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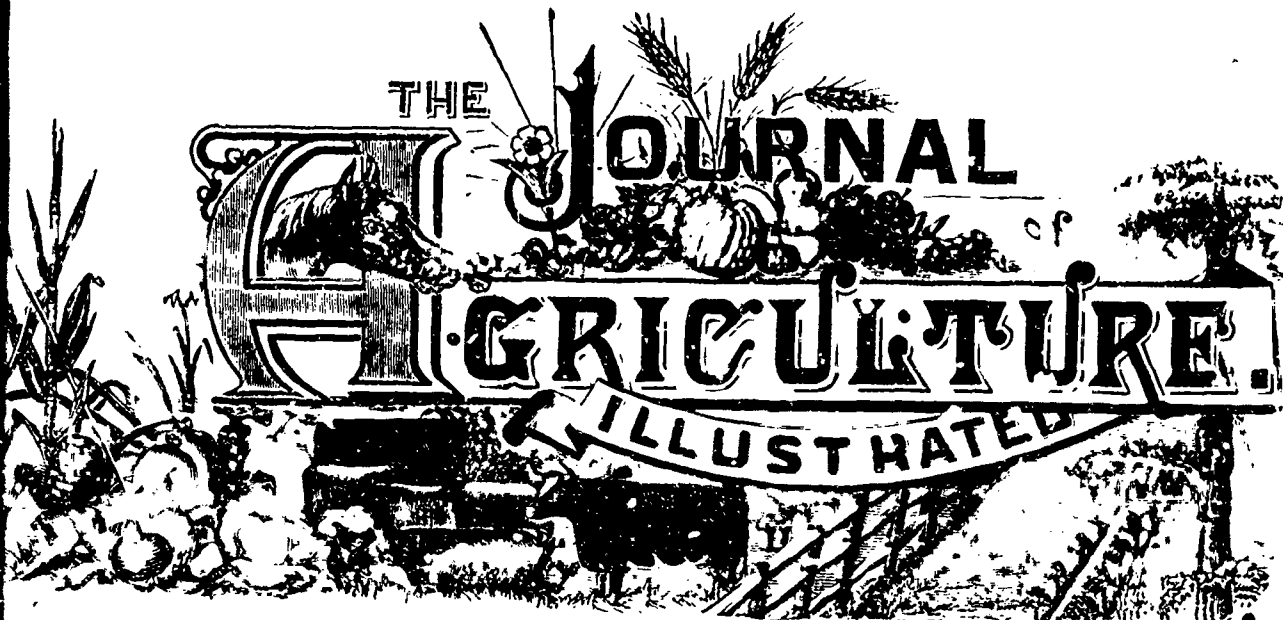
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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—**EDITORIAL MATTER.** All editorial matter should be addressed to A. R. Jenner Fust, P. O. Box 254, Sorel—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

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DE OMNIBUS REBUS.

Sorel, Box 254, Que.—March 28th, 1887.

The "Vermont Watchman," now no longer enjoying the privilege of being edited by the erudite Dr. Hoskins,(1) in its issue of the 23rd March, founds a leading article—not in the page devoted to agriculture, by the bye—on the speech of the Hon. W. W. Grout in the House of Representatives, on the establishment of agricultural experiment stations in every state of the Union.

After speaking at some length of the deterioration of the soil in Vermont as the result of wasteful husbandry, General Grout proceeded to discuss the remedy, and argued that to

improve the soil the farmer must know what ingredients were lacking, whether of nitrogen, potash, *nitrate of sodium*, phosphoric acid or superphosphate of lime. The average farmer knows little of agricultural chemistry, and has neither money nor time for experiments. "Nevertheless, this information is essential to his success, and how is he to acquire it? How, except from the agricultural experiment station, such as is provided by this bill, to which he may send samples of his soil for analysis and from which he may learn the relative value of fertilizers and their adaptability to the wants of his soil? The work of the experiment station is educational in character, and, upon every principle of sound public policy, entitled to the support of the state."

Now there are a good many things chemistry can do for the farmer, but if he dream that on sending a sample or samples of his soil to the station he will receive back a recipe of like value to a doctor's prescription for a case of catarrh or sciatica, he will find himself vastly mistaken. The analysis of a soil is one thing, the requirements of a certain soil is another. The experimental station, properly conducted, can reply to the farmer's question: "what does my soil require?" only in one way, and that is by showing him how to make the soil itself answer the question. If it attempt anything more, it lays itself open to the charge of being an imposition on the public.

And, should any of my readers desire to follow out a regular course of experiments on a large or on a small scale, I think if they will attend to the following suggestions, they will have no difficulty in finding out in what specific constituents their soil is deficient.

In the first place, it must be noted that experimental plots—large or small—should invariably be duplicated, or even

(1) I am happy to see that Dr Hoskins has undertaken the agricultural editorship of the "Rural Vermonter" A. R. J. F.

triplicated—accidents as to measurement, too much or too little manure or seed, easily occur.

The plots may be of any size you may choose: I believe in largish ones—say, one-fourth of an acre—but you may take four-rod plots, if you like, i. e. eleven yards square.

The plots should be laid out, side by side, in a part of the farm which, as nearly as possible, represents the quality of the general soil of the whole. The spot will be easy to select on the alluvial lands, but where sand, loam, and clay exist on the same farm, it will be absolutely necessary to establish experimental plots on each of the different soils.

Each plot should be separated from its neighbour by a path—two feet wide will do—and a wider path still should encompass the whole.

Now comes the question: what manures shall we try? In answer to this question, I shall assume that the land to be interrogated contains already every matter necessary to perfect the growth of plants in sufficient quantity, except nitrogen, lime, phosphoric acid, and potash. I assume this, because I do not think it requires any proof: every one seems to be satisfied on this head. And, first, of nitrogenous manures.

The principal sources of nitrogen, as found in the manure market, are: Sulphate of ammonia, nitrate of potash or salt-petre, and nitrate of soda.

Sulphate of ammonia is composed of sulphuric acid and ammonia, and contains, in a state of purity:

	p. cent.
Sulphuric acid.....	60 60
Ammonia	25 76
Water	13 64
	100 00

And as the ammonia consists of:

Nitrogen.....	14 00
Hydrogen.....	3 00
	17 00

it follows that sulphate of ammonia, when perfectly free from adventitious matter, contains 21.21 % of nitrogen. The sulphate of ammonia of the Montreal gas-works is generally found to contain about 20.60 % of nitrogen, and is sent out in a creditable condition. As the supply is no greater than the demand, the company can hardly be expected to lower the price, though I devoutly wish it would; for if this manure could be sold at the same price it fetches in England, a marvellous change would be soon effected in the yield of our Canadian crops. Nitrogen is the most important of all manures: the alteration visible in a weakly crop of grain after a top-dressing of 100 lbs. to the acre of sulphate of ammonia, is a sight to be seen.

M. Ville accounts for the wonderful change worked by so small a dose of nitrogen on a weakly crop of grain in the following words:

“Plant life consists of three distinct periods:—1. The embryonic period, during which the young plant grows at the expense of the seed”—as may be seen during the germination of barley in the maltsters “pieces.”—“2. The foliaceous period, which is essentially the creative period of the crop, during which the plant lives on the air and soil. 3. The reproductive period, during which the plant forms its seed, and lives at its own expense. This epoch in the life of the plant I have also called the re-absorptive period, to mark distinctly that the activity of the plant is then removed, and concentrated in the flower and fruit, the formation of which is brought about by means of the substances accumulated in the leaves and stems. Now, at the close of the winter, the substance of a part of the leaves has been partially changed by the action of the cold, and vegetation is retarded by the

nutritive elements, nitrogen, phosphoric acid, potash, and lime, having a tendency to withdraw from the work of vegetation, when they are, of course, lost to the whole vegetable system. A small dose of sulphate of ammonia will be sufficient to revive the vitality of the leaves, and cause these substances to contribute to the production of the seed.” The above refers to the case of fall wheat, but is equally true of any spring-sown grain which is at a stand-still for want of its proper food.

I should not exceed the quantity of 100 lbs. an acre of this manure, unless the land is very poor, for fear of the leaf-growth becoming superabundant, which would probably lead to the laying of the crop, unless the season were very dry, when it might be burnt up.

Nitrate of Soda.—Is, I believe, to be had at the powder-works at Belœil and Hamilton. I do not know the price, but the composition is as follows:

	p. cent.
Nitric acid.....	63 53
Soda	36 47
	100 00

Nitrate of soda, then, when chemically pure, contains 16.4 % of nitrogen. It comes from Peru, where it is found in compact masses, mixed with sand and sea-salt.

It is usually sold in England with what is called a “refraction” of 5 %, and its composition is, with that allowance:

	p. cent.
Nitrate of soda.....	95 45
Chloride of sodium (common salt).....	1 62
Moisture.....	2 25
	99 32

The remainder is sand. Thus, the average sample contains about 15.75 % of nitrogen; so, if sulphate of ammonia be worth \$70.00 a ton, nitrate of soda should fetch \$54.00, nearly; and, if 100 lbs. of the sulphate of ammonia be a proper dose for an acre of land, 130 lbs. of nitrate of soda should have the same effect; though, practically, I have always found that the nitrogen in the form of nitrate of soda has a greater effect on the growth of the stem and leaves of the grain-crop, than when it is applied in the form of sulphate of ammonia. I cannot assign any reason for this, and I should like very much to try the experiment over again. Perhaps I may have a chance this summer.

Ammonia in the form of sulphate may be applied as a top-dressing in one dose, but nitrate of soda had better be given at twice, and will answer better if sown when the leaf of the plant is moist with rain or dew.

Both these manures should be mixed with about twice their bulk of fine mould and very carefully distributed. Ashes, wood and coal, will do, if the manure be spread immediately after mixing.

Nitrate of potash.—Is thus composed:

	p. cent.
Nitric acid.....	53 41
Potash	46 59
	100 00

A most valuable manure it is, containing nitrogen and potash, both in a very assimilable form. What a pity it is that its cost is too high to admit of its use with profit. It might answer, perhaps, if tried on tobacco, provided that the merchant would pay for quality of leaf. Kainit is so cheap now, that all other forms of potash, for manurial purposes, are practically out of the market. I do not mean to say that it is cheap in this country, but every where else it can be

bought at a reasonable price. The quantity of potash used on the land here, is almost none at all, and it can not answer to import kainit, when we export our wood-ashes to the States. In England, kainit, guaranteed 23%, is worth \$10.00 a ton of 2240 lbs. = \$9.00 for our ton, and the last States quotation I saw of the same article, quality not specified, was \$20 00 1

In applying potash in any form to light soils, care must be taken not to overdo the dose—the crop, whatever it be, might be burnt up.

Phosphoric acid.—The chief sources of this manure are bones, coprolites, Carolina rock, and our own apatite; all composed of phosphate of lime, mixed with other matters. Phosphoric acid is formed of phosphorus and oxygen :

Phosphorus.....	31
Oxygen	40

71

In *phosphates*, the phosphoric acid is the active part, in superphosphates there is present a portion of sulphate of lime (plaster) as well as the phosphoric acid. Of the different sources of this invaluable acid—the parent of swedes—bones are the oldest in use; next, come coprolites, and then Carolina rock and our own apatite.

Every farmer should make his own bone-superphosphate, by saving all the bones from meat used in the house, breaking them with a heavy hammer, and dissolving them in a mixture of sulphuric acid and water. Quantities : To one hundred pounds of bones take 40 pounds of *brown acid*: twice the *bulk* of water as of acid should be first thrown over the bones. In a few days, the bones will be reduced to a pasty mass, which may be dried up with wood-ashes, fine mould, &c.

As the bones contain about 3½% to 4% of nitrogen, this will be found a very powerful manure for all kinds of crops. Four cwt. of it ought, if all the cultivation is well conducted, to produce from 14 to 18 tons of swedes to the acre.

The Carolina rock, coprolites, and apatite, requiring to be finely ground before mixing with the acid, had better be left to the artificial manure maker.

The best way of using the superphosphates, however, is to give half a dose of them to the land with half a dressing of dung. The superphosphate will start the young germ into active growth, and the dung will carry the plant on to maturity. Where really pure bone-dust can be had, a dressing of 2 cwt. of superphosphate and eight bushels of bone-dust will prove satisfactory. It is a remarkable fact, that beyond 16 bushels to the acre, the addition of any quantity of bone-dust is ineffective : I mean, of course, in its action of the crop of the year ; its effects are to be seen in the following seasons.

The price of superphosphate in England to-day, for 26% to 28% of soluble phosphate of lime, is \$12.00 a ton. Here, it is sold—in very small quantities I fancy—for \$26.00!!!

Plaster.—Really, this is not a proper name. Plaster, rightly so called, is sulphate of lime deprived of its water by being raised to a temperature of about 250° F. Our land-plaster is the unburnt rock ground into a coarsish powder. In neither the burnt nor the unburnt states has it much effect on well farmed land, as there is-always an abundance of both lime and sulphuric acid present in such land. But here, where land is frequently left for a dozen years without a sight of the dung-cart, its effects, on certain soils, are really marvellous. In England it has never paid for its use; but where lime is never applied to the land in any other form, as in this part of the world I should be inclined to make it a part of all manurings. By the bye, an idea prevails that it will fix the ammonia in dung-heaps. This is a mistake : it will fix the ammonia in liquid or semi-liquid matters, but not in dryish matters.

Farm-yard dung.—Last of all comes our old friend, farm-

yard dung, the constituents per cent of which, as far as we are concerned, are as follows :

Mixed stable dung..	Nitrogen.	Phosphoric acid.	Potash.	Lime.
	416	176	492	1046

Of course the contents vary very much, according to the food the animals producing the dung receive, and I fancy the above analysis by no means errs on the favourable side. It is by M. Ville, whose whole book, of nearly five hundred pages, is written to prove the infinite superiority of artificial manures to farm-yard dung, he himself being a dealer in the various articles recommended. Never mind; in spite of everything, there are some sound truths to be picked out of his writings, if one has the patience to look for them.

And now let us lay out our experimental plots, as we proposed at starting. They should, I think, be six in number for grain and the same for roots; as thus :

1	2	3	4	5	6
Farm yard dung 600 lbs	Manure containing nitrogen, phosphoric acid, potash, plaster.	Manure containing nitrogen alone.	Manure containing phosphoric acid, potash, plaster.	Farm-yard dung 300 lbs. and half-dressing of no. 2.	No Manure.

Each of these plots are supposed to contain four rods, the fortieth part of an acre, and the proposed dose of artificial manures, per acre, would be 160 lbs. of sulphate of ammonia, 400 lbs. of superphosphate, 400 lbs. of kainit, and 200 lbs. of plaster; consequently the dose for each plot would stand as below.

No. 1.	lbs.
Farm-yard dung.....	600
No. 2.	lbs.
Sulphate of ammonia.....	4
Superphosphate.....	10
Kainit	10
Plaster	5

	29
No. 3.	lbs.
Sulphate of ammonia.....	4
No. 4.	lbs.
Superphosphate.....	10
Kainit	10
Plaster	5

	25
No. 5.	lbs.
Sulphate of ammonia.....	2
Superphosphate.....	5
Kainit	5
Plaster.....	2½

	14½
	lbs.
Dung.....	300 (1)

This is a most elastic plan : the quantities and proportions can be varied at pleasure. For instance ; potash is of doubtful utility, therefore add two more plots and try nitrogen and potash on one, and nitrogen without potash on another. I applied last summer, in addition to the usual dose of dung, twelve bushels of good hard-wood ashes on the half of an acre of potatoes, the other half receiving only the dung. A very

(1) That is : half dung and half artificials.

careful inspection of the crop, both as to quality and quantity, left no doubt in my mind that the ashes had no effect on either. But then, there is this to be said, which unfortunately completely invalidates the experiment, the ashes were spread and the potatoes planted on the 12th of May; whereas, potash, to be effectual, should be spread and harrowed in very early, or else no benefit is likely to be derived from its use till the next season. I suspect we ought to use ashes for potatoes in the fall, in spite of the danger of its being washed away in the spring.

I should certainly try a plot of mangels with half dung and eight pounds of sulphate of ammonia, and another of swedes with half dung and five pounds of superphosphate.

I shall feel very deeply indebted to any one who will give himself the trouble to carry out the above suggestions. I may be in a position to do it myself, and if I am I will describe the results in the Journal.

ARTHUR R. JENNER FUST.

Clover.—I observe, in the Country Gentleman, that Mr. Waldo Brown, one of its paid contributors, persists in his disbelief of any such thing as clover-sickness, and expresses himself as determined to continue in his unwise course of sowing clover with every grain-crop until it completely refuses to grow. He will find out his mistake before many years have passed over his head, or else the experience of the last hundred years in England is utterly deceptive.

Butter.—I wish some kind fellow would take in hand the task of improving the quality of our butter. By the first of March, all the good butter to be found in this district had been marketed, and since then nothing but rank stuff, utterly uneatable by any delicate palate, has been exposed for sale.

Cheese.—Good, ripe Cheshire cheese is selling, wholesale, in England for 15½ cents a pound: a remunerative price. By the bye, it is worth noting that the quotations of this cheese in the papers are rather misleading: the cwt. or hundred-weight in Cheshire is equal to 120 lbs., whereas all other cheese is sold by the ordinary cwt. of 112 lbs. The weights and measures in my dear old country are exquisitely absurd. Grain is sold at Liverpool by the cental = 100 lbs.; in Kent, Surrey, &c., by the load of 5 quarters = 40 bushels; in Hertfordshire by the load of 5 bushels, and in Derbyshire by the load of 3 bushels. In Cornwall, wheat is sold by the bushel of 11 pecks; and in S. Wales by the *lestrig* of 12 pecks. Meat is sold at Bristol by the cwt. = 112 lbs.; in Somersetshire by the score = 20 lbs.; in Essex by the stone = 14 lbs.; and in London by the stone = 8 lbs.

I hear there is to be a great make of fodder-cheese this spring. Well, the price is good enough now to encourage such a procedure, but it will pull the price down again, and we shall have the usual up-and-down markets which leave every body in doubt what to do. If we persist in putting all our eggs into one basket, we shall, sooner or later, have to pay the penalty due to our folly.

Hire of Bulls.—Now, here is a strange thing! M. Mongeon, my friend the Sorrel gaoler, has a cross-bred Ayrshire and Shorthorn bull, just a year old; a big brute enough for his age, having been well done by ever since he was calved, but leggy, flat-sided, and lumbering-looking about the head. Sire unknown, but the dam a great awkward beast, part Ayrshire and part I don't know what—a deep milker though. Well, two farmers came to my friend and offered him ten dollars for the hire of this bull-calf for the season. Not much judgment, my readers will say! True enough, but the drollest part of the business is, that both the farmers live in the parish

of *Sainte-Ursule*, the home of the purest and best Canadian cattle!!!

Mint.—A very good thing is roast lamb if you can get mint to make the sauce with, but, as a general rule, that is a difficult thing to find true to sort. There are four or five different sorts of mint: spearmint, peppermint, penny-royal, &c., of which the spearmint is our sort. It may be propagated with ease by young offset plants or shoots, by parting the roots, and setting them out in spring, or by planting cuttings at any time during the summer. Mint loves a dampish soil: there is no use in trying to grow it in a poor sand. After the cuttings have taken, they require no more care, except keeping the bed free from weeds. The best way is to put the plants in beds four feet wide, and allow about six inches between the plants in the row and two feet between the rows. In two or three years time the bed should be dug up and sown with some other crop, as by that time the roots of the mint will have become so matted together as to rot and decay.

With regard to the general culture of mint, it is only necessary to clear the beds of weeds in spring and summer, cutting down all the remaining stalks in the autumn, digging the alleys between the beds, and spreading a little fine compost between the rows. Plantations thus formed can be cut from time to time when wanted for culinary purposes, but for storing to keep dry during winter it is better to let the mint stand till the flower is on the eve of breaking out: all pot-herbs, like the grasses, contain the greatest amount of flavour and substance at that period of growth.

Should green mint be wanted for "juleps" throughout the winter, young shoots may be obtained by planting some roots thickly in large pots, and placing them in a warm window. Is *mint julep* good? I never tasted it, but I cannot fancy bruised mint-leaves, sugar, and whiskey being a pleasant combination of flavours. However, I dare say it is better than that abominable mixture, *rue bitters*, a drink which, for my sins, I was *once* induced to taste.

Dried mint is a most delicious addition to pease-soup. It should be kept in closely stoppered bottles and in a cool place. In England this soup is never served without it, but here, strange to say, I never saw it used.

Green-meat.—I fancy, from what I hear, that a good many people are about to embark largely in the cultivation of green-crops for the summer foddering of cattle. Now, there is no doubt about the system being a good one; it is immensely productive of manure, and affords the means of keeping to good profit a very large head of stock. The only difficulty I see in it is the filling up of the gap that will occur between the cutting of the earliest soiling crop, fall-rye, and the next earliest, red-clover. It will not do to let the cattle have a taste of green-meat in May—say, about the 20th, by which time the rye should be fit to cut—and then push them back to their dull, hard food of hay: that would soon make them tell tales. The only thing I can see to fill up the interim is lucerne, which will only grow on certain soils, and even on those soils will not last more than three or four years in this climate.

How would Prickly Comfrey do? It would certainly come in very early, and from late information, I hear it is conquering the prejudices heretofore entertained against it. I really think it would be worth trying on a small scale. One thing is certain; it cannot be cut too young, for most of the failures in its use have been attributable to its being old and stringy, before it was given to the stock.

Fall-rye, if grown, should be sown very thickly. The thicker the seeding the earlier will it come to the scythe. The best crop I ever grew had four bushels of seed to the

acre! Cut it before the ear is quite out, as it runs through its stages with the greatest rapidity. Fresh, green rye is not so poor a food as it is generally supposed to be. If the analyses are to be trusted, it is far superior to oats:

	Water	Ash	Albuminoids	Fibre	Other Carbohydrates	Fat
Rye	76.0	1.6	3.3	7.9	10.4	0.8
Green oats.	81.0	1.4	2.3	6.5	8.3	0.6

Which analyses show that rye contains a far greater proportion of albuminoids, the most valuable of all food matters. Spring-rye and tares, or vetches, do not go well together; for the rye soon outstrips the tares, and is in ear long before the tares show sufficient bulk to be worth mowing. Besides, tares ought never to be given to stock, except to sheep, before they are in bloom, and by that time, the rye will be nearly worthless. Tares, too, do not succeed on the lighter soils of this province.

The most successful mixture of seed for fodder I ever saw is one I spoke of last year:

	Bushels.
Oats.....	1
Pease.....	1
Corn	$\frac{1}{2}$
Tares.....	1

With two pounds of rape sown broadcast after the above is harrowed in, and finished by rolling. If the sowing is early—i. e. before the middle of May—I find it advisable to omit the corn, and for it substitute a peck of tares, the same of pease, and half a bushel of oats. But for the successive sowings after that date—which should be made every fortnight—the corn is very useful; the pease and the tares climb up the stems of the corn, like pease up the pea-sticks. After mowing for green-meat, the tares and the rape, when the land is in good fettle, start again after the first shower, and produce a good bite for the sheep. Senator Guèvremont declares that he never had cows give as much milk in August as his did on this food last summer.

The sort of pea to sow for this purpose is the large white pea, not the *quarantaine*. The outting should be begun when the tares are in bloom, and the crop lasts in good condition for a long time. It was curious to see how soon the cows began to find out the rape. The second day from their beginning on this new food, they set to work to turn over their portions, and hunted out every leaf and stem of rape before they attacked the other plants.

Spurry.—There is a plant called *spurry* (*spergula arvensis*) sometimes sown in England on very poor sands. A slight dressing of dung is necessary, and good cultivation tells on it. Sown at the beginning of May, it would be fit to cut by the middle of July. Not a great yielder, but better on the soil mentioned than any other plant. Mr. Evans, the seedsman, promised me, in 1884, to import some seed for trial: I do not know if he has any for sale or not.

Rape.—In early years, if a stubble is broken up immediately after harvest, harrowed fine, and 6 pounds of rape sown broadcast and rolled in, by the first of October there will be nice picking for the cows, if the sheep do not want it. The cows should be let into the piece of rape about two o'clock in the afternoon, for an hour or so. The seed will cost about a dollar an acre, and the extra milk will be worth four times as much. Horned stock should never be sent to feed off rape with empty bellies: they would probably get blown, particularly if the dew is on. After the evening feed of rape, a moderate allowance of hay or good oat-straw will keep the cows from too great looseness. Rape gives no bad

taste to milk, and will stand a good hard frost without injury. It laughs at 10° F.!

Tops of swedes, &c—By the middle of October, the difficulty will be how to dispose of the leaves of the roots while they remain good: rotten leaves will tell their tale in the butter. I spoke of this so lately, that it is not worth while to go over the ground again.

The winter of 1886 87.—Truly enjoyable has been the past winter to those who, like myself, prefer books to travelling. The fall of snow has been, if not the greatest, very nearly the greatest ever known, viz., 182 inches—the last fall, March 25th, added 12½ inches to the score. I say the last fall, for I hope as to day is the 1st of April, we shall not have any more to speak of. (1) If our Sorel lands are not flooded, the snow must disappear by evaporation, which is not likely. The ground was frozen hard on November 7th, and the plough has never stirred since; so, there will be no end of work to do when the land is free again. (2)

ARTHUR R. JENNER FOST.

An extract from the Country Gentleman, written by a breeder of sheep will be found on p. 71 of this number of the Journal. The writer is evidently a patron of the Shropshires, but however much he may admire that breed, I can assure him it is but lost time to extol them at the expense of the Hampshire Downs. The latter have large heads; it is true, but, in revenge for that defect, they have the invaluable property of coming sooner to profit than any other sheep we possess, besides being hardy to a marvel, and standing folding in large flocks better than any breed except their more refined cousins the Southdowns. As I wrote in the February number of the Journal for this year, describing the lambs at the Smithfield Club show of December, 1886:

“To compare the weight of these lambs—the three breeds of short-wools and the Oxfords: the Hampshire-downs beat the Oxfords by 41 pounds a head; the Southdowns by 51 pounds a head; and, nearly doubling the weight of the Shropshires, beat them by 94 pounds a head!!! The Hampshire-downs and the Southdowns were ten months old, and the others nine months old.

And that the Hampshire-downs to not fail to increase in weight in proportion to their age is clear from the fact that, at the same show, the wethers of the same breed won the gold medal, beating the whole of the long- and short-wools, and weighing at 22 months old, two-hundred-and eighty pounds a piece.

Mr. Smead wants to know if our sheep in England, where, he says, it rains two days out of three, are kept throughout the winter in the open air. Now, it does not rain, two days out of three in any part of England, and in the parts of England where sheep farming is carried out on a large scale, the rainfall is trifling. At all events, in Surrey, Kent, Hertford, and, in fact, throughout the Eastern and home counties, the rainfall is less than twenty-five inches, or about two inches a month! Lancashire and all the N. W. and N. counties receive about thirty-three inches. Hence, there would be little wisdom in housing our flocks in the winter, more particularly as it would take them away from one of their most important offices, that of manuring the land by feeding off rape and turnips where they grow. It is no exaggeration to say that every sheep in England, except a few preparing for exhibition, passes its life in the open air. And how can it be otherwise? My old friend Jonas Webb, of Babraham, kept 1500

(1) But we had, though!

A. R. J. F.

(2) It appears that, though the frost set in for good on Nov. 7th, the snow came so close upon it that the land was only surface frozen, and the snow is now going away through, instead of over the ground.

A. R. J. F.

breeding ewes; Mr. Tanner, near Brighton, Sussex, had 2,000; many a sheep-farmer on the borders has from 4,000 to 6,000. One farmer in the Western isles keeps ten shepherds! Where on earth could shed room be found for even a portion of such flocks?

Neither would housing sheep in winter be found beneficial to them, were it otherwise practicable. The plan was tried by several distinguished *agronomes* forty years ago, and given up as useless trouble and expenditure. Sir Richard Simeon, in the Isle of Wight, the Revd. A. Huxtable, in Dorsetshire, Philip Pusey, in Berkshire, all went into it, and all gave it up, after a fair trial. What says Mr. Pawlett, in his prize-essay, v. Journal of the R. A. S. of England, vol. VI, part II (1846)?

"Much having been said and written by high authorities on the decided advantage, to be derived from feeding sheep in the yard during the winter months, I determined to try it. I selected eight lambs for trial, which were weighed on the 7th of December, 1839, and put in a yard made in the following manner: A small plot of ground near my turnip-field where my other lambs were feeding, was enclosed with thatched hurdles, set double, with straw between the two hurdles, not only for shelter, but also to prevent the lambs from seeing any object that would disturb them. On the north side of the yard I built a shed, open towards the south, but enclosed on the other three sides. As a floor, I laid deal boards nailed to ledges 4 or 5 inches deep, to keep the boards from the ground, and sufficient space (about $\frac{3}{4}$ of an inch) left between them, so that the wet from the lambs might drain through: these were well swept daily, and well littered with straw. The lambs were fed thrice daily, with swedes, carrots, and clover-chaff. Another lot of 8 lambs, of the same breed and about the same weight, were weighed on the same 7th of December, and penned in the field adjoining, which was in stubble, and were fed with precisely the same food by the same person as those in the yard; being exposed to the weather as sheep generally are. On the 11th of February following, both lots were weighed again, after being at trial 9 weeks and 3 days. The results were as follows:

EXPERIMENT NO. 11.

8 lambs fed in the yard gained each on the average 19½ lbs.	8 lambs fed in the open field gained on the average 20½ lbs.
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Another experiment conducted by the same person and in which the lambs were all fed alike resulted thus:

EXPERIMENT NO. 12.

8 lambs in the yard gained each on the average in 12 weeks 32 lbs.	8 lambs kept in the open field gained each on the aver- age in 12 weeks 28 lbs.
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Showing in favour of yard feeding 4 lbs. each lamb during 12 weeks, or 5 oz per head per week. This difference is far too trifling to pay for the extra trouble and expense incurred in building sheds, taking the straw to the fold-yard, and carting out the manure.

The advocates of yard-feeding say that sheep treated in this way consume less than sheep in the open field. Mr. Pawlett, on the contrary, could discover no such difference. He expresses an opinion that the shed-fed sheep could not bear the subsequent exposure to the cold winds if turned out to grass after a winter's shelter. After these trials, Mr. Pawlett gave up all idea of feeding sheep in yards. In a note to the above essay, Mr. Pusey, whose practical acquaintance with agriculture needs, to those who remember the dear old Squire, no description, says:

Having formerly recommended the trial of shed feeding, I am bound to state that, in an experiment like Mr. Pawlett's, I

kept ten Down lambs in a shed and ten out of doors, weighing each lot regularly; but that I found the gain of weight rather on the side of the out of doors lambs. *Ph. Pusey.*—Mr. Pawlett, whose flock were pure-bred Leicesters, instituted several other experiments on sheep-feeding, some of which I append:

EXPERIMENT NO. 2.

Relative value of swedes and white turnips in October.

Lot of lambs on out white turnips gained in a month each on the average 10½ lbs.	Lot of lambs on cut swedes gained in a month on the average 4½ lbs.
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EXPERIMENT NO. 3.

Lambs fed on cabbage and white turnips gained each on the average in 29 days 12½ lbs.	Lambs fed on white tur- nips gained in the same time 11½ lbs.
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EXPERIMENT NO. 4. OCTOBER.

Lot on white turnips and chaff only, gained each in a month 8 lbs.	Lot on swedes and white turnips and chaff gained in the same time each 5 lbs.
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Since these experiments, I have invariably used," says Mr. Pawlett, "white turnips for lambs in the autumn, and find they are an excellent food, if not sown too early in the season, and preferable to swedes during the months of September and October, equal to them in November, and very inferior to swedes in December, or when the weather becomes cold and frosty." that is, with us, about the 20th of October, taking one year with another.

After four or five experiments on the relative value of swedes and carrots (red and white) as food for sheep, Mr. Pawlett comes to the conclusion that carrots are utterly unsuitable for feeding this description of stock, and gave up growing them.

The last experiment tried was as follows:

Lambs fed on unwashed roots gained each 7½ lbs. in 28 days.	Lambs fed on clean washed roots gained each in the same time 4½ lbs.
---	--

And the lesson Mr. Pawlett derives from the experiment is, that there is no advantage in this method of management—the washing of roots—indeed, we all know that animals are fond of licking up freshly turned earth; and a little taken into the stomach with the food must be conducive to health, or nature would not lead them to take it.

In this essay, the early shearing of sheep is strongly recommended. The fleece should be off *here* by the 1st of June, which would be about our equivalent to the Bedfordshire 1st of May.

Cure for foot-rot in sheep: butyr of antimony and vitriol mixed. Pare the hoof down quite bare to the flesh as far as the disease has penetrated, and apply the mixture with a feather.

The whole of the thousand (?) sheep pastured last summer in the open common below Sainte-Anne de Sorel are suffering from the scab! So, at least, my friend M. Milotte, who has 26 ewes, tells me. Recipe:

One pound of tobacco stems boiled in a gallon of water for an hour.

Two pounds of soft soap.

One large wine-glassful of spirits of tar.

But it is devoutly to be wished that these flocks might be dipped in a proper preparation every season towards the end of the summer. Ought not the government inspector to have something to say on this matter? As Crabbe says:

"I preach for ever, but I preach in vain." A. R. J. F.

In my evenings this winter I have been reading through an old Cyclopædia in 40 volumes, published in 1820, wherein

I find a lot of queer bits of information, and among others, the following :

Mr. Weld, speaking of his travels in N. America, says : "The wine of the island of Montreal is good beyond description." Was this wine made from wild or cultivated grapes? Who knows? Weld, of the date of whose travels I am in doubt, was a member of a well known family, which adhered, and still, I believe, adheres, to the old faith, and would doubtless be on good terms with the clergy of the colony, the only agriculturists of the time worth speaking about. I fancy the Welds (1) are Cheshire or Shropshire people, and their place is "something Castle" (Lulworth?) but the name I forget. Any information on the subject thankfully received.

Apatite.—This word is derived from the Greek *απαταω*, to cheat! Not that there is any deceit in our apatite, though perhaps it leads some of the proprietors of the mines into devious ways, such as assertions that it is better simply ground than dissolved in sulphuric acid.

Swedes.—Some day or other, I hope we shall get at the truth of what a ton of swedes will really do in the way of making meat. Professor Playfair, now the Rt. Hon. Lyon Playfair, found, as long ago as 1846, that one ton of swedes given to sheep served a yearling wether 19 weeks, he eating 17 pounds a day. We saw just now, while considering Mr. Pawlett's experiments, that a lamb increased on an average about 10 lbs. in 28 days, and of course a two-tooth sheep—Prof. Playfair's sheep's age—would fat faster. Thus, $2\frac{2}{7}^0 = 130$ days : 28 : 131 : : 10 : 46.79.

Or, allowing for age, at least 50 lbs. of mutton; which, even at our prices at Sorel, would be equal to \$3.00 for a ton of swedes. Whereas if, as "Quebec" contends, swedes are only worth 49 cents a ton, the produce of meat, at 6 cents a pound, made from a ton, would be only 8½ pounds!

ARTHUR R. JENNER FUST.

OUR ENGRAVINGS.

Holstein Friesian Cow.

Smoke House.

Henwife fattening coop.

Polled-Angus bull.—1st prize at Islington.

Experiments with Vetches.

EDS. COUNTRY GENTLEMAN.—It is probable the best English variety, the Gore vetch, has never had a fair trial in the United States, for in all cases it is far superior to the other spring kinds, and it is relished by animals more than peas or any other forage crop. In England this spring vetch follows the old-fashioned winter variety, the latter being sowed generally with rye, two bushels of each, about August, when they become very thick and forward, giving a great bulk for feeding through the next May. The Gore, mixed with oats, is sown as soon as the land can be prepared in spring, and gives an immense crop for following the winter vetches and rye, and will last through June. Horses are exceedingly fond of vetches, and those not used for fast riding and driving are fed freely with them, but the farmers fold their sheep and feed great quantities, which enables them to mow more grass for hay.

After the vetches are eaten, the land is cultivated for the root crops—swedes and turnips—thus taking two crops, and eating them, where formerly a naked fallow came. (2)

(1) There is a branch of the family at Tavistock Court, Devonshire, but that, if I remember rightly, conformed to the state church.

A. R. J. F.

(2) Rarely swedes, but white turnips and rape. Strange to say, I never heard of this Gore vetch. Can any body tell me anything about it?

A. R. J. F.

Gentlemen who like trying experiments can readily obtain the seed through any of the reliable agricultural seedsmen, if they give the order in time, and for this year it is time now, as foreign seeds are not kept in any quantity here. When in full bloom and until the pods are filling, animals thrive the best upon them. If eaten before the blossom shows, they are too relaxing, and if fed when nearly ripe, the pods and top ends will be eaten, and the stems near the ground rejected. (1) G. G.

—Puttsfield, Mass.

Blindfolding Bulls.

EDS. COUNTRY GENTLEMAN.—For two years I have kept my bulls blindfolded in pasture and stable, by making rings that will slip up to base of horns, nearly, allowing room for a 1½-inch strap to pass through, strap to be riveted to a piece of sole or harness leather, wide enough to hang over their eyes, preventing them from seeing forward, the straps to pass



through the rings on horns and into buckles in front. A light strap should also pass from ring to ring across the forehead. Also strap from leather blind to nose ring, as a bull soon learns, if latter strap is not on, to throw the blindfold back on to his neck. This arrangement will beat the worst bull in existence.

P.

Cayuga County, N. Y.

The Shropshire and other sheep

EDS. COUNTRY GENTLEMAN.—I notice in your issue of March 3 (p. 172), that Mr. Wood in answer to questions on different breeds of sheep, at the Ithaca meeting, stated that the purest breed was the South-Down; "they are bred so high that they have reached their highest point; when brought over here they go back every time; they cannot be kept up to the standard." That sounds queer to me. I was not aware that any breed reached a point so high that they were in danger of toppling over. It is true that the South-Down, being the oldest of the Down breeds in England, has received more care in the breeding and feeding, and perhaps has been "pampered" more than any other English breed; and when brought to this country and falling into the hands of breeders that do not give these sheep the care that they had received in England, they will to some extent fail to look as well in the show-pen; but the good qualities of the breed remain, nevertheless, and I believe that to the South-Down the mutton breeders of this country are very much indebted for creating a market for their lambs; in fact I believe that

(1) As a rule, all our best south of England farmers sow the small winter-vetch even in the spring. The yield is less than the yield of the spring-tares, but the quality is far superior.

A. R. J. F.

no English breed has done so much to improve the mutton interest of this country as the South-Down. (1)

Mr. Wood further says: "The Shropshire is a magnificent breed produced by using a Leicester, then a South-Down, then a Cotswold ram, on the old Morfe Common sheep." Every Shropshire breeder will be glad to find that out; the oldest breeders of Shropshires have been striving for years to find just what breeds, if any, were crossed upon the Morfe-Common ewes to produce the Shropshire of the present day, and have been unable to find out definitely anything about it. As early as 1541, the Shropshire and Staffordshire sheep of England were known as a native sheep, and went by the name of the Morfe Common, the Longmynd, the Clan Forest, and the Cannock Heath sheep. The Morfe Common had small horns, speckled, dark, or black faces and legs; the Cannock Heath, polled grey-faced, or of every intermediate color between black and white. In fleece, all the above-mentioned breeds possessed about the same quality of wool, at

Shropshire has been bred direct from the breeds that were roaming on the Morfe and other Commons over three centuries ago, and have been produced by selection, care in feeding, and the other things necessary to improve a breed, *without inter-mixing other blood*. As Mr. Wood says, the Shropshire is a magnificent sheep, and farmers are finding it out. Hence the great and increasing demand for them. In England some Hampshire breeders have found out that by using a Shropshire ram on their ewes, the offspring loses the big mullet head and has broader back and finer quarter than when the Hampshire is used. (1) Perhaps this in some degree accounts for the prize winning of the Hampshire in England that Mr. Wood speaks of.

Mr. Wood says the Oxford-Downs are a cross between the Hampshire ewe and Cotswold ram, but they lack prepotency; the Shropshire, he also says, lacks prepotency. I have had experience in breeding and crossing all the Down breeds, except the Oxford, and I have never discovered any lack of



HOLSTEIN-FRIESIAN COW CLOTHILDE.

least no early writer makes any distinction. Youatt says of them that the Shropshire wool was not to be equalled in its kind by any in any part of the world, at that time. From these breeds that were then found in England, the Shropshire of the present day, originated. Late in the seventeenth century and early in the eighteenth century, there is no doubt that some owners of sheep that were pastured on the Morfe Common and other adjoining commons introduced into their flocks Leicester rams and South-Down rams. But in what numbers we had no authentic history until Mr. Wood explained it at Ithaca. The best English breeders think that of the flocks which were crossed with Leicester and South-Down rams, the lambs were sold to the butchers, and the flocks were also sold, and none of the cross-bred sheep were kept, with which to improve the breed. Further, that the present

(1) Southdowns are not fitted for rank-growing herbage. In such keep they quickly "run out," and in four generations the wool becomes thin, harsh, and the mutton resembles the meat of the Leicester.

A. R. J. F.

prepotency in the Shropshire when crossed upon the grade Merino, or any other grade sheep of this country; but I have learned by experience that a Shropshire ram used upon fine-wool Michigan ewes has produced 112 per cent. of lambs (to ewes) that sold in market in the month of July for \$4.25 per head when but four months of age. I have also found that the Hampshire has more prepotency in one respect than I care for; he did not fail to impart his big head and coarse bone to the extent of rendering it impossible for the mother to give birth to the lamb, and instead of 112 per cent. of lambs being raised but 80 per cent. were raised, with a loss of 5 per cent. of the breeding ewes from the same cause.

Mr. Wood further states that the Hampshires, in their native country, "are never put under a roof, and are consequently hardy, with great constitutional vigor." Does Mr. Wood mean to say that the breeders of Hampshires in England (*All of them*. A. R. J. F.) keep their sheep in the open

(1) This is a pure fabrication.

A. R. J. F.

air the year round? (*Of course they do.* A. R. J. F.) And does he wish to recommend that the custom be followed in this country by those that he sells to? Does Mr. Wood follow that custom himself, and were the sheep that he has shown at the New-York State Fair raised in that manner? These are questions that interest all breeders of English Sheep, as it is generally believed that in a country where, as Mr. Wood says of England, it rains two days out of three, (*Bosh!* A. R. J. F.) sheep should have some shelter from the rain storms. In this country they should be kept dry, he tells us in his lecture.

C. D. SMEAD.

—Schuyler County, N. Y., March 7.

Central Experimental Farm, Ottawa, Canada

The work to be undertaken at the different stations is thus set forth in the Act:—

(a.) Conduct researches and verify experiments designed to test the relative value for all purposes of different breeds of stock, and their adaptability to the varying climatic or other conditions which prevail in the several provinces and in the North West Territories,

(b.) Examine into the economic questions involved in the production of butter and cheese;

(c.) Test the merits, hardiness and adaptability of new or untried varieties of wheat or other cereals, and of field

crops, grasses and forage plants, fruits, vegetables, plants and trees, and disseminate among persons engaged in farming, gardening or fruit growing, upon such conditions as are prescribed by the Minister, samples of the surplus of such products as are considered to be specially worthy of introduction;

(d.) Analyse fertilizers, whether natural or artificial, and conduct experiments with such fertilizers, in order to test their comparative value as applied to crops of different kinds; (1)

(e.) Examine into the composition and digestibility of foods for domestic animals;

(f.) Conduct experiments in the planting of trees for timber and for shelter;

(g.) Examine into the diseases to which cultivated plants and trees are subject, and also into the ravages of destructive insects, and ascertain and test the most useful preventives and remedies to be used in each case;

(h.) Investigate the diseases to which domestic animals are subject;

(i.) Ascertain the vitality and purity of agricultural seeds, and

(j.) Conduct any other experiments and researches bearing upon the agricultural industry of Canada, which are approved by the Minister."

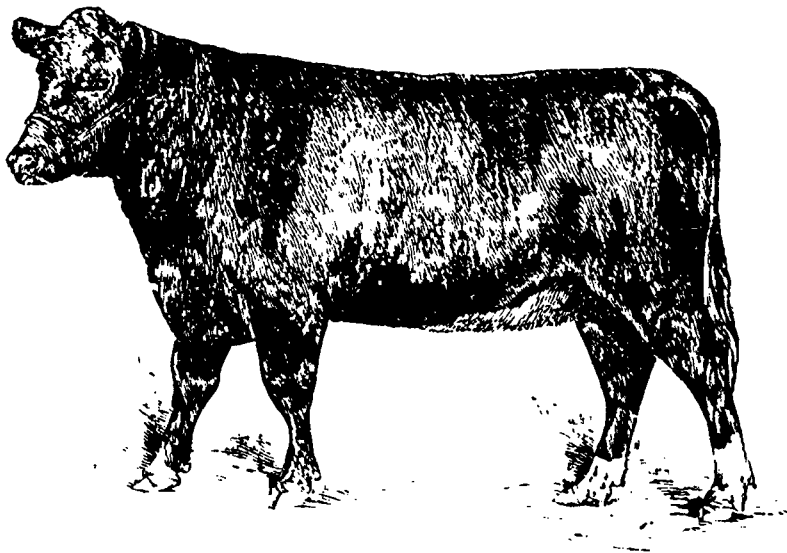
(1) Shouldn't I like to have a share in the work! A. R. J. F.

WORK ALREADY ACCOMPLISHED.

The Central Experimental Farm has been located near the Capital, within three miles of the Parliament Buildings. Four hundred and sixty acres of land have been secured in a commanding position overlooking the city of Ottawa, possessing every desirable variety of soil and aspect to meet the varied requirements of the experimental work to be conducted there. Although possession was had but a few days before the winter set in, some work has been accomplished, unnecessary internal fences have been removed, the loose stones cleared over a large area, some grading done and about twenty acres of land ploughed. During the winter a large supply of stable manure has been obtained, between fifty and sixty acres of undergrowth chopped and piled, an office and store room erected, and a glass structure built for the purpose of testing the vitality and germinating power of seeds.

Correspondence has been had with the Directors of the Royal Gardens at Kew, England, the Imperial Botanic Garden at St. Petersburg, Russia, and the Imperial College of Agriculture at Japan, and as a result collections of grain and seeds will shortly be received from these several institutions.

Purchases of seed grain in great variety, including wheat, barley, oats and rye, also grass seeds for meadows and permanent pastures have been made in Northern Russia, Germany, England, Canada and the United States with the view of testing their comparative merits when grown side by side. A collection of many varieties of



POLLED ANGUS.

potatoes has also been secured for a similar purpose. A large number of standard fruit trees and vines are being obtained; also a collection of hardy Russian sorts, comprising nearly two hundred varieties, some of which it is hoped will succeed in the colder sections of the Dominion, where the more tender kinds cannot be successfully grown. A very extensive assortment of economic and other forest trees and shrubs, both native and foreign, are being secured; also collections of seeds of the same, for the further extension of this important division of the work. Plans of the necessary buildings are also being prepared, so that no delay may occur when the time arrives for their erection.

SEED TESTING.

This department is now ready for work. It has been undertaken for the purpose of determining the value of the agricultural seeds which are sold to farmers from year to year, and to save them from some of the losses to which they are annually subject by using old and inferior seeds. Every farmer in Canada will have the privilege and the right to send to the Experimental Farm samples of any seeds of which he may desire to know the germinating power, and it is hoped that all will avail themselves freely of the advantage offered. A suitable glass structure has been erected for this work of a

sufficient size to admit of the testing of a very large number of samples at one time.

METHODS.

The returns of the germinating power of seeds will not be based upon a single test, but every sample will be tested in duplicate, once in the soil and again out of the soil in the most approved form of apparatus devised for this purpose. Small seeds will also be examined for impurities, such as sand, dust, foreign seeds, chaff, &c., and the proportion of these given.

DIRECTIONS FOR SENDING SAMPLES.

The samples sent should be a fair average of the bulk of the seed from which it is taken. The quantities which should be forwarded will vary in proportion of the size of the seed. Of large seeds such as corn, peas, wheat, barley, oats, &c., about four ounces will be required, while of the smaller seeds such as grass, clover, turnip, carrot, &c., from half an ounce to an ounce will be sufficient. The larger seeds may be put into small cotton bags each marked with the name of the seed, and these smaller bags enclosed in a larger canvas bag provided with a tag on which the address may be written. The smaller seeds may be folded in stout paper, each parcel marked and the whole enclosed in a strong envelope. Packages and communications should be addressed: "Experimental Farm, Ottawa, Canada." All mail matter will be carried free to and from the Experimental Farm within the limits of the general postal regulations as to the size and weight of packages. All seeds received will be entered in the order in which they arrive and the returns made as promptly as possible.

TREATMENT OF FOREST-TREE SEEDS.

The great importance of encouraging and stimulating tree planting among the farmers, especially in the Northwest Provinces, is beyond dispute. It is felt also that this can only be accomplished on the scale of magnitude required by the planting of suitable forest tree seeds, which can be gathered from the native trees growing in the Provinces or purchased at a small cost. This leads us to add a few words of advice on the general treatment of forest tree seeds.

Many of the tree seeds which mature early are better sown soon after they are gathered. This applies especially to the several varieties of elm and to the soft maple. The hard maple, box elder and ash seeds keep well over winter, provided they are stored in a cool place and not allowed to get too dry. Acorns, nuts and stone fruits are most successfully planted in the autumn, but if kept over winter should be mixed with moist sand and exposed to frost and planted as early as possible in the spring, taking care that they are at no time left in masses under conditions so as to heat. Many failures with seed arise from not sowing it in partial shade. If seeds are exposed alternately to hot sunshine and cold, while they are swelling, they will frequently rot before they appear above the surface. The requisite shade may be obtained by the use of brush wood, or a light layer of corn stalks or straw, removing this as soon as the seedlings are up and fairly established. Many nurserymen enclose their seedbeds with wooden frames, on which are laid light frames made of one-inch strips and covered with cotton or muslin. These are convenient and can be provided at small cost. Seedlings of evergreen trees grow slowly and require to be shaded and kept moist during hot weather all through the first year of their growth and sometimes longer. Seeds take some time to swell their coats after being placed in the ground, hence, if planted dry, they should be sown as soon as soil can be had to cover them. Germination may be hastened, especially with seeds of a hard texture, by pouring hot water on them and allowing them to soak for twenty-four hours before sowing.

Seeds sometimes fail to grow from being planted too deep. The larger nuts and acorns should be covered with soil about as deep as the seed is thick; other smaller seeds should not be covered with more than half an inch of mellow soil, pressed gently with the back of a spade so as to make the earth firm around them, and when the young seedlings appear they should be carefully weeded. Occasionally seeds will remain in the ground until the following season without germinating. Should any fail to grow by the time spring is over, and on examination the kernels are found sound, the seedbeds should be kept weeded and shaded until the next season.

Feeding Milch Cows and Calves.

In the report of the Munster Agricultural and Dairy School, Cork, details are given of experiments that have been conducted as to feeding milch cows and calves.

The first experiment was commenced on February 28th, the object being to find how the quantity of milk would be altered by varying the proportion of roots and meal given to the cows. The money value of the food was taken as the standard, and 1 lb. meal—bran, Indian meal, and crushed oats mixed—was calculated to cost as much as one stone roots. Besides the roots or meal, hay was given *ad lib*. The ordinary food at the time was 9 lb. meal, 20 lb. hay, and 28 lb. mangolds. Six cows were selected as nearly equal as possible in yield of milk and time from calving.

Two were kept on each ration for two weeks at a time, with the following results:—

Cows.	Ordinary food.	12 lb. meal.	6lb meal, 6st. roots.	12 stone roots.	Ordinary food.
1 Average milk per day, lb.	30.6	26.7	30.1	28.3	26.6
2 Do. Do.	34.5	33.7	34.8	33.3	31.3
Average lb.	32.5	30.1	32.45	30.8	28.9
	Ordinary food.	12 stone roots.	12 lb. meal.	6lb. meal, 6st. roots.	Ordinary food.
3 Average milk per day, lb.	33.7	30.6	35.3	34.7	34.0
4 Do. Do.	35.3	34.8	36.8	33.5	31.9
Average lb.	34.5	32.7	36.0	34.1	32.5
	Ordinary food.	6lb meal, 6st roots.	12 stone roots.	12 lb. meal.	Ordinary food.
5 Average milk per day lb.	31.6	35.0	20.5	29.3	32.0
6 Do. Do.	35.1	34.0	30.3	29.5	33.6
Average lb.	34.8	34.5	30.4	29.4	32.8

The average daily milk from the six cows.

Ordinary food.	12 lb Meal	6 lb meal, 6 st. Roots	12 st. Roots	Ordinary food.
lb	lb	lb	lb	lb.
33.9	31.8	33.7	31.3	31.4

In every case the quantity of milk was reduced with the stone roots, which is remarkable when considered in connection with the analysis of the food.

ANALYSIS OF ORDINARY FOOD USED IN EXPERIMENTS.

	Albuminoids or flesh formers.	Oil.	Carbohy- drates or heat givers.
	lb.	lb.	lb.
9 lb. Meal.....	1.12	.45	5.26
28 lb. Mangolds.....	.336	.028	2.29
20 lb. Hay.....	1.8	.5	8.2
Total	3.256	.978	15.75
In 100 lb. Meal.....	12	5	58
In 100 st. Mangolds.....	17	1	114

Experiments in cattle feeding.

How to feed cows most economically and advantageously in winter is a problem of great importance to dairy farmers. For that reason we call attention to some remarks on the subject in the *Live Stock Journal Almanack* by Mr. Primrose M'Connell, a writer who has had the advantages of scientific training and experience as a dairy farmer on an extensive scale. Mr. M'Connell compares three varieties of food—turnips, silage, and cooked mash. The first he values at 10s. per ton, the second at 15s, and the third at 26s. 8d. in its moist state. The estimate for turnips is a common one, and that for silage is based on the assumption that the consuming value (1) of a ton of average hay is £3, and that the green grass which would make one ton of hay would make four tons of silage. (2) The mash is composed of 4 lb. straw chaff, 4 lb. bran, 2 lb. bean meal, 2 lb. ground oats, and 36 lb. water. One shilling per ton is allowed for cooking these ingredients, and this brings the cost of the dry matter to £4 per ton. To compare the three kinds of food equal values are taken by given analyses of one ton of turnips, two-thirds of a ton of silage, and one eighth of a ton of dry mash, as follows:—

	Albuminoids.	Fats.	Carbo- hydrates.	Ash.
1 Ton Turnips.....	1.4	0.20	7.1	0.60
$\frac{2}{3}$ " Silage.....	1.5	0.04	9.0	1.60
$\frac{1}{8}$ " Dry mash.....	1.7	0.35	4.5	0.36

The albuminoids are the most valuable of these food constituents, and the mash contains 21 per cent more of them than the turnips, and 13 per cent. more than the silage, for the same cost. Taking the fats also into consideration, and leaving the carbo-hydrates out of account, Mr. M'Connell estimates that ten shillings worth of the mash is worth as food 28 per cent. more than turnips and 33 per cent. more than silage costing the same money. In addition he contends that it is more easily digested, and that there is a great saving in the animal economy through giving food warm, as well as an increase in the flow of milk. Lastly, there is an advantage in being able to use for food, with the least possible waste, such by-products as cavings, tail corn, and chobs, as well as inferior hay, and all kinds of straw. In wintering

(1) Consuming value, is the value set upon hay, roots, &c., by the valuers when the tenant is entering on his new occupation. The landlord's interest in the manure enters so largely into this value that it is almost impossible to make the matter clear to any one not acquainted with the queer system of "valuations" prevalent in England.
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(2) Observe that, when the writer puts the value of silage at 50% more than the value of turnips, he is not talking of green corn silage, but of grass.
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70 cows, Mr. M'Connell has found the cost of cooking not to exceed fifteen pence for each cow.

Another cattle-feeding question is dealt with by Sir John Lawes in the *Scottish Agricultural Gazette*. He set himself to ascertain whether a farmer would do better by selling the produce of an acre of oats or by converting it into beef. Experiments carried out at Rothamsted show that 3365 lb. oats (84 bushels of 40 lb.) and 5040 lb. straw, assumed to be grown on one acre, with 1960 lb. decorticated cotton cake, will produce 958 lb. in the live weight of oxen. Taking two-thirds of this as carcase weight (a fair computation, as the proportion of dead to live weight in the increase only is larger than that of a whole bullock), there would be 639 lb., which, at 6d. per lb., would amount to £15 19s. 6d. If we deduct £5 5s. for the cake there will remain £10 14s. 6d. as the return from the consumption of the oats. Now, oats weighing 40 lb a bushel would be worth about 20s. a quarter, and the assumed crop of ten-and-a-half quarters would come to £10 10s. We have, then, a balance of 4s. 6d. and the manure on the side of feeding the crop to set against the straw in the event of the produce being all sold off the land.

FROM A FARM WORKED BY PROXY—I.

THE SIN (?) OF SELLING HAY.

On page 640 of the *COUNTRY GENTLEMAN*, in the article on "Plowing under Clover," to which I replied in my last, Mr. Terry also says: "Unless Dr. Chamberlain can show me how to get \$10 to \$20 per ton out of the hay, and keep the manure on the farm. I am afraid I shall plow under some clover for manure next year. I would not think of selling clover hay, even at present high prices, to be taken off the farm. To the good farmer it makes little difference what the market price of hay is, as he would never take clover to market."

Is this then a law of the Medes and Persians, that cannot be changed? There seems to be a popular impression that it is a sin to sell hay and that it is the unpardonable agricultural sin to sell clover hay. Several years ago I tried to show, in these columns, that this idea is not well founded, and that the wisdom or unwisdom of selling hay, or any other crop, depends simply upon relative prices. I have not changed my mind. Is it then always an agricultural sin to sell hay, and is it far worse to sell clover than timothy, or far worse to sell either of them than wheat, potatoes, &c.? A clear scientific statement of the "manure value" of each crop will help to answer these questions. I give the figures below as given by the great chemist Wolff, and deduced by him as an average of a large number of careful chemical analyses. They show simply the number of pounds per ton of the several fertilizing elements drawn from the soil, and I have added the total cash values of those elements. Strong land, in good heart like Mr. Terry's, would perhaps yield in a good season, the following amounts of the four crops in question, viz.: Clover, 2½ tons; timothy, 2½ tons; potatoes, 225 bushels (6¾ tons); wheat, 33¾ bushels (one ton); and at the present average prices of superphosphates in Ohio the cash exhaustion per ton and per acre will be as stated below:

TABLE SHOWING SOIL EXHAUSTION BY CROPS.

—Loss per ton in Pounds and Dollars.—

Crop (1 ton.)	Nitro- gen.	Potash.	Phosphoric Acid.	Loss per Acre.
Clover hay.....	39.4 lbs.	36 6 lbs	11.2 lbs.	\$3.92 \$22.30
Timothy hay...	31.0	40.4	14.4	9.82 24.55
Potatoes	6.8	11.4	3.2	2.28 15.39
Wheat	41.6	10.6	15.8	10.58 10.58

Now, it will be noticed above that, in clover and timothy

especially, the proportion of nitrogen is immensely larger than is found either in stable manure or in ordinary commercial fertilizers; much larger, too, in clover than in timothy; much larger in both than it pays to buy; and if we take into account the labor of handling the manure, and the partial insolubility of stable manure, and the loss of probably 15 per cent. of the totals above, in feeding, even if the liquid and solia are saved and used as wisely as possible, and if we purchase bone meal wisely on its analysis, I am persuaded that half the above sums expended in bone meal will replace, on clayey soils at least, the available fertility removed by selling the crop. I think, too, that selling an acre of clover hay from the farm really exhausts the soil less than selling an acre of timothy, and but little more than selling an acre of potatoes at the above estimates, since the benefit of the clover roots remains.

For several years Mr. Terry has sold the potatoes from 24, and then from 18 acres of his total 36 acres of plow land, and yet is horrified to think of selling hay which exhausts the soil but little more. He says "the good farmer would never take clover to market," no matter what the price. Last fall Mr. T. plowed under "three large loads per acre" of clover on six acres. Timothy hay now (Nov. 22) quotes \$20 per ton in Cleveland, and clover is really worth more to feed than timothy, Mr. Terry says. So let us say he plowed under \$50 worth of clover (2½ tons) as manure. He raised potatoes on the field, about 100 bushels, at 35 cts. per bushel = \$35 per acre for the crop, after tilling, dunging and digging; \$50 per acre plowed under, and \$35 per acre for the crop.

Of course these last figures are not a fair average at all. Hay is exceptionally high, and potatoes were an exceptionally light crop for Mr. Terry, owing to rather dry weather, and not very high, since they were plenty elsewhere. But I think it perfectly fair to place these figures in sharp juxtaposition to show that it is not always a sin to sell clover hay, or always wise to plow it under. It is simply a question of relative prices. When hay was \$4 or \$5 per ton, good acres \$2.50 per cwt., and wheat \$1 per bushel, as I can distinctly remember the prices to have been thirty or more years ago, I think it was wise to plow under clover for wheat. When hay is \$20 in our nearest good city market (Cleveland, 25 miles), and wheat quotes only 77 cts. per bushel in the same market, I should deem it unwise for me to plow under clover as manure for wheat, or for potatoes at present prices. To do so would remind me of an incident I may have told in these columns. I had a cow once that was a milk-drinker; Old Lise was her name. I had milked a full pail from her, and set it down where I could watch it while I milked the other cow in the same yard. A little boy standing by said: "Mr. Chamberlain, if Old Lise should drink that pail of milk, would she give twice as much next time?" While my attention was attracted by my amusement at the question, Old Lise tried the experiment! But I didn't notice that she gave "twice as much the next time!" Moral: "This fable teaches" that clover seed at \$6.50 per bushel, and hay at \$20 per ton, are expensive manures to plow under to grow wheat at 77 cts., or potatoes at 35 cts. per bushel. Rotation of crops is all right, but we want to be sharp enough to "rotate" some cash into our own pockets; in other words, we want to save both "money value" and "manure value," if we can, but if for any reason one of the two is very low, and the other very high, it will, perhaps, be wise to sacrifice the one that is very low, and to save the one that is very high; but hardly the reverse.

In the same article Mr. Terry says: "Brother Chamberlain sold his cows last spring, and now has his large barn, with deep bays, well filled with hay. * * * I am more than anxious to see how he will get the 'money value' and the

'manurial value' out of the hay;" and intimates that I shall have to take a large part of the pay in "experience." Well, I am not worrying much about the "money value," with hay at \$20 cash in November, and likely to go higher, and as for the manure value, if I should sell every ton of hay from 50 acres, I should not be exhausting any larger proportion of my arable land, nor exhausting it much more rapidly, than Mr. Terry did his in selling the potatoes off from 24 out of 36 acres of plow land; for of my land this dry year none averaged over two tons of seasoned hay per acre. For 20 years my little farm has had, on the average, the manure of over 30 head of cattle and horses, with more or less hay and grain bought, or cut on shares, and fed on the place. I shall this winter probably keep cows for my neighbours, or buy young stock to feed out some 20 tons of Hungarian hay, and 10 tons of fine meadow hay, and the straw from about 20 acres of wheat. This stuff I have, besides the timothy hay from 35 acres, every ton of which will probably be in demand in Cleveland at \$20 or \$22 per ton, or at home at \$15 to \$18 per ton. If I were on the farm myself, I should try to feed out more of it, probably shipping milk to Cleveland at 3½¢ per quart, the present price, thus getting "money value," and "manure value," too.

One thing is certain - I shall try not to let my farm run down in fertility while I own it. It is more than twice as productive now as when I bought it 22 years ago; and I do not want people to say: "Yes, he's president of an agricultural college, and 'farms with his mouth,' but you ought to see his farm!" The farm is in good shape, and I mean to keep it so as long as I own it. This last August I put a heavy dressing of fine stable manure on 10 acres for wheat, and of pure bone meal on five acres more, and of best superphosphate on five more. (1) The ground and the weather were very dry when the wheat was drilled, about Sept. 5th to 10th, and it was some two weeks coming up. But it all looks exceedingly well now—the manured best, the phosphated next best, and what had bone meal next, while a narrow strip that had neither bone meal nor phosphate nor manure looks not half so well as any of the rest. Good commercial fertilizers always show marked results on wheat on my rather clayey soil, and this helps solve the question of "manure value."

The ground for all the wheat was thoroughly and seasonably worked, and it looks now as if there would be a large yield. I was here on the farm a few days, just as the ground was ready for the seed. The finely rotted manured was spread on the surface with a Kemp manure spreader, which worked to perfection, two men and a boy handling 50 loads a day. The manure was drawn to the field in spring, and placed in four large heaps at convenient distances on the field. I had not seen the farm or the wheat again after Sept. 1st until to-day (Nov. 22d), when I came up for a few days to help to build a new sugar house, and see to various matters from personal observation.

This working a farm by proxy, when one is 700 miles away, is rather up-hill work. It requires a careful letter each week from my farmer, stating progress made, work done, for wardness of crops, &c. and a careful reply each week from the owner, giving directions. Still I find it, thus far, much better, and more profitable and satisfactory, than renting on shares. I have an excellent farmer or manager, and as my friend J. G. says, if things go right I can take the credit myself, and if they go wrong I can "lay the blame on the hired manager."

Let me re-state my conclusions in regard to selling hay, and plowing crops under:

1. Selling clover exhausts the land not quite so fast per acre

(1) The bone-meal should average 3.5% of nitrogen, and the superphosphate about the same.

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as selling timothy, and little faster than potatoes. One reason why it is so seldom sold is because there is little call for it in the cities, and it brings less per ton when sold than timothy. (1)

2 The question of plowing under clover for manure is simply one of relative prices and circumstances. I think it has seldom paid the regular farmer in Ohio during the last 20 years.

3. As a rule, the really wise farmer sells condensed products, *i. e.*, those in which the "money value" far exceeds the "manure value." As a rule, too, articles of *human food or use* are the condensed products, but not always. For example, hay may be in a just sense a more condensed product than potatoes.

4. The horror about the sin of selling is not well founded. It may or may not be wise to sell it. There is no cast-iron rule. The farmer must use his judgment and common sense like any other business man. But I do not now remember to have heard of any one's plowing under timothy or potatoes for manure. And yet they contain about as much "manure value" as the clover.

W. I. CHAMBERLAIN.

AGRICULTURAL.

T. H. Hoskins, M. D., Editor, Newport, Vermont.

EXPERIMENT STATIONS—A STATE CHEMIST.

We think it is time to draw a distinction between the fertilizer-control stations, which some states are establishing, and true agricultural experiment stations, like the one established by the state of New York, and which is now under the able control of Dr. E. Lewis Sturtevant. The former are useful and necessary, as a part of the police system of the state, but the only excuse for the name which is given to them is to be found in the hope which doubtless attended their foundation, that they would in time grow up to their name. As they now exist they bear about the same relation to a genuine agricultural experiment station that a laboratory set up for the analysis of flour and baking powders would bear to a bakery—or perhaps, more exactly, to a cooking-school.

A true agricultural experiment station has for its function exactly what its name describes—the making of experiments, the purpose of which is to investigate the unsolved questions connected with the practical agriculture of the state or country which establishes them. These unsolved questions are very numerous, and many of them are intricate, requiring much laborious exertion and the tabulation and comparison of results over a long series of years. Very high qualifications are required in the head of such an establishment, and though in some minor matters valuable results might be obtained without great delay, yet in most of the proper subjects of investigation the attainment of perfectly reliable knowledge would result only from work that could not be hurried. For plainly, if this knowledge were easily and quickly won, there would be no need of the state's taking the matter in hand. The easy questions have already been answered, and nearly every farmer can test the correctness of these answers on his own farm. When the state is called upon to help agriculture in this way, it should only be to provide for that sort of work which the ordinary farmer cannot do for himself—the sort of work which takes time, money and trained skill, in order to obtain trustworthy results.

Some minor work, indeed, might properly be required of such an experiment station. It would be quite proper to charge it with the testing of all known varieties of plants in ordinary cultivation, with the purpose of settling their comparative value on different soils, and under different treatment in the

(1) Simply, because people *won't* make clover-hay properly.

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way of manuring, tillage, etc. Incident to this would be the equally proper work of testing so-called novelties, and the sifting which would be necessary to show how many identical kinds are being distributed, ignorantly or fraudulently, under different names. Such work as this has been done at the New York station with beans, corn, potatoes, tomatoes, oats and other crops, and the results obtained are valuable to the public.

Still, the heavy work of such an institution, in order to justify its support from the public funds, should be done for the solution of great problems in agriculture. The best model we have for such work is that set at Rothamsted, in England, by Sir J. B. Lawes. There, experiments begun nearly forty years ago are still going on, and the significance of some of these is only now beginning to be realized, so that their real teachings can be made available in practical agriculture.

Such an experiment station requires money, and a good deal of it. It also still more requires men who are not easy to find, and when found will also be found to be in request for other kinds of work, for which large compensation is willingly given by rich and intelligently managed corporations, or combinations of capital. This being the case, and all the above named facts being taken into account, it is quite easy to see that the farmers of the smaller and poorer states are not likely to ask for, or favor, the setting up of genuine, well-equipped and manned experiment stations, at least until the success of those already established has amply demonstrated their local usefulness. On the other hand, any cheap attempt at dabbling in this class of work, with no proper conception of what it is, what it will cost and what kind of men it will require to make it effective, is to be earnestly deprecated. Better do nothing in the matter than set cheap fools to fooling with it.

But as to fertilizer-control stations, every state is bound to have one as the only protection its farmers can have against the fraudulent fertilizer trade. In our judgment this would be best accomplished by the appointment of a state chemist, with a suitable laboratory at the capital, whose functions should not be limited to this work, which would only require a few weeks of his time annually. He should at other times be at the service of the state agricultural society, the state medical and pharmaceutical societies, or of any of the county societies, or of the board of agriculture, the dairymen's association, and of all the departments of the state government—all of course under proper conditions and regulations. Chemistry now enters into nearly every concern of life, and a state chemist would be perhaps the most useful of all our public officers. We believe that, when we have one, we shall wonder how we ever got along without him.

Vermont Watchman.

FATTENING POULTRY

BY "HENWIFE."

A ROUGH-AND-READY method of fattening fowls may be pursued by simply confining the birds in a small house, and giving them as much food as they can consume; but I believe this way to be productive of waste, both of food and results, as the chickens fight, scatter the food, dirty the dishes, and fly round their prison in a manner which exhausts the system and causes indigestion. Many coops, on the most scientific principles, are now offered for sale, but I would prefer to give a few hints as to the best way for farmers to construct cheap pens for themselves.

On most farms there is some disused barn, cow shed, or old stable, which can be utilised as a fattening house, and if it be water-tight in the roof, the wooden sides can easily be repaired sufficiently to keep out snow and cold winds. The floor,

probably of earth, must be levelled and sanded, well beaten down and rendered hard with an admixture of lime and water; the walls should next be cleaned and whitewashed, and a couple of glass windows introduced.

The walls may now be fitted with coops of the most common deal, each about 24 by 13 inches. The floor-boards must be sufficiently thick to support the weight of the shelf above. The front of each coop is a barred door turning on hinges, while a hinged flap runs the whole length of the coops, deep enough to admit of the introduction of a scraper to clean the pens. A projecting ledge supports the troughs which contain food.

A precautionary measure against the ingress of rats should be taken by setting traps in their runs, and filling up their holes with broken glass and pitch, as these pests will always be attracted by the quantity of food brought into the barn.

A thick curtain of baize or any dark material should be hung on iron rods before each window.

A large pan of fresh water placed in a convenient position should receive the troughs between each meal, in order to prevent the slightest possibility of any sourness resulting from the stale paste remaining in the corners of the vessels.

a round, fleshy, sufficiently fat chicken, commanding a good price at market.

Such birds as those exhibited at Paris, and requiring from three to four months' treatment, are beside the question, and therefore I do not speak of them, as now our object is to fatten the farmer's barndoor fowl in the quickest and easiest manner.

Punctuality, cleanliness, and watchful attention must be observed. A forgetful feeder, omitting a meal one day and giving an extra one the next, coops left dirty for several days, stale food kept over-night, ailing birds uncared for, food carelessly prepared—all such little mistakes lead to grave consequences, and should be guarded against.

The shed should be airy, but not draughty, and stout shutters outside the glass panes be provided for winter use.

The birds should be kept in darkness the whole day, with the exception—and it is an important one—of an hour before each meal. The admission of light arouses the fowl from the slumber in which it passes its time, excites its spirits, and whets its appetite. The food should be, in quantity, about a teacupful of meal paste to each bird, placed in the troughs already described. If the feeder observes that the fowl eats



“HENWIFE'S” FATTENING HOUSE.

The fowls are best fattened at from three to four-and-a-half months old.

Cockerels and pullets should be placed out of each other's sight, and each compartment ought to contain but one bird. The fowl should be dusted with sulphur or some insect-destroying powder before being penned, as, especially in warm weather, the feathers swarm with mites, which produce great irritation, and, keeping the poor bird in a feverish state, militate considerably against rapid and successful fattening.

A thin layer of fine grit must be spread on the floor of each coop, and the bird placed therein and left to itself, fasting for at least twelve hours.

If offered food on its arrival, a fowl often refuses to eat, mopes, and so makes a bad beginning; but by adopting the above plan a vigorous appetite is created, and it learns to expect its meals with great regularity.

The method of cramming is well-known both to Surrey and Sussex breeders.

But this occupying a considerable time, is less fitted for the general farmer than the plan I shall now describe, popularly known as “Peckers.”

The fowls should be fed twice a day for the first fortnight and three times for the concluding two or three weeks. From a month to two months, according to the age, breed, and weight of the fowl, should complete the process, and produce

up its portion ravenously, and appears to desire more, he may add another cupful. Regulate the supply to the demand.

If too much is given at first the fowl becomes disgusted, picks it over, and finally rejects it. Immediately after feeding the curtain should be drawn, and the attendant depart quietly, placing the empty troughs in the pan of water before-mentioned.

If a fowl appears to “go off,” when it has been in the coop a few days, a little boiled—not raw—grain, and a morsel of meat or a lettuce leaf to pull at, frequently brings it round again.

Varieties of food are useful in keeping the birds eager and hungry, but they should be adhered to with a certain regularity, in something like the following order:—

First day: 6 a.m., barley-meal and toppings; 12 noon, rice, boiled in skim-milk; 6 p.m., oatmeal and potatoes.

Second day: 6 a.m., maize-meal and toppings; 12 noon, barley boiled quite soft; 6 p.m., oatmeal and maize-meal, mixed with a little spice.

The food must depend, of course, upon the locality and circumstances of the farmer. Near large towns quantities of stale bread may often be obtained from hotels or schools, and such pieces, broken small and soaked in warm skim-milk till moist, are excellent food for fowls. Buckwheat meal cannot be surpassed as a fattening agent, and is remarkable for pro-

ducing the splendid poultry of France; but it is difficult to procure in England, and very expensive. (1) Such little delicacies as a spoonful of sugar in the rice, a lump of fat, some coarse treacle, will hold their proper position in the poultry dietary when procurable. I never give any drink to fattening fowls, finding it disorders the stomach, and rather impedes digestion. The meal should be mixed rather slack, and all food given luke-warm. Wheat-meal, now so cheap, is an excellent food if mixed with twice its own bulk of maize-meal.

A bird which is fattening well will lie down a great deal, and the comb will enlarge rapidly. Ridges of white fat will appear under the skin below the wings, and along each side of the breast bone. When the period of fattening is complete, the fowl should be fasted for twelve hours before being killed.

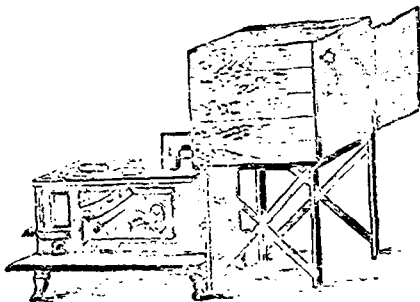
The skin of a fat bird is very tender, and the utmost care must be taken during the operation of plucking. This should be done while the fowl is warm, and it must then be trussed, and wrapped in a fine linen cloth, soaked in pure cold water till it is "set." Fowls should be wrapped in clean paper, not old newspaper, and packed in fresh crushed straw, with plenty of padding between each bird, to prevent bruising. The practice of smashing in the breast-bone is very bad, and renders carving a difficult operation. The breast-bone may be depressed by a weight placed on it upon a folded cloth. The head should be folded close to the side, and the legs, after being well-washed, left intact.

Feathers should be sorted as far as possible, the white ones being kept separate. After being washed with plenty of soap and water, picked and cut they should be dried in a cool oven. The washing is, of course, performed by enclosing the feathers in a large loosely woven canvas bag, which is plunged bodily into a tub of soap suds.

I have found this plan very superior to the lime-water process, the method of simply drying them in bags. The washing renders them perfectly sweet and adds considerably to their elasticity. — *Live Stock Journal Almanac*, 1885.

A "Smoke-House," or Smoke-Box.

An easily extemporized "smoke-house" is shown in the engraving. An old box-stove is placed in the back yard, with a dry good's box mounted on a frame close at its rear. The stove and box are connected by an elbow of stove-pipe. Place hooks in the top of the box upon which to hang the hams,



AN EXTEMPOORIZED SMOKE-HOUSE.

&c. One end of the box serves as a door. The fire in the stove is easily governed by a draft-slide in front. An opening in the rear of the box over the door, allows the smoke to pass out when necessary; otherwise it is closed by a slide. When a smoke-house of this kind is once used, we are sure no one

will thereafter willingly resort to old barrels or hogsheads, which frequently are set on fire, injuring the meat that is being smoked within.

CORRESPONDENCE.

In your January number you kindly gave us one of Sir J. B. Lawes tables, which tells us that oxen, sheep and pigs void about 95 $\frac{1}{10}$ of the food they consume. That I take to be the maximum and only to be obtained when the greatest care is exercised so that not the smallest portion of either the solid and liquid is allowed to go to waste.

The manure from a pregnant animal or a milch cow will not yield such a high percentage as a portion of the food will be taken up by the fetus or turned into milk as the case may be. Waring, in his book of the farm, tells us that: "Except when peat, sand, &c., are used, stable manure contains nothing but what has already formed a part of plants and it contains every ingredient that plants require for their growth. This however states but one half of the question. The other half and a very important one it is—is as follows—a given quantity of farmyard manure does not contain all that is needed to produce the same quantity of vegetable matter that constituted the food and litter of the animals by which it was produced."

I take it for granted that Waring is supposing that the manure has been properly taken care of and every portion saved.

Now look at the way most—I won't say all—of our farmers treat their manure. They simply throw the solid excrement and what little of the liquid that may be retained in the litter in a heap in their yards to be leached by the sun and rain till such time as they are ready to use it on their land. They then spend both time and labor in spreading this, what they call good manure, over their fields and are surprised they do not get heavy crops. The truth is they have allowed the most valuable part to be taken away by the sun and rain and do not know it.

As it is a well proved fact that a ton of hay or other farm crop turned into manure will not produce a like quantity of vegetable matter, is it not time that our farmers considered this subject well before their farms cease to produce paying crops and look for some method by which they can prevent further deterioration? Neither rotation nor "meliorating" crops will do it. To those who sell hay, grain, &c., I would suggest that they take better care of what manure they make and supplement it with some good commercial fertilizer. To those who sell cattle or horses, or fatten beef for amusement—as I question if there is any profit in it in this province—to buy cotton-seed meal or linseed meal, good bran and such other feed as they may require, and then take care of their manure. Not long ago I was talking with a breeder of thoroughbred cattle who told me that he had found he could not raise roots successfully without the use of concentrated manures, even if they cost him \$50 a ton. I think most of our farmers will find the use of commercial fertilizers preferable to increasing their present stock of cattle and buying feed for the purpose of making more manure, is it will require no extra capital and although it may seem expensive a small quantity goes a long way. It is more easily applied to the land than farmyard manure and being in a soluble condition is available as plant food just at the time a young plant wants nourishment. Don't for a moment suppose I am not a strong advocate for farm-yard manure when it is properly handled. But for root crops and corn that owing to our short season require to be forced ahead I think a good concentrated manure is best or at any rate a little can be used profitably in conjunction with manure so as to insure a quick start. Before closing I would like to advise your readers that

(1) This grain in England is only grown for game. In Norfolk I have seen large fields of turnips with every twelfth drill sown with buckwheat.
A. R. J. F.

as the value of different fertilizers vary so much with different soils that it would be well for them to make limited trials of different sorts before deciding what is best suited for their particular land. And also that in using fertilizers they must not expect much heavier crops than if they applied a large quantity of manure.

I am quite convinced that if our average farmer wants to raise paying crops he can no more do without the use of commercial fertilizers than he can afford to harvest his crops in the same way as his grandfather did a hundred years ago. I should like to hear what some of your readers have to say on this subject.—*Fairfields.*

Quebec, 14th March, 1887.

To A. R. JENNER FUST.

Dear Sir,—On p. 224 of Stewart's "feeding animals" he says, if he takes 65 lbs. clover ensilage and 60 lbs. corn ensilage, they will make a complete ration. Then, on the next page, he says that a ton of clover is worth 2 tons fodder corn. If this is so, why does he not take half the quantity of clover ensilage in making up the complete ration? I am about to put up a silo and I wish to ensile clover at the same time with corn, but clover ripens early—it was cut last year about 10th July—how would you advise me to proceed? The printers did not send me the Journal for Feb., March, and April, 1884, and I therefore missed your article on malt sprouts, I can get them for 15c p. bush. I am running short of straw and hay, and thought the sprouts mixed with cut straw and steeped would make a fair ration, will you say what proportions should be used. I shall have to purchase fodder later on, straw \$3.00 p. 100 bds., hay \$8.00 p. 100 bds.

I remain yours truly,

H.

Ans.—1. Stewart advises the proportions above named, because the clover, being extra rich in albuminoids, makes up for the extreme poverty therein of the corn. The clover contains 3.06% of albuminoids and the corn only 1.00%. I will give an article on this "nutritive ratio" in the next number. It seems to be a puzzle to many people.

2. Ensilage second cut clover with corn; unless you like to ensile and weight the clover first cut, and then uncover and add corn when ready.

3. Malt cummins are a very useful food, particularly to mix with corn or other starchy substances. According to the tables, they are worth \$1.33 per 100 lbs., and corn only \$1.11. Straw, cummins and corn might answer your purpose, but I do not think straw and cummins would do much for your cows: they do not care to eat much of the sprouts as they are generally gritty and dirty. Theoretically they are of far greater value than in practice—a good plan is to pour boiling water over them.

Dear Sir,—We have one silo in operation in this county now and I know of three others that are to be built in the spring (including my own). Would you kindly tell me: If I can cut at one time a sufficient quantity of hay to last my stock horses and cows for, say 3 or 4 weeks, without injuring the hay? Also, if I can feed my horses whole oats with the out hay, the hay to be dampened and the oats mixed in, or must I have the oats ground? I would like to have your answers to those two questions before I commence to build my silo or buy the cutter. My reason for wanting to cut so much hay at one time is that my horses and cows are in two separate buildings and the cutter I propose buying is too heavy to be continually moved about. I shall also cut all my straw for bedding so as to try and improve my manure. I used all my oat chaff in the cow stable this winter to absorb the urine and found it

answered well. I hope you will excuse my troubling you, but I feel if on e I get into the right groove it will be easy to go ahead. My farm, 25 acres, was very much run down when I bought it, and my one object at present is to make it pay.

Yours very truly,

X.

To A. R. Jenner Fust

Chaff can be cut to any amount, without suffering much if any loss, provided it be slightly sprinkled with salt and trodden firmly down in the bin. For bedding, the cut straw should be in 4 inch lengths.

A. R. J. F.

NON-OFFICIAL PART.

A FAIRFUL LEAP

into the abyss of poverty, over the precipice of shortsightedness is taken by thousands, who might become wealthy, if they availed themselves of their opportunities. Those who write to Hallett & Co., Portland, Maine, will be informed, free, how they can make from \$5 to \$25 a day and upwards. Some have made over \$50 in a day. You can do the work and live at home wherever you are located. Both sexes; all ages. All is new. You are started free. Capital not needed. Now is the time. Better not delay. Every worker can secure a snug little fortune.

A Fine Piano for Senator Mahone.

[From the Baltimore American.]

A number of prominent musical people of this city gathered in the warerooms of Messrs William Knabe & Co. yesterday morning to examine a piano made by the firm for Senator "Billy" Mahone, of Virginia, for his Washington residence. The instrument was specially designed and built for that gentleman, and is truly a magnificent specimen of the highest musical, as well as decorative, art. It is a full Concert Grand, the same in size and general outline as the famous Grand Messrs. Knabe & Co. furnished for the White House. The case is of rich and beautifully figured rosewood, decorated with inlaid work in white holly of unique and intricate design, carved out in the most artistic manner. Each panel has a groupe of different musical instruments, the whole surrounded by borders of fine marquetry work in leaves and flowers, &c. The legs and lyre are richly carved and decorated to match the body of the case, the whole producing a striking and at the same time most refined, esthetic effect. The tone is superb, striking the listener by its wonderful volume, depth and richness, combining with greatest power a most refined and mellow character and charming singing quality, the action and touch perfectly delightful to the performer by its ease and responsiveness. It is, indeed, a most wonderful instrument in every respect, and the Senator is to be congratulated on its possession.

The veteran seed-grower, Mr. J. J. H. Gregory, of Marblehead, Mass., issues this year a rare catalogue of the choicest products of the soil, containing many new varieties. Mr. Gregory's reputation for fair dealing and integrity makes the warranty given with his seeds of unmistakable value; and no grower, either for profit or pleasure, should fail to secure one of these catalogues, which are sent free on application.

We have received from the well known seed firm of D. M. Ferry & Co., Windsor, Ont., their ILLUSTRATED SEED ANNUAL for this year. A house with the national reputation that the above one possesses, and whose name is a household word from one end of the country to the other, needs no further introduction from us. By selling only the purest and best seeds, and by honest and courteous dealing, they are now the peer in their trade, catering annually to over six million people. Their ANNUAL is gotten up in a very artistic manner, and contains such information that every person should have it. By sending your name to the firm they will send you one, postage paid.