factory, the principal one is to deliver no milk at his establishment that is not absolutely pure. Any person who skims his milk, who keeps back the strippings, who puts water or any other adulterant into his milk, who delivers his milk in a dirty or in a sour state, is a thief. A severe character, but a just one. He robs the proprietor, who by his act is exposed to the chance of delivering goods inferior to the sample in quality, and has to pay damages to the purchaser in consequence; he robs his brother-patrons at the same factory, for he takes part of the sales-money which, by rights, should be theirs, the amount of which he has reduced in proportion to the quantity of bad milk he has delivered; he robs the buyers of cheese who perhaps make their purchases at a season when the defects caused by his bad milk are not obvious, though they may become apparent after the dealer has them in his store, when he is sure to lose by his purchase. (1)

Another duty of the patrons is not to keep on bothering the proprietor because the season is bad, and the cheese does not bring the price they expected. If the trouble they give causes the proprietor to close his factory, though he has done his duty honestly by them, they will be responsible *in foro conscientix* for all the injury they have caused.

The most villainous of all the faults of which patrons are guilty is envy. In good seasons, if no accidents happen in the manufacture, the proprietor does well, and gets a good return for his capital. This is only fair, for his risk is great. In spite of every care, it will happen that inferior cheese is made, and it does not take many bad cheeses to cause a serious diminution in the expected profits. With such risks as these to run, what moneyed man would be ass enough to invest in the dairy business sums that may not return him more than six or seven per cent., at most, even if he meet with no losses. That is about the interest that money invested in first-class mortgages reaps, and the inventor has no need to run about hunting for the payment, which seeks the capitalist in his office, without trouble or risk on his part. Nevertheless, I have known patrons so desirous of setting their feet on the neck of an unfortunate proprietor, who had no written contract with them, as to force him to manufacture their

milk almost at a loss, at the risk, on his refusing, of seeing his factory closed.

When once the patrons have signed a contract favourable, in the first instance, to themselves, and in the second to the proprietor, they should behave with justice and liberality to him, that their mutual relations may bear the impress of the most perfect honour and honesty.

How the patrons should behave towards the manager.—If the patrons behave properly towards the proprietor, they will rarely fail to get on well with the manager. Circumstances, however, will occur, where, whether by accident, or by negligence, the patrons bring bad milk to the factory. They must not be offended if the manager points out the defects to them, and begs them to take more care. On the contrary, their duty is to search out the cause of the damage, and put a stopper on it for the future. If, on the other hand, the manager makes some mistake in weighing the milk, the patrons are not to shout out at the top of their voices: He is robbing us! but they should ask calmly for an explanation, and if this is given in the presence of the proprietor, it will seldom fail to make matters assume a more cheerful appearance. The important point in a matter of this sort is, not to impute to the one who turns out to have been in fault the slightest suspicion of having acted thus on purpose, unless the contrary is clearly proved. (1)

M. Chapais went on to say that many people were trying to reduce the number of middlemen between the patrons, who furnish the milk to the factory, and the purchasers of the butter or cheese. "It would be difficult," continued he, "to find a farmer possessing a sufficient number of cows and a factory in complete working order, all under his own control, and the products of which he would have the right of disposing of himself, but an approximation to this is proposed as follows. A dairyman, skilled in making both cheese and butter, having certain funds at command, might establish a factory, and buy the milk from the farmers at a price to be fixed in the following way. For instance, in the district of Montreal, an agreement should be made to sell the milk by the measure of one gallon = 10 lbs., and these ten pounds of milk should be estimated for the month of June, let us say, at the highest price paid for cheese on the Montreal market during the ensuing month, July in this case; it being settled that it takes ten pounds of milk to make a pound of cheese, and taking from the price the two cents for the proprietor's profit. To be clearer, I will give an example: If July cheese be worth ten cents a pound, at Montreal, on the average, the price of June milk would be eight cents. (2) The buyer, while paying the highest market price for the milk, would not be exposed to losses arising from the fluctuations in the same market. This system would oblige the proprietor to utilise the whey and skim-milk in feeding pigs and calves. An objection to the plan comes from some who say, that it would deprive the farmer of the skim-milk and whey which he wants for his young stock; but, in it, there is nothing to hinder him from keeping back such a quantity of milk as may be required for family use, and to supply the household with butter, and, at the same time, to furnish his pigs and calves with milk sufficient for their wants.

J. C. CHAPAIS.

(From the French)

(1) It seems to me that neither Mr. Macfarlane nor M. J. C. Chapais have a very exalted idea of the moral temperament of the patrons of the factories.

A. R. J. F.

(2) I am now, February 28th, paying at the rate of 28 cents a gallon for milk and something else! And the worst of it is, that my purveyor, although he knows what my business is, gravely—very gravely—looks me in the face, and protests that he makes no profit from his cows!!

A. R. J. F.

(1) According to Mr. Macfarlane, who lectured on factory work at Huntingdon on the 10th February, patrons are constantly dropping pints and half-pints of water about. He more than hinted that their women-folk derived all their best bonnets and shawls from this source!

A. R. J. F.

Pea-Beans and Meat-Scraps.

Our occasional correspondent, Mr. H. F. Hunt writes to the *Rural Vermonter* as follows :

BEANS AND MEAT SCRAP.—H. F. Hunt, Quebec, writes : " I see in the Boston market reports, pea-beans quoted as hand-picked, screened, small, medium, &c. What do these terms mean? They quote those from Vermont, small, hand-picked, at \$3.10 to \$3.15. Is this the usual price? Would the pea-bean ripen here? I can sow on or about the 25th of May, usually, but frost comes about the 8th of September. The early Aroostook does well here, but is small and takes a good many to fill a bushel. What is the name of the pea-bean used in Boston? I am in a position to secure a good deal of meat-scraps—not ground, however, but in cakes, for one cent per pound. How would it do for a fertilizer in place of nitrate of soda or sulphate of ammonia? Could you kindly give me the chemical constituents of the substance? I propose using it for onions, cabbage, cauliflower, &c., but do not know what proportions to use. Can it be ground in an ordinary flour mill? "

To which our good friend Dr. Hoskins answers as follows : " In reply we may say that beans have advanced considerably in price recently on account of the scarcity of potatoes. " Hand-picked " beans are just that, *i. e.*, beans picked over by hand, removing all imperfect ones, and such dirt as the fan failed to take out. " Screened beans " are beans that have been sifted to remove fine dirt and splits. They are usually screened before hand-picking—or rather they are turned into a set of two or three wire screens, placed one above another in a frame, and thus screened, hand-picked and sized into " small " and " medium," at the same operation. There is at least one pea-bean that is as early as the Early Aroostook, which, though small, is too long to rank as a pea bean. It is a new variety, called " The Boss," which we have grown for several years, and think the earliest, most productive, handsomest, and most healthy bean of its class. Meat scraps are a rich nitrogenous fertilizer, but we think they have to be ground in a steel mill. In a fine condition, mixed usually with some bone, they are sold for fertilizing purposes, but are generally bought by the fertilizer makers, rather than by the farmers. They go, in this form, by the name of " ammonite," and contain about 12 or 13 per cent. of nitrogen, with some phosphoric acid. We should hardly know how to manage the crude article in lumps."

We may say that the small pea-bean matures perfectly in Quebec. It can be had from Mr. William Evans, at Montreal.

It should not be sown before the ground is perfectly warmed up, say some time early in June. We hope our friend Mr. Hunt will also try " The Boss."

He will find in *pea-bean* haulm, hard as it may appear, an excellent fodder for milch cows, when cut up fine in the straw-cutter, and softened by maceration in hot water. Salt lightly and moisten the haulm thoroughly. The refuse beans, in a soup, help the cows to give the richest of milk, or the hens, in producing fresh eggs. In his soil, and with good cultivation (20 inches in the rows and 3 inches between the plants), he should obtain from 25 to 30 bushels to the acre, with thorough clean cultivation, and without manure, provided the land is rich enough for a heavy crop of oats. By showing a sample of such beans to his friends and customers, he would soon secure a market in Quebec for all he can grow, and at excellent prices : \$2 a bushel, and more on an average.

Respecting meat scraps, although they may contain as much as 13 and 14 % of nitrogen, such nitrogen does not act in the soil as would sulphate of ammonia. Such nitrogen is generally estimated to be worth from $\frac{1}{4}$ to $\frac{1}{3}$ less than would an equal weight in sulphate of ammonia. Sulphate of ammonia is now worth in Montreal \$65 a ton, say \$70 on the farm at

Quebec. It contains about 20 % of nitrogen, all soluble. Two tons of good meat scraps, costing \$40, should therefore prove about as rich in soluble nitrogen as that costing \$70 in sulphate of ammonia.

But, such scraps, we imagine, could be put to a still better value. By feeding young hens in winter with such scraps, sliced turnips or boiled potatoes or even good ensilage, *ad libitum*, crushed bones, *do. sand*, and besides, a daily mess of clover or young grass cut green—dried up sufficiently with sweet hay, put through the straw cutter and moistened with hot water, Mr. Hunt should obtain a large crop of winter eggs, and yet find in his hen manure about as much available nitrogen as he would in manuring directly with meat scraps. Let him break up the meat cakes into large bits with a hatchet, and the hens will soon do the *grinding*. Please try and give us, in the *Journal*, the results obtained.

Meat-scraps can also be fed, partially, to growing pigs with much profit, and such manure would gain in richness accordingly, that is : what would be insoluble if put directly into the soil as meat scraps would become soluble in the manure. At least, this is the prevailing opinion amongst scientific writers and deserves 1. full consideration, and 2. a thorough trial experimentally. In the latter case, we would advise to feed hens with a given quantity of scraps. Apply to as many rods, the same weight of scraps, broken up fine and composted with horse manure, as that the weight of hen manure and of such compost be equal, and note results. We know that Mr. Hunt is quite willing and able to carry out successfully such an experiment and we should be glad if he would try it. Of course, watch the egg crop and let us know about that too.

ED. A. BARNARD.

If beans are sown at 20 inches apart, they cannot be horse-hoed, whereby half their value as a fallow crop is lost. I sow beans as thick as they will stand in the rows, just as thick as garden pease. My own idea of a crop of beans is 24 inches apart from row to row ; very thick in the row—2½ bushels of seed to the acre—and the yield should be certainly 60 bushels an acre. Horse-hoe, hand-hoe, and plaster. A. R. J. F.

The following letter, from Mr. Hemming of Drummondville, deals with an interesting question. The writer, it seems to me, has not fully understood the bearing of my statement. The old practice was, and we still see it carried on in some places, to cut corn in what may be called the grass state. The more modern practice is to allow the same crop to approach more nearly to maturity before severance. In the former case, no ears were allowed to form ; in the latter, the ears are not only allowed to form but almost to ripen. The analyses of the green and ripe corn are as follows :
(Wolf.)

	Water.	Ash.	Albu- minoids.	Fibre.	Other carbohydrates.	Fat.
Green.....	84.0	1.4	4.7	4.7	8.4	0.5
Ripe grain...	14.4	1.5	10.0	5.5	62.1	6.5

The green corn contains 1.4 % of Albuminoids, the ripe grain 10.0 % of the same valuable constituents, the nitrogen of which, as far as we know at present, is derived from the soil, and it is to this that I referred in my statement as causing the ripening of the ear to take more out of the land than was extracted by the immature plant. Of course the fibre, the carbohydrates, the fat, and the water, are, as I need not tell Mr. Hemming, derived from the air and the rain, and they form 97.60 % of the whole, exclusive of the amides in the albuminoids ; in fact of nitrogen in the green corn there is

only .20 ‰, whereas, in the ripe grain we find 1.60 ‰, or eight times as much.

Mr. Hemming says he "does not of course refer to the organic portion of the crop as that does not affect the question under discussion." I, on the contrary, believing with Lawes and Gilbert and Boussingault, that plants derive their nitrogen from the soil, founded my statement mainly on that theory.

A. R. J. F.

TO THE EDITOR OF THE JOURNAL OF AGRICULTURE.

Sir,—In reading your interesting remarks *de omnibus rebus* published in the present May number of the Journal, I came across the following, where you are speaking of the corn crop for ensilage, viz.

"We must not forget that, *though corn sown thickly and cut green takes but little out of the ground*, it is a very different matter when the seed is allowed to form and nearly ripen."

I would like to know whether you have any authority for such a broad statement. I am aware that many years ago, before Liebig had revolutionized theoretical agriculture, it was the almost universally received opinion that all green crops, including root crops, *took but little out of the ground* and were supposed to obtain most of their sustenance from the air, but I had thought that the researches of chemists had since shown that this idea was untenable. I presume that it emanated from observing the wonderful effect that the introduction of turnip culture had in improving the sandy soils of Norfolk; although had the subject been rightly considered it ought, in my opinion, to have led to the opposite conclusion.

Some forty years ago my attention was first drawn to this subject by an occurrence that happened on my father's farm in Ireland, and which I referred to in a Prize Essay of mine treating on Agricultural Chemistry and practical farming, that was published in the Journal of the Royal Agricultural Society of England (vol. 13 p. 12) in the year 1853 (though written several years before) and in which I indicated the scheme of experiments since so successfully carried out by Messrs. Lawes and Gilbert. This occurrence is related in the following terms. "In the autumn of 1846 a field of about 3 acres was manured at the rate of 20 tons of farm yard manure per acre, and sown with rye for soiling in the following spring. It produced a very heavy crop, but on account of the stalks becoming too hard for the horses, we were obliged to allow half of the rye to remain for seed. The part of the field which had been soiled was immediately ploughed and sown with globe turnips, with a dressing of 3 cwt. of Peruvian guano per acre. The turnips were very fine and obtained a prize at our local show. After the seed rye was harvested and the turnips cleared, the whole 3 acres were ploughed and set with beans (horse) in the following February; and now comes the curious part of the affair; the beans came up well over the whole field, but we soon began to perceive a difference between those on the seed rye and turnip ground, the former looking much more luxuriant than the latter, but we were not prepared for what afterwards took place. The beans that followed the turnips actually stopped all growth when 6 inches high and of course did not seed, whereas after the seed rye they grew so luxuriantly as to injure the produce, and this difference extended to the line where we had discontinued cutting the green rye, the more conspicuous as we had stopped on the middle of a land. This result certainly astonished me, for it was in direct antagonism to all the preconceived notions of farmers, as it is usually thought by them that crops do not draw the ground, nearly to the same extent when cut

"green, as when allowed to ripen their seed. Turnips, too, are generally supposed to extract the greater portion of their nourishment from the atmosphere. But we find that beans actually refused to grow after the green rye and turnips, notwithstanding the application of 3 cwt. of guano; while where the rye was allowed to ripen its seed and do extra manure was applied, they grew luxuriantly." (1)

The foregoing experience would certainly not seem to support your theory, so far as practice is concerned, and on the other hand if we refer to the researches of the chemist we shall I think find that your theory is equally untenable in the broad terms in which it is stated. Of course I am perfectly willing to admit that a crop that has been grown for seed will not take so much out of the land when cut green as when the seed is allowed to form and mature, but I think it will be found that the only difference on this respect is the component parts of the grain itself, which of course is additional, but it does not at all follow, in my humble opinion, that if the crop had been *thickly* sown for the purpose of soiling or ensilage, that the matters extracted from the soil would not exceed that of the lighter crop which had been allowed to perfect its seed.

Let us see what the chemists have to say so far as this question is concerned.

I find by reference to the tables that are appended to my essay (A 4) that a heavy crop of wheat (32 bushels per acre) would extract 233 lbs. of inorganic matter from the acre of soil, of which the grain and chaff would extract 82 lbs. and the straw the balance, so that the ash from the grain and chaff is about one third of the whole. This is the result arrived at by Prof. Way, then chemist to the Royal Agricultural Society after about 40 separate analyses. A heavy crop of oats (56 bushels to the acre) gave, according to Prof. Norton 426 lbs. of ash extracted from the acre, of which 126 lbs. is to be assigned to grain and chaff. So that it would appear that the grain and chaff of a heavy crop of wheat or oats, if allowed to mature, cause an additional drain upon the land of something more than one third of the whole. It ought however to be mentioned that the grain extracts nearly 5 times as much phosphoric acid from the soil as the straw, while the straw extracts even a larger proportion of potash than the grain does of phosphoric acid.—My tables do not contain any analyses of Indian corn, that being a crop that is not grown in England, but by reference to the analysis of that crop to be found in the American Appendix to Stephen's Farmer's Guide, p. 19, it will be found that the amount of potash and phosphoric acid is relatively far greater in corn stalks than in straw, in consequence of the less quantity of silica.

If these analyses have any bearing on the question, it can I think be scarcely said with justice that these crops apart from the seed take but little out of the ground particularly when it is considered that the relative produce of grain is far less in this country than in England.

I now come to consider what according to same authority is extracted from the ground by green crops.

The only analysis of a soiling grain crop to be found in my tables is one of oats, cut when showing ear, and this for reasons therein stated is not very reliable. (Table D. 4.) It appears however by this analysis of the whole plant that about 270 lbs. of inorganic matter was extracted from the soil by a crop estimated at 6 tons in the green state. This, making allowance for the stalk that had not yet grown, would give about the same amount as the straw of the oat crop already referred to, showing that there was not much if any difference between the composition of the straw when green and

(1) A most extraordinary experience!

when in a matured state. By table B 4 it would appear that a crop of turnips of 20 tons to the acre would extract, according to Lawes, 260 lbs. for the bulb, and 132 lbs. for the tops, or about 500 lbs. for the whole crop or say 75 lbs. more than a heavy crop of oats of 56 bushels to the acre including the grain. So that chemical analysis clearly shows that crops when green extract at least as much from the soil as crops that have been allowed to mature their seed, less of course the seed itself, and that the idea of their deriving the principal portion of their nourishment from the air is without foundation.

In these remarks I do not of course refer in any way to the organic portion of the crops as that does not affect the question now under discussion, viz.: the relative exhausting powers of green and matured crop so far as the soil is concerned. (1)

I think the fact of a turnip crop extracting more from the soil than a grain crop is the very reason why this crop was found to have such a beneficial effect on the light Norfolk soils, for the crop being eaten off the land where it was grown by sheep, the whole of these mineral constituents that had been extracted from the soil by the turnip crop were at once returned to the soil in such a shape that they were ready to be assimilated by the succeeding crop, and consequently the turnip might be considered as merely a manufacturer of manure and the greater the quantity extracted from the soil by this crop the greater would be the benefit derived by the subsequent crop. The same course of reasoning also shows clearly to my mind why the culture of turnip or other root crops can never be profitably carried out on a large scale in this country where our climate will not admit of their being eaten off by sheep, for the more the crop robbed the soil, if not consumed on the land, the poorer the land would be for the succeeding crop, unless the whole of the manure made from the turnips was restored to the land in the spring, and this the expense of carting and the shortness of our spring season would not admit of on a large scale. (2)

If then my premises are correct I think you will admit that your original remark was somewhat too broad and might be misleading to the practical farmer. At the same time I am free to confess that since I have been in this country, some 37 years, other avocations have prevented me from paying the same close attention to this very interesting subject, and it may be that you have authority for your assertion, although I must say that I should feel surprised to find such to be the case, for the old saying *ex nihilo nihil fit* will I think apply equally to agricultural crops as to other matters, and therefore I should say that a farmer could not expect to out say 50 tons of green corn from an acre for ensilage without drawing on his soil to an extent equivalent to the largeness of his crop, and to a far greater extent than for an ordinary corn crop planted for the seed. (3)

I trust you will excuse the length of this letter, for I found that I could not condense it more, if I wished to give

(1) There I differ entirely from Mr. Hemming. It was of the amount of nitrogen in the matured grain compared with that in the green growth I was thinking; when I wrote the passage Mr. Hemming refers to: the difference, according to the chemist Wolff, is as ten to one!

A. R. J. F.

(2) Rape can be fed off in this country from the 20th July to the 6th December. I have proved it.

A. R. J. F.

(3) But the crop of which I speak is a thick-sown crop of corn intended for ensilage, and my contention is that if one half of the piece is cut green—i. e. before the ears form, and the other half be allowed to form ears and nearly to ripen them, the latter will take more out of the ground than the former. Mr. Hemming cannot possibly intend to generalize on the matter from the single practical instance he gives! I have been a practical farmer for more years than I like to mention, and I have never yet heard a doubt expressed on the matter before!

A. R. J. F.

my reasoning in such a manner that it could be followed by your readers.

Yours truly, E. J. HEMMING.

Drummondville, P. Q., 11 May, 1888.

OUR ENGRAVINGS.

English Hatching yard.—v. p. 89.

Black Tartar Oats.—v. p. 88.

Georgeville, P. Q., 16th March 1888.

ARTHUR R. JENNER FUST, Esq.,

Box 109, Upper Lachine.

Dear Sir,—I have received your note containing the article on green meats to which I have given careful attention. As regards the first three months (1) pasturing we have no difficulty in keeping our cows in good flow of milk, although of course there would be a considerable increase if we were to supplement the pastures with rye or lucerne as you suggest. Our trying time is after the middle of July, and I hope to provide against this with your mixture of oats, pease, tares, corn and rape. (2) The general plan in this neighbourhood, and I suppose throughout the greater part of the province of Quebec, is to turn the cows into the hay-field shortly after haying is over and the meadows are consequently left with hardly an inch of grass to protect them from the winter frosts. (3)

I look forward to the time when I shall be able to adopt as thorough a system of green summer food as that you suggest in these notes, but I fear I shall not be in a position to do so for a few years.

Mr. Barnard, of Three-Rivers, has written me on the subject of creameries to which I shall reply.

Please accept my best thanks for the useful information you have given me.

Yours respectfully,

BICKFORD WEST.

SUPERPHOSPHATE.

Below, will be found a letter from Messrs. Downes, artificial manure brokers, Liverpool, accompanied by an analysis of their superphosphate. This is, of course, a mineral superphosphate, containing nothing of any consequence as a manure except phosphate of lime rendered soluble, and the sulphate of lime—land-plaster—which is one of the results of dissolving the *apatite* by sulphuric acid.

The expense of transit, the bags, and the duty will amount to about \$6.00 a ton, laid down on the wharf at Montreal, which will make the gross price equal to \$16.00 the ton of 2,240 lbs. = \$14.00 the ton 2,000 lbs. Now, to this add 20% for importer's profit, and it is clear the retail price should not exceed \$16.80. At all events there is a very large margin left between \$14.00 a ton, and the usual price for such superphosphate as is sold here, viz., \$26.00.

With such a price for superphosphate of ammonia at 3½ per lb to 3¼ per lb., the question of the advisability of using artificial manure I consider to be solved.

A. R. J. F.

Montreal, April 11, 1888.

ARTHUR R. JENNER FUST, Esq.,

Box 109, Upper Lachine.

Dear Sir,—I am obliged by your kind reply to mine in

(1) Mr. West means two months as his bad time begins in the middle of July. The rye would be ready almost before the grass.

A. R. J. F.

(2) Messrs. Dawes have sown it.

(3) And the timothy must be very much injured by cattle tearing the bulbous roots out. When I was in the Townships, some 15 years ago, none of the better class of farmers allowed cattle to enter their mowing lands.

A. R. J. F.

the sulphate of ammonia, and thank you for your goodness in offering to introduce this as you may be able. I supply the whole requirements of the Standard Fertilizer Co., Mr. John Cowan, takes also all he uses from me.

At present I ask for 25% sulphate, 3½ cents per lb. per barrel of about 300 lbs.; and \$3.25 per 100 lbs. for two lots, cash f. o. b. Montreal. For larger quantities I could say rather less.

I send by this post a sample of my ordinary make but I generally make it of a better colour. Hoping to hear further from you and with thanks, I remain yours faithfully.

J. E. VASEY.

tended upon the chestnuts and acorns in the fall is equal in every respect to the best English mutton sheep, and no American shepherd need go further for a desirable location or better sheep for mutton. But one cannot have everything in one sheep, and when wool is wanted mutton must be sacrificed, and vice versa, for the best mutton does not carry the most profitable fleece. If we follow the English methods, pasture the flocks upon rich meadows, feed in the fall upon turnips, (1) and finish with cotton-seed oil meal, we may have mutton equal in every respect to that of England.

(3) They don't seem to know anything about rape in the States. It is the very thing for them, as it requires no hoeing. A. R. J. F.

At last! Sulphate of ammonia guaranteed 25%—equal to 20.60% nitrogen at 3½ cents a pound by the ton is worth buying. Of course I cannot say anything about the value of such a manure more than I have already said and repeated *usque ad nauseam*. Nobody ought to grudge the outlay of \$3.25 for an acre of wheat or mangels, corn or grass. Believe me, it will make all the difference to your crops. The price 5 years ago was \$80.00 a ton—now \$65.00!!! Perhaps, if I keep on hammering at it, I shall get the price of phosphoric acid equally reasonable. At all events nitrogen at 15.75 cents a pound is not out of the way. A. R. J. F.

Liverpool Foreign Seed and Nitrate, &c., Market.

(From S. Downes & Co., General Brokers,
132, The Albany, Liverpool.)

April 17th 1888.

ARTHUR R JENNER FUST, ESQ.

Dear Sir,—To day we have received your favor of 3rd inst. and hope it will lead to business.

In answer to your enquiry, the price of 100 tons of superphosphate of lime, guaranteed to contain 26 to 28 per cent soluble, i. e. tribasic phosphate of lime made soluble, is £2.2 per ton of 2240 lbs. English, in *single bags* free, delivered alongside vessel here. Net cash against bills of lading.

An entire cargo is always sent in bulk, but 100 tons could not be forwarded otherwise than in packages—such as barrels or double bags—if the former then 9s. per ton, or 2s.6d. per ton more for the extra bag will have to be added, to the cost price.

The freight will be about 15s. and 10 per cent. per ton.

We beg to inclose average detailed analysis of superphosphate. We are, Sir, your obt. serts.,

SAMUEL DOWNES & Co., Per H. Joneshangar.

GUARANTEED 26 TO 28 PER CENT. SOLUBLE.

Moisture	15.09
Water of Combination and Organic Matter	6.79
Monobasic Phosphate of Lime	17.11
Equal to Bone Phosphate (Tribasic Phosphate of Lime) made soluble	(26.79)
Insoluble Phosphates ..	3.38
Sulphate of Lime	} 45.58
Alkaline Salts	
Insoluble Siliceous Matter	12.05
	100.00

AMERICAN MUTTON SHEEP.—Henry Stewart, who is recognized as among our first authorities on sheep, says that our American mountain sheep have the same kind of mutton, and when crossed by Southdowns their meat is quite as good as that of the English sheep. A North Carolina mountain half-bred Southdown pasturing in the woods and fat-

NON-OFFICIAL PART.

WANTED. A reliable energetic man to take orders for Trees, Shrubs and Vines. For particulars address with references, D. H. PATTY, Nurseryman, Geneva, N. Y.

AN EXTRAORDINARY OFFER.

TO ALL WANTING EMPLOYMENT.

We want live, energetic agents in every county in the United States and Canada to sell a patent article of great merit, ON ITS MERITS. An article having a large sale paying over 100 per cent. profit, having no competition, and on which the agent is protected in the exclusive sale by a deed given for each and every county he may secure from us. With all these advantages to our agents, and the fact that it is an article that can be sold to every house owner, it might not be necessary to make "AN EXTRAORDINARY OFFER" to secure good agents at once, but we have concluded to make it to show, not only our confidence in the merits of our invention, but on its salubility by any agent that will handle it with energy. Our agents now at work are making from \$150 to \$300 a month clear, and this fact makes it safe for us to make our offer to all who are out of employment. Any agent that will give our business a thirty days' trial and fail to clear at least \$100 in this time, ABOVE ALL EXPENSES, can return all goods unsold to us and we will refund the money paid for them. No such employer of agents ever dared to make such offers, nor would we if we did not know that we have agents now making more than double this amount. Our large descriptive circulars explain our offer fully, and these we wish to send to everyone out of employment who will send us three one cent stamps for postage. Send at once and secure the agency in time for the boom, and go to work on the terms named in our extraordinary offer.

Address, at once, NATIONAL NOVELTY CO.,
514 Smithfield St., Pittsburgh, Pa.

SILK RIBBONS!

Those of our lady readers who would like to have an elegant, large package of extra fine, Assorted Ribbons (by mail), in different widths and all the latest fashionable shades; adapted for Bonnet Strings, Neckwear, Scarfs, Trimming for Hats and Dresses, Bows, Fancy Work, &c., can get an astonishing big bargain, owing to the recent failure of a large wholesale Ribbon Manufacturing Co., by sending only 25 cents (stamps), to the address we give below.

As a special offer, this house will give double the amount of any other firm in America if you will send the names and P. O. address of ten newly married ladies when ordering and mention the name of this paper. No pieces less than one yard in length. Satisfaction is guaranteed, or money cheerfully refunded. Three packages for 60 cents. Address, LONDON RIBBON AGENCY, JERSEY CITY, N. J.

FOR SALE.—Ayrshire cattle, Berkshire pigs, Plymouth-Rock poultry, apply to Mr. Louis Beaubien, 30 St. James Street, Montreal.