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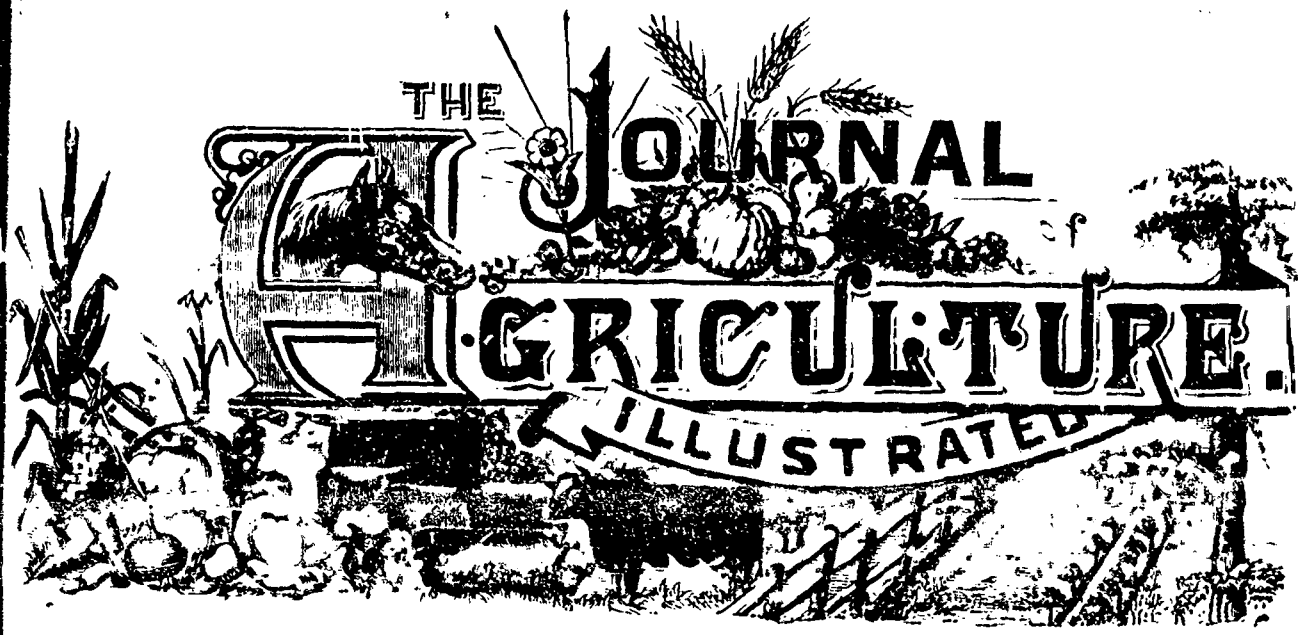

Published for the Department of Agriculture for the Province of Quebec, (official part) by
EUSÈBE SENECAL & FILS, 20, St. Vincent St. Montreal.

Vol. IX. No. 6. MONTREAL, JUNE 1887. $1.00 per annum, in advance.

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, Lachine, Qué.—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

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DE OMNIBUS REBUS.

Box 254, Sorel, Que.—
April 12th, 1887.

RELATIVE PRICES OF GRASS- AND CLOVER SEEDS IN ENGLAND AND IN CANADA.

England.		Canada.
Orchard Grass	19 cts.	25 cts —26 % dearer in Canada.
Perennial Rye Grass	4 "	10 " —150 % " "
Meadow Foxtail	35 "	35 " —same price.
Meadow Fescue	19 "	30 " —58 % dearer in Canada.
Fall Fescue	31 "	30 " —about the same price.
Hard Fescue	12 "	25 " —100 % dearer in Canada.
Clover, perennial (true cow-grass)	20 "	none —.....
Trefoil	8 "	25 " —217 % dearer in Canada.

The English prices I have taken from the list of a leading seedsman as published in the Agricultural Gazette. The Canadian prices are from Mr. Wm. Evans' catalogue. The chief points are the difference between the prices of the trefoil, the perennial rye-grass, and the hard-fescue. *Alsike* is the same price in both countries.

Expensive "hand-dressings," as the artificial manure were called, about one hundred years ago, were in great request in England All sorts of experiments were being tried, and the difference of action between the bulky farmyard manure and the "hand-dressings" was well understood. Woollen rags, rape-cake, soot, and a mixture of whale-oil and potash, seem to have been the chief supplementary manures. "These," says a writer, about 1774, "are in all respects inferior to rotten dung: when that can be obtained, every kind of manure must give place to it. But at the same time dung affords nourishment to the plants, it opens the pores of the earth. Hand-dressings, on the contrary, give food to plants, but contribute but little towards loosening the soil."

Broadcast sowers.—I was agreeably surprised, about a week ago, at the sight of sixteen broadcast-sowers, by Wisner, of Brantford, Ont., just delivered at the Sorel station of the South Eastern railroad, and addressed to different *habitans*, all living within a distance of five or six miles from this place. As three of them, on their road to Sainte-Anne de Sorel, passed my house in the afternoon, I had an opportunity of giving a short lecture to the purchasers on their use. I found, as I expected, that they had conceived the idea that all they had to do was to fill the seed-boxes with grain and grass-seeds, and, to use their own expression, "Hurra"! There was to be no harrowing or any other bother, but the work was to be finished by the time the sowing was done.

This is an utter mistake, and if the idea is to be put in practice, the latter end of these farmers will be worse than the former. It would be far better to continue to sow by hand and cover the seed with the harrows, than to trust to these machines to do the whole work. The two advantages possessed by the sower are these : the grain is distributed equally, and the grubber-teeth following inter it more deeply than can the harrows.

The land should be prepared for the sower just as it should be prepared for the drill. The harrows should thoroughly pulverize the furrows before sowing : how many *times* or strokes will depend upon the state of the soil, but it should be made quite free from clods, and equally worked all over. I have mentionned before that land properly harrowed should tread evenly, and if the foot be drawn across the ridges, it should meet with no impediment. Then, the land is fit for the machine, and a couple of strokes with the harrows, followed by the roller, at once on light land, and when the grain is about three inches high on heavy land, will complete the job.

If grass-seeds are to be sown, they had better be deposited after the grain is harrowed; as, otherwise, they would be buried too deeply. In this case, the grubber-teeth of the sower must of necessity be kept out of work. On heavy land, in an early season, I prefer letting the grain get well up—say four inches high—sowing the grass-seeds, covering them with a light, short-tined harrow, and finishing, as usual, with the roller. (1)

My friends evidently imagined that these sowers were going to save them a rare quantity of seed grain! Nothing of the sort. The same quantity must be employed whether it is sown by hand or by machine. It is a pity people will not learn to reason a little about these things instead of trusting to the assertions of interested agents. With the drill, which deposits the seed in rows, and at an equal depth, there is a saving of seed; but, where the grain is scattered abroad over the surface of the land, what difference can it make whether it is done by hand or by machine? There is too little seed sown to the acre already.

Nutritive ratio.—A correspondent wishes to know what is the rule for finding out the nutritive ratio of cattle-food. It is simple enough, provided you have the analysis of the food at hand : Multiply the fat by 2.4, and add the product to the carbhydrates, dividing the sum by the albuminoids. Thus supposing we want to find the nutritive ratio of a food containing, of albuminoids 3.19 %; of carbhydrates 12.71 %; of fat 0.75 %; we proceed as follows :

$$.75 \times 2.4 + 12.71 \div 3.19 = 4.5$$

and the nutritive ratio, therefore, of the food is as 1:4.5. Of course, the "digestible nutrients," as they are called, and not the whole organic substances, must be taken for this purpose.

Re-mounts for England.—I see by the papers that horses are wanted by the War-office in London for the English cavalry, artillery, and transport-service The American journals say that it is proposed to buy 3,000 here in Canada—if the suitable stamp can be found. This is encouraging; for many a man in Ontario has a good colt which he would be glad to sell at a fair price, and in this province, though we have very very few horses that would suit, there is no reason why we should not re-model our breeding stock. Canadians ponies are capital in their way, but it is not ponies that are wanted. Hambletonian trotters are not the thing either. The shoulder of the French Canadian is too upright by half, and the general run of horses in the Eastern Townships are cowhocked. A close-built, stocky thoroughbred would improve the former, and a Cleveland would give weight and power to the latter. But I suppose the intense prejudice of the farmers of both the French and English districts in favour of the American market, will prevent their making any attempt to alter the type.

(1) The arrangement of the grass-seed apparatus in the Wisner sower is very good. The seed falls *behind* the grubber teeth, and a rolling would be sufficient to cover it.

A. R. J. F.

Hand-feeding.—An old book on farming (1774) tells me a thing I did not know before : in Lincolnshire, England, it was the custom years before the date mentioned, to give bullocks at pasture oilcake in addition to their grass! A remarkable fact, showing that the modern English farmer is not so early a bird as he thinks he is, for the additional food on second-rate pasture is supposed to be quite a new idea.

Errata.—I knew I was about the worst proof-reader in the world, but I did not think I was so bad as to leave such stupid work behind me as the following errors : April number, p. 52, l. 17 from top, col. 1; for *sell* read *sells*, and same p. and col. line 15 from bottom, for "The small Belgian sort and the *petit tabac canadien* are the sort"; read "The small Belgian and the *petit tabac canadien* are the sorts." And the article is my own too, which makes it worse!

Lunar superstitions.—Some time ago, M. Chapais, in answer to a correspondent, expressed his opinion that if the land was well manured and cultivated, the moon had no influence on the crop. The querist had propounded the theory that potatoes planted, *crescente luna*, in the increase of the moon produced tubers, but if set in the decrease of the moon, *quando scema la luna*, all that resulted was haulm! Well, we have a good deal of these remanets floating about this part of the world still. Though the great Herschell, more than seventy years ago, showed that the moon had no influence on the changes of the weather, it is impossible to persuade the older *habitans* of the truth of his assertion. Pork, also, salted when the moon is waning, will not keep! So strong a hold has this reverence for our satellite upon the mind of the people, that the men who make a business of castrating stock in this village, positively refused to operate on three young boars belonging to M. Séraphin Guèvremont, unless he would let them wait until the apparition of the new moon!

Agriculturalist.— I see this word—six syllables—used constantly in the papers of the United States to express *a farmer* If we must use a latin word, why not take the old form, which may be found in many dictionaries, &c., of the last century, *agricultor*?

Insecticides.—I met with the following receipe for an insecticide the other day. It seems as if it might be useful. "Rectified oil of turpentine and alcohol, 4 oz. of each." Mixed with q. s. water, this ought to kill the cabbage caterpillar. Experiments would be needed to find out the proper point of dilution.

Bad seed.—A very progressive farmer from Saint-Roch, a station on the Montreal and Sorel railroad, which, I am happy to say, started into new life on the 14th inst., after four months' hibernation, asked me if I could account for none of his fodder corn germinating last season! The solution of the enigma was easy enough, the agricultural society to which the unfortunate belongs had bought kiln-dried

Western corn prepared for the distilleries. I recommended him for the future to buy his seed-grain from a responsible seedsman, if he could find none for sale among his neighbours.

Cabbages.—Another bad season for keeping cabbages out of doors. The rain in the early part of the winter got into the stores, and the moisture, having no means of escape, rotted more than three-fourths of the contents. But what can be expected when, in spite of all I can say, growers persist in piling up the cabbages 2½ feet high and covering them with hay? M. Séraphin Guèvremont lost from this piece of stupidity upwards of 2,000 good heads of St. Denis and Savoys, each of which would have sold for at least eight cents in the Sorel market = $160! He promises to be wiser next year.

Weather.—No chance of sowing for another fortnight, I am sorry to say. The snow is about half gone, and to-day (April 16th) a nice gentle rain is falling. Those who "don't hold with full-ploughing" will perhaps regret their folly when it is to late. Hay is getting dearer every day, and if May opens with morning frosts to keep the grass back, it will be at famine prices before turning out time. Treble the number of cows calved early this year about here compared with the state of things three years ago, when on this same day of this same month at Belœil I had to drink my tea without milk because there was not a drop to be got for love or money. (1)

Abortion in cows.—I observe, by the last number of the French Journal, that Mr. Barnard does not hesitate to keep the bowels of his in-calf cows open by a portion of linseed added to their usual food. Henry Stephens, in his "Book of the Farm," gives as the results of this experience that the best way to have an agreeable calving-time is to give linseed-cake to all down-calvers for a month before their time is up. I have always practised, and of course recommended, the same system. But Mr. E. W. Stewart, in the Country Gentleman, asserts most strongly that linseed, either in the form of cake or in the form of grain, causes abortion! If any *ergot* be present in the cake or grain given to the stock, I can easily understand abortion being the consequence; but that it should follow from the use of linseed in any form is to me utterly incomprehensible. It is much more likely to arise from allowing the mixed food to heat until fermentation ensues.

A correspondent of the English Agricultural Gazette complains that he has twenty-eight heifers which are slipping their calves. They are fed on chopped oat-straw and roots, with barley-meal, the whole mixed up together and *left to heat.* The editor, Mr. Morton, whom I have known for some forty years as a thoroughly practical man, advises the querist to alter the food; give hay instead of straw, and give the roots in a different form, *unheated.*

ARTHUR R. JENNER FUST.

Superphosphate.—It is really a thousand pities that the farmers of the United States will persist in calling a manure composed of phosphates, potash, and nitrogen, by the name of *superphosphate*, which ought to be applied solely to the mixture of phosphate of lime and sulphuric acid. Here, a man tells me that he put 200 lbs. an acre of *phosphate* to his turnips, and of course I have not the least idea of what he means. It is just as easy to use right names as wrong ones, and more particularly nowadays, when the whole agricultural world is so deeply interested in the investigation of the action of specific manures.

(1) Began sowing, with pease on a buckwheat stubble, April 29th. A. R. J. F.

Apropos to this subject, I remark a most cheering fact in the general devotion of English farmers of the present time to the practical proof of the truth of the experiments instituted by Lawes and Gilbert, Voelcker, &c., on the use of specific manures of different kinds. Oxfordshire, Norfolk, and thirteen other counties affiliated to the Bath and West of England Agricultural Association, have been busily employed in this pursuit for several years past, and the last report of the above society gives a most interesting report on the effect of certain manures on the wheat-crop. Superphosphate alone, and with nitrate of soda, nitrate of soda alone, and sulphate of ammonia, respectively, have been compared with one another, and with farmyard manure, one plot being kept unmanured as the "datum" line from which to read results. In some cases these results are extraordinarily good; in others they barely repay the outlay; and in several they have failed, not only in the agricultural sense, that is, to meet their cost, because of insufficient increase of produce, but in the scientific sense, i. e, to give any guidance or instruction, because of the untoward circumstances of the experiment.

The trial-plots are grouped in three divisions: in one case, where the general wheat-crop of the farm has yielded, unmanured, over 40 bushels without manure; and in two other cases, where the unmanured crop has been from 32 to 40 bushels, and less than 32 bushels, respectively. In the first group the nitrogenous manures yielded from 6 to 7¾ bushels extra—nitrate of soda *with* superphosphate being the best, while superphosphate alone did nothing. In the second, the increase was 4½, 2¾, and 4 bushels extra from nitrate of soda with superphosphate, from nitrate of soda alone, and from sulphate of ammonia alone; while superphosphate alone gave 1¼ bushel extra—all these per acre. In the third group, the average increase was 6⅔, 5½, 3½ bushels respectively, while superphosphate did nothing.

And the lessons the experiments seem to teach are these:

1. That even on land in high condition, it is expedient to apply a moderate top-dressing in the spring, whether of nitrate of soda or of sulphate of ammonia.
2. That superphosphate with nitrogen *may* be useful, especially if the land be in poor condition.
3. That superphosphate alone is, as a general rule, useless for wheat, except under special circumstances.

In all of which conclusions, the experiments carried out for the last 45 years at Rothamsted perfectly agree.

Live-weight and dead-weight.—A correspondent wishes to know: "what is the relative proportion between live- and dead-weight of bullocks and sheep?" In 1860, Sir John Lawes gave the results of elaborate and exhaustive experiments on the composition of oxen, sheep, and pigs: his conclusions are as follows:

Well bred and moderately fat oxen should yield 58 °/₀ to 60 °/₀ in carcase of fasted live-weight. Exceptionally fat oxen may yield from 65 to 70 °/₀. Moderately fat sheep should yield about 58·°/₀ of carcase of fasted live-weight, and excessively fat sheep may yield 64 °/₀ or more. Moderately fat pigs, killed for fresh pork, should yield, including head and feet, about 80 °/₀ to 82 °/₀ of fasted live-weight; large well-fattened pigs for bacon will yield a considerably higher proportion. Breed, age, and condition, must be all taken into consideration.

I doubt very much if the generality of horned cattle slaughtered for the Sorel markets yield more than, if as much as, 50 °/₀ of their live-weight. Old bulls never come up to the weight by eye, and the little Canadian cows set all judgment at defiance. By the bye, I have written to Mr. Guy Kerr to know if the Canadian cattle he exhibited at Sher-

brooke last September were sent to the exhibition as a joke or in sober earnest! (1)

Lambs.—One point should be carefully attended to in weaning lambs. They should never be kept too long in the same pasture. Dry, stale grass is one of the most efficacious foods for the production of diarrhœa in this species of stock Plenty of fresh water should be always provided for the flock. a practice too often neglected here.

Care of Cows and Calves.

Questions: How do you treat your cows during the last month of their pregnancy, and after their delivery? (1)

How do you treat the calves during the first month, and afterwards? (2)

Answers.—(1) We make no change in our system throughout the whole winter. Cows are always to be kept in good condition. We milk them, if possible, up to the very day of calving, as our butter is always worth 50 % more in winter than in summer.

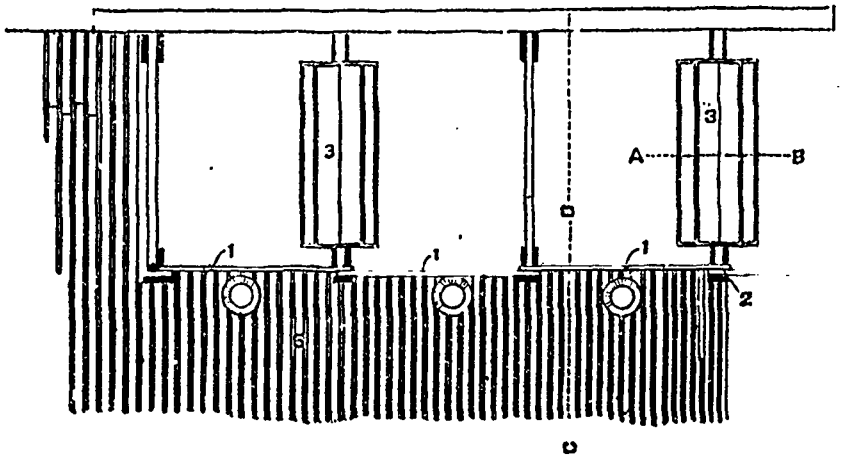


Fig. 1.

Before parturition, if the cows seem constipated—a thing that rarely happens with the warm and salted prepared food they receive—we should give them about a double handful of linseed boiled in plenty of water, and scattered all over the chaff.

If the cow has an inflamed udder, we should not be afraid of *partially* milking her, in order to diminish the fever and reduce the tension. This would give the cow great ease.

After calving, we proportion the prepared food to the quantity of milk given, always feeding with the view of obtaining as much butter as possible, profit being always borne in mind. Our rule is that the milk and butter must repay us for all the expenditure of food, leaving the dung as net profit. It is a good deal, to obtain the full value of all the cows eat, and to have the dung left as additional profit.

(2) The calves never see their dams. They are taken away the moment they are dropped; they are dried with a wisp of straw, and, if it is cold, covered with the same until they get on their feet of their own accord. As soon as they are thirsty, and not before, we give them the first milk of their dams, at the natural temperature, about 80° F. For the first three days, they have nothing but this for food, but afterwards, we daily replace one-twentieth of the new milk by the same quantity of skim-milk, so that by the twentieth day the calf receives nothing but skim milk. This is always given in sweet and warm state, and we add to it a small quantity of pease-soup to enrich that otherwise poor food. (1) Thus, after 23 days, the calf is fed on sweet skim-milk and soup exclusively. If the grass is sufficiently long to cut, we give a little of it every day to the calves in a small rack made on purpose; but if not, they receive the greenest, sweetest hay, at early, and made on purpose for the calves and lambs.

After the first month, this system of feeding is continued for two months and more, the quantity of grass being increased as required. I do not let my calves out before they are three months old; and even then care must be taken that they do not catch cold, or suffer in health from any cause. A calf soon falls away in bad weather.

My calf-stalls are placed above the manure cellar. Instead of the floor there is a grating, made of boards $1\frac{1}{4}$ x 3 inches, with an interval of an inch between the pieces of $1\frac{1}{4}$ inch. Thus, the calves are always dry, all the droppings, liquid and solid, passing through the grating. They receive no litter, except when just born and when they feel cold. The stalls are 4 x 5 feet, or 4 x 6 feet, when the width of the building allows of it. So the calves enjoy perfect liberty, and have plenty of room up to the age of six months. (2)

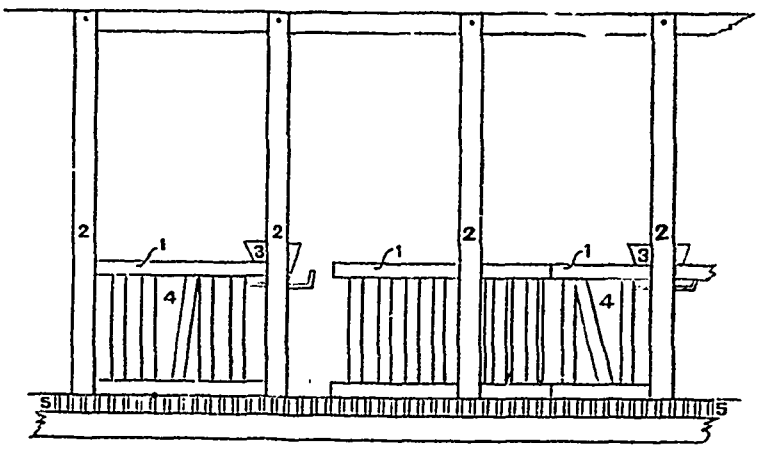


Fig. 2.

The accompanying engravings will enable the reader to make similar stalls if he please. We cannot too highly recommend their utility.

The ground-plan (5) shows the grating-floor. Every three feet, there are small

(1) And, I regret to say, Mr Kerr has not thought it worth while to reply. A. R. J. F.

(1) A little linseed meal too, please, Mr. Director. A. R. J. F.

(2) I cannot approve of calves standing over the manure pit. The smell of their dung while on milk is horrible in the extreme—almost worse than the dung of cattle fed on raw potatoes. Besides, there must be an up-draught of air through the slats, which would be likely to cause rheumatism. A. R. J. F.

blocks of wood to prevent the grating from separating. These are not shown in the cut.

(1) Movable gates sliding one to the side of the other, and kept in place by a board (2) fixed at the end of the divisions between the stalls, leaving the necessary distance for a passage between the two gates.

(3) A rack for hay or grass, with a box below to prevent the grass pulled out of the rack from falling and getting lost.

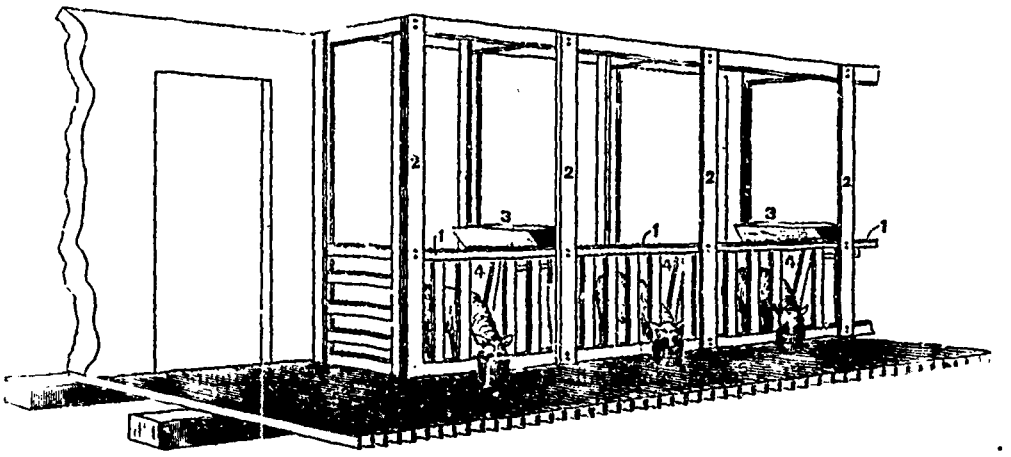


Fig. 3.

Roots, meal, &c., can be put into this box.

(4) A movable board which is lowered to allow the calf to get its head through to drink. The pail is placed in the passage so as to avoid being upset. (See article on this subject, December number, 1886, page 179.)

ED. A. BARNARD.

(*From the French.*)

Vetches.—I see that Mr. E. W. Stewart, in his book on Feeding Animals, states that, like clover, they will furnish pasturage on which sheep may be folded, at successive periods, during the whole season; v. p. 428. He may have seen such a thing now and then as a second growth of vetches, but as a rule it would not be worth moving the hurdles for. In all my experience, I never saw but one system pursued in England: the moment the sheep have fed off a part of the field long enough to admit the plough to work, their manure is turned under, and turnips, on light land, and rape on heavy land, are sown at once with a slight dressing of artificial manure. Mr. Stewart talks of sowing two bushels of seed to the acre. Three is the usual quantity, for winter tares, and when the large spring vetches are used, three and a-half. This is when tares or vetches are sown alone, which is seldom the case, rye being sown with them in the fall, and oats, or wheat when cheap, in the spring.

Reclaiming old pastures.—In another part of the Journal will be found a letter from Mr. Blinn, requesting advice as to his procedure in reclaiming an old pasture. He proposes to sow a mixture of permanent grass-seeds, and to harrow thoroughly with a Scotch iron harrow. He thinks ploughing would be beneficial, but dreads the expense of fencing.

Now, I have seen the above process tried several times on pastures like that Mr. Blinn mentions, but I never saw the slightest benefit derived from it, except that the harrowing certainly uprooted a good deal of moss. The seeds never grew, though many of them germinated, and the moss soon closed over the marks of the harrow-tines, leaving the land pretty much in the same state it was before. Had I a piece of old gravelly pasture that was what Mr. Blinn calls "bound out," by which I presume he means given over to couch-grass and other creeping weeds, I, provided always I could not afford time to bring it under proper cultivation, should proceed in something like this fashion:

For each acre, take ten bushels of quick-lime, turn them up carefully with twenty loads of earth, and early in the fall spread the mixture over the pasture. This, I have tried with perfect success on land of about the same stamp as Mr. Blinn's, only very much worse, I should fancy, as it was a black pea gravel, or, what is called in my country, "ohesil". After the

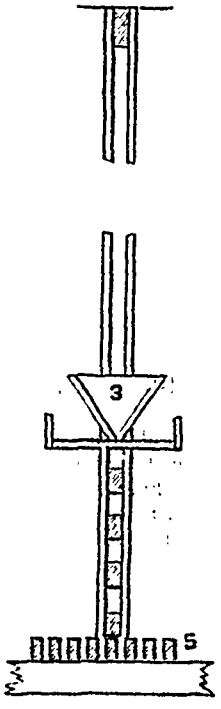


Fig. 4.

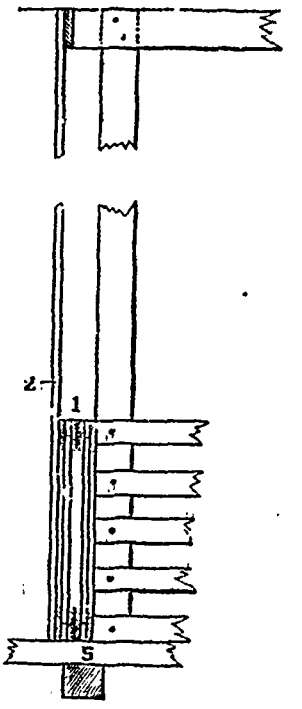


Fig. 5.

dressing, the moss disappeared, and the trefoil and white-clover came up as thick as the latter does, with a little encouragement, at Sorel—I cannot say anything stronger than that. If my correspondent will try the above plan, not by any means

omitting a good harrowing, I have no doubt he will find that next spring his "bound out" pasture will wear a more responsive face.

Measuring cattle for dead-weight.—There are several easy rules for finding out the weight of the four quarters of cattle by means of measurement. A beautiful little instrument is sold by the mathematical instrument makers which contains a tape, concealed in a case, and a dial with an index which gives the weight in *stones* of 8 lbs., in *stones* of 14 lbs., and in *scores* of 20 lbs. The conversion of the different weighs into hundreds of pounds is simple enough, but any of the dealers could arrange the dial to show centals. A good deal of judgment is required to determine the weight of an animal after all one's care in taking the measurements. I generally find that we must deduct at least 40 lbs. from the apparent weight of the little Canadian cows that are too often all the beef we can get here. The average hind quarters that were exhibited by the farmers this winter ran about 75 lbs! One of 100 lbs. was a rare thing to see, and they were most of them from cows that had produced several calves, so that had to be allowed for. A cow half-fat will require an allowance of at least 5 %, and another 5 % must be deducted if she has had two or three calves. Then again, almost all badly bred animals grow their fore-quarters heavier than the hind-quarters, and this must be judged of nicely, as the measurement must be taken close behind the shoulder. (1)

Value of turnips.—It is all very well to decry turnip-growing, because we are not accustomed to the cultivation of that crop, but it seems to me a curious thing that the people who are opposed to growing roots for cattle are the very same who see no salvation for the country except in beet-sugar! Had our farmers been accustomed to grow roots of any kind, they would not have found it so hard to grow sugar-beets at a profit. I have taken out the constituents of a crop of the following: oats, ensilage-corn, swedes, and potatoes, together with their value as reckoned by the great German analyst Wolf. The list stands thus:

	Albuminoids. lbs.	Carbhydrates lbs.	Fat. lbs.	Value. lbs.
Forty bs. oats.....	126	523	67	$14.11
Twenty tons swedes...	520	4240	40	64.00
do corn-silage	400	3300	80	52.00
Five tons potatoes.....	210	2180	20	29.00

We see by the above figures that a fair crop of swedes contains four times as much of the albuminoids as a good crop of oats; nearly 2½ times as much as a good crop of potatoes, and a 120 pounds more than an equal crop of silage-corn. I say a *fair* crop of swedes, for I do not call 20 tons an acre anything more than a fair crop. Again, taking the values, I find that the swedes are worth more than twice as much as the potatoes, 4½ times as much as the oats, and $12.00 an acre more than the corn. Reducing the fat into carbhydrates, by multiplying by 2.4, we have for the swedes, 4336 lbs. of carbhydates, and for the corn, 3552 lbs., an advantage of 784 lbs. on the side of the swedes. And all the extra cost of the swedes as against the other drilled crops, corn and potatoes, is the trifling expense of hoeing or rather singling, and surely we must allow something for the tops of the swedes, which often weigh from four to five tons an acre. Even to be ploughed in as green manure they must be worth something, and where sheep are at hand they are worth a good deal. (1)

(1) Girth in inches squared, multiplied by length in inches, and the product divided by .7238. gives the weight in stones of 14 lbs. Or multiply product, in feet, by 3.33: the former is a trifle more accurate than the latter. For instance, suppose a bullock measures 6 feet in length and 7 feet in girth; then, by rule No. 2:

$7 \times 7 \times 6 = 294 \times 3.33 = 979$ lbs.

By rule No. 1:

$$\frac{84 \times 84 \times 72}{7238} = 70 :: 14 = 980 \text{ lbs.}$$

Of course, practically, the example is absurd, as no bullock 6 feet long girths as little as 7 feet. A. R. J. F.

Hotbeds.—I knew very well that some of the market-gardeners round Montreal carried on their business on a pretty large scale, but I was not prepared to hear that one of them, at St. Henri, had made this year one hundred and fifty hot-beds, each twelve feet long by six feet wide! The frames would cover 12,800 feet square—more than a quarter of an acre—and the earth required to fill them only six inches deep would amount to 234 cubic yards, or about 320 loads. And, then, think of the snow-shovelling and sweeping necessary from the middle of January, through February and March!

The following experiments, and their results, are taken from an article by Col. Townley, a Lancashire landowner, whose name may be familiar to some of my readers in connection with "The Claimant." The yields are not large for the moist climate of that county, but as the experiments were conducted with great care, and the manure varied very much in kind, the deductions to be drawn are not without value:

	Manures.	Yield.	
No. 1.	Coal-ashes.....	211 bushels,	rather small.
2.	Stable dung and coal-ashes, mixed.....	344 "	very fine.
3.	Stable-dung alone	315 "	"
4.	No manure.....	134 "	very small.
5.	Compost and dung and lime, and night soil...	201 "	middling.
6.	Stable-dung covered with black-earth.....	438 "	remarkably fine.
7.	Soap-boilers' waste (*potash*)	383 "	very fine.
8.	Stable dung and lime..	268 "	tolerable.
9.	Lime alone.....	187 "	"
10.	Coal-ashes and lime.....	19 "	"
11.	Stable-dung and soap-boilers' waste (*potash*)	298 "	very good.
12.	Soot, night-soil, and coal-ashes.....	271 "	"
13.	Salt and night-soil.....	200 "	"
14.	Sawdust and coal-ashes	190 "	smaller.
15.	Sawdust and stable-dung	307 "	very fine.
16.	Poultry-dung and coal-ashes.....	236 "	pretty fine.
17.	Poultry-dung and sand.	156 "	rather small.
18.	Sawdust and lime	197 "	"
19.	Decayed rushes and lime	208 "	very good.
20.	Tanners' bark and lime.	76 "	very poor.
21.	Tanners' bark and stable-dung	141 "	rather larger.
22.	Tanners' bark alone...	35 "	very poor.
23.	Stable-dung and lime, spread over the land...	230 "	pretty fine.
24.	Chopped furze (*whins*) with lime	256 "	very fine.

(1) Senator Guèvremont is so well satisfied with his first attempt at growing roots last year, that he is preparing 5 acres of land for swedes, 1½ acre for Belgian carrots, and 1 acre for mangels.

A. R. J. F.

As my readers will observe, the manures mentioned above are all common manures, and to be met with everywhere. The words in italics are mine.

The best yield, 438 bushels, = 12 tons, was produced by a mixture of *black earth* or, as we call it in England, *bog-earth*, and dung: the mechanical effects of the former in lightening the soil, and rendering it permeable to the rootlets of the plant must be very great. In a bed of blown sand, on the same terrace on which Lincoln college stands, Francis Pulley, the college-gardener, succeeded last year in growing as perfect celery as ever I tasted. It was not over and above large, but it was crisp and well flavoured. I have no doubt that, in the same way, tomatoes would luxuriate in a bed of dung and black-earth, though I suspect the flavour of the fruit would not be improved thereby.

In both cases in which soap-boilers' waste was used the crop was improved by it, showing that potash was needed by the soil, though, strange to say, when used alone this waste answered best. The quality of the tubers was *very good* in the two instances.

Where poultry-dung was used alone—for I presume the sand, unless it was composed of shells, could have had no effect—the crop was very inferior; but, when mixed with coal-ashes the yield was 6½ tons; partly due, of course to the mechanical effect of the ashes in opening up the land. There is hardly anything in the manure line so overrated as the dung of poultry.

Phosphates.—"We might just as well call beef, mutton, and pork by the general name of *beef*," as to call commercial fertilizers by the general name of "*phosphates*." *Rural New Yorker.*

Crimson clover.—The *trifolium incarnatum*, or crimson clover must, like vetches (v. supra, p. 35), have utterly changed its nature since I used to grow it in England! The Rural New Yorker, in answer to a correspondent, says it may be sown in the spring, and will give three cuttings or two cuttings and a pasturing! It may be so, but I never saw it come again to the scythe after once mowing, and as for sowing in the spring, that would be rather throwing away its most valuable property, viz., that if sown on a wheat-stubble in autumn, it is one of the earliest of all the green foods to come to the scythe in the spring. It will not bear ploughing or even grubbing, but must be sown after a good harrowing and rolled in.

Root-fallen wheat.—"Upon a large part of our special fall-wheat plots the seeds were planted one each in the intersection of 10-inch squares. We now find that probably 90 % of these plants have been thrown out by the frosts of the spring and winter; thrown out as if they had been picked out by hand. On the plots when the wheats were sown in drills, the plants are sound and healthy." *Rural New Yorker.*

Now, the above is very curious and worth investigating. Does the superior resistance offered by the drilled wheats depend upon the greater depth at which they were planted, or upon the interlacing of the matted roots? As two of the "valued correspondents" of the Country Gentleman have lately been promulgated anew the worn out heresy of the shallow sowing of all kinds of grain, entirely forgetting the existence of the two sets of roots, the *germinal* and the *coronal*, I should be glad to hear the opinion of any of my readers on the subject.

"*Fertilizers.*—The establishment of a chemical station in connection with the central experimental farm would provide the means of thoroughly testing and establishing the value as a fertilizer of Canadian mineral phosphates, and undoubtedly aid in developing this important industry. Ashes are shipped in large quantities from Canada to the United States, where they are sold as a fertilizer, at a cost of from 25 to 33 cents a bushel. Canadian farmers hesitate to pay 10 cents per bushel. If the actual manurial value of ashes on farm and garden crops were demonstrated to our farmers, it is altogether probable that this useful article would be consumed at home.

A few years ago Canada had important belts of wheat lands east of Montreal. What has become of these? An indifferent and careless system, or lack of system, has prevailed in those districts; many crops of wheat have been grown in succession, and little or nothing done to replace the elements taken from the soil. This has led to its exhaustion to that extent that wheat growing no longer pays; a judicious system of fertilization and rotation of crops would doubtless restore the fertility of such worn-out lands."

Professor Saunders, in the former of the above paragraphs, strikes a note that ought to arouse the attention of many a torpid brain. That our farmers, in this province at least, are not willing to believe in the value of commercial fertilisers is one thing; but that they absolutely refuse to avail themselves of that very manure which, when they clear their land, they see with their own eyes work such wonders, is another. Even if the potash is not required by the heavy lands, the phosphoric acid must be always useful. I have grown a more than fair acre of white turnips with nothing in the way of manure but 30 bushels of hard-wood ashes—principally derived from elm. The ashes of the beech, however, are the most valuable of all, as far as regards phosphoric acid—the special food of turnips—for, according to Sprengel, while oak ashes only contain 1.9 % and Scotch fir only 2.8 %, the ashes of the beech contain no less than 5.6 %. And how often am I shocked, as I drive along the concession-roads, at seeing the spent ashes thrown away—the tobacco stems too—as if of no value, while, according to Berthier, the lixiviated ashes of the beech, though of course deprived of their potash, still retain 5.7 % of phosphoric acid.

Go into the sheep-farms in any of the southern and eastern parts of England, and there you will see every bit of turf round the borders of the fences cut up, burned, and mixed with dissolved bones or other artificial manures to be drilled in with rape or turnips. These being consumed on the land by sheep, a good crop of barley ensues, to be followed by clover or other grass, and that by wheat, no other manure than the dressing of ashes, &c., being required for the rotation.

And our *habitans* in the district round Saint-Hyacinthe and Saint-Césaire may well lay the observations contained in the latter paragraph of my quotation to heart. If M. Aries and the Hon. T. Chaffers can grow their 30 to 34 bushels of wheat to the acre, as I saw them doing last August, I see no reason why their neighbours should not raise the produce of their land to, at any rate, 24 bushels an acre. I am sure many an acre of it does not give 12 bushels. Even on this poor Sorel sand, Senator Guèvremont managed to screw 22½ out of the land last year, and the upper third of his wheat-field was bare down to the subsoil, not yielding much more than the seed.

Mangels.—Those who intend to sow mangels this season will do well to provide themselves with a certain amount of nitrogenous manure, in addition to the usual dose of farm-yard dung. It is worth knowing that superphosphate, whether in the form of dissolved bone-ash, Carolina rock, or apatite, though absolutely necessary for swedes, does not seem to have the slightest effect on mangels or sugar-beets. The following experiments are part of the work of Lawes and Gilbert in the

year 1871, after 15 years growth of swedes on the same land without manure. The last crop of swedes was 11 *cwts* to the acre!

SUGAR BEETS, AFTER 15 YEARS WITH SWEDE TURNIPS.

Plots.	Series 1. Season 1871. Produce per Acre (Roots trimmed as for feeding not for sugar.) Roots. Tons. cwt.	Leaves. Tons. cwt.	Series 2. Each plot as Series 1, and cross-dressed with 550 lbs. nitrate Soda. Roots. Tons. cwt.	Leaves Tons. cwt.
1.—Farm-yard manure, 14 tons	18 3	3 5	27 13	6 19
2.—Farm-yard manure, 14 tons, and 3½ cwt. superphosphate	14 13	2 14	25 16	5 15
3.—Without manure—1846, and since	7 11	2 0	22 3	5 12
4.—3½ cwt. superphosphate, 300 lbs. sulphate potass, 200 lbs. sulphate soda, 100 lbs. sulphate magnesia	7 11	1 5	22 15	4 8
5.—3½ cwt. superphosphate	5 12	1 8	20 19	3 14
6.—3½ cwt. superphosphate, 300 lbs. sulphate potass	5 1	1 4	21 5	3 13
7.—3½ cwt. superphosphate, 300 lbs. sulphate potass, 36½ lbs. ammonia salt	5 18	1 5	20 19	3 18
8.—Unmanured, 1853, and since; previously part unmanured, part superphosphate.	7 10	1 14	21 13	3 16

The firt thing that strikes one in the above table is the mystery, that land which, after growing swedes for 15 years consecutively without manure, refused to produce more than 11 cwt. of that root to the acre, should yield about twelve times as much of beets without any apparent reason for its increased power. Now, here, is a good example of the folly of trusting too much to analysis. Between the composition of swedes and beets there is, comparatively speaking, very little difference. What, then, is the cause of this discrepancy? It lies in a nutshell.

You have seen, my readers, *usque ad nauseam*, that the food peremptorily demanded by swedes is phosphoric acid, and more than once I have related the experiment of Philip Pusey in mangold growing, by which he showed that the desire of that root is for nitrogen. Here, the swedes, during their 15 years' enjoyment of the land, had, as far as we can judge, absolutely devoured the last atom of *available* phosphoric acid: available, I mean, by *their* power of assimilation. Then, come the beets, and making use of their superior powers, they seize upon a portion of phosphoric acid which the swedes had been unable to grasp, and, finding their loved nutriment in the 550 lbs. of nitrate of soda, they start into vigorous growth, yielding a full crop of 22 tons 3 cwt. (*v. series* no. 2). It will be observed that the dressing of nitrate of soda showed its effects most emphatically when added to 14 tons of farmyard dung, as well as when applied to land that had not seen manure of any kind for 15 years, adding no less than 9½ tons to the by no means trifling (18 tons) yield of the dung. This was not the ordinary straw-fed rubbish, but made in boxes, sunk two feet below the level of the ground, by fatting bullocks eating their fill of cake, grain, roots, and hay. In the 14 tons applied to the acre there were probably at least 180 pounds of nitrogen, but not in a readily assimilable state; whereas, the nitrogen in the nitrate of soda was ready to supply the appetite of the beet-plants at once.

Observe, too, that the plots manured with heavy dressings of mineral manures yielded even less, on the average, than the unmanured plots! Thereby, as far as beets go, absolutely upsetting Liebig's theory of manuring plants with their ashes being the true system of improved cultivation. You will see that to plot number 8 was added 36½ pounds of ammonia salts. This was done because in the chemical manures brought out under "Liebig's patent," which, by the bye, caused a dead loss to the shareholders of the whole of the invested capital, there was a distinct ammoniacal smell.

Will this style of work pay? Well, that depends: let us see. I take mangels to be worth at least $3.00 a ton, and sulphate of ammonia, at the gas-works, costs $70.00 a ton. The increase of, say, 7½ tons, at $3.00 = $22.50, and the cost of the increase = $14.00, i. e. 400 lbs. of sulphate of ammonia at $3.50, leaving a profit of $8.50, each extra ton of beets costing only $1.87, which the most obstinate anti-root-grower must allow to be cheap. And remember, please, that these experiments were made on *sugar-beets*, and mangels yield far better than they do.

Cow leech.—This is the old English term for *veterinary surgeon*, and a pretty brutal lot they were. Whatever disease attacked any of the animals of the farm, the cow leech, on being called in, immediately put in operation his round of remedies. He first administered a drench, then a clyster, then he bled the sufferer, and expected a cure! Well, that practice was bad enough, but a mere trifle compared with what came under my observation on the 22nd April.

M. Mongeon, the gaoler of Sorel, came to me with horror and dismay depicted on his face: "A cow ill?" said I. "Oh, yes," replied he, "very ill." I went to see the poor beast, and she was very ill, blowing like a grampus, and no wonder! A cow-leech had been to work upon her; he had not scrupled to employ heroic remedies; he bled her—about half-a-gallon—; he rubbed her throat and back with spirits of turpentine, till she could hardly stand for pain; he put bags of hot oats on her back, clothing her like a horse about to take a sweat on the eve of its preparation for a great race; the temperature of the stable, by the bye, was *only* 70° F.—he shoved a powder of unknown composition down her throat, and, to conclude, he cut off the end of her tail! I need hardly say that I explained my views on the matter pretty plainly, and retired from the horrid scene about as little in love with ignorance as ever I was in my life. My only wonder is that this M. Valois, did not put rowel, or seton, in the cow's dewlap, and after having bored a hole in her horn, he should have inserted a mess of salt and butter therein!

The following table presents a statement of the *real* and selling values of the principal brands of commercial manures employed in the State of Vermont. The remarkable points in the table are these: 1. That the manures are, on the aver age, 33 per cent dearer than they should be; 2. That the amount of nitrogen per cent is so absurdly small that it is no wonder that so many farmers in the States complain that they derive no benefit from chemical manure; 3. That the names of four out of the six samples convey no idea of the materials of which the manures are composed, and the names of the other are vague: *ammoniated bone superphosphate*, should be, *ammoniated dissolved bones*. The valuation of the constituents was made by the chemists attached to the stations of four different states, and ought to be pretty correct.

Now, take the first on the list, Bradley's X L Superphosphate, and just see what a quantity of it must be used to produce a crop of wheat, for instance. I should not expect much wheat if I gave the land less than 40 lbs of nitrogen to the acre: it would take more than 1500 lbs. of Bradley's manure to provide that amount, at a cost of $28.50! And so on for the rest.

Number of License.	BRAND.	Nitrogen.	PHOSPHORIC ACID. Soluble in Water.	Soluble in Ammonium Citrate, "Reverted."	Insoluble.	Available.	Total.	Potash.	Selling price for 2,000 Pounds.	Valuation of 2,000 Pounds at Station's Prices.	Percentage Difference between Selling Price and Valuation.
2	Bradley's X L Superphosphate	2.60	7.25	1.69	2.57	8.94	11.51	2.39	$38.00	$26.81	42
8	Standard Fertilizer	2.65	6.19	2.89	2.62	9.08	11.70	2.12	37.00	26.89	37
11	Bowker's Hill and Drill	2.91	7.60	2.73	1.25	10.33	11.58	1.49	38.00	28.47	33
12	Buffalo Ammoniated Bone Superphosphate	3.23	7.34	2.60	1.51	9.94	11.45	1.69	38.00	29.27	30
18	Americus Ammoniated Bone Superphosphate	2.70	7.14	2.74	1.24	9.88	11.12	3.01	38.00	28.28	34
22	Quinnipiac Phosphate	3.42	7.31	2.90	1.42	10.21	11.63	2.33	38.00	30.95	22

CORRESPONDENCE.

In your January number, you kindly give us one of Sir J. B. Lawes' tables, which tells us that oxen, sheep and pigs void about 95 % of the food they consumed. 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 or 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 fœtus 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 farm-yard 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 many of our farmers treat their manure. They simply throw the solid excrement and what little of the liquid may be retained in the litter in a heap in their yards, to be bleached by the sun and leached by the rain, till they are ready to use it on their land. They then spend both time and labor in spreading this, that 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 fertiliser. To those who sell cattle or horses, or fatten beef for amusement—I question if there is any profit in it in this province—to buy cotton-seed meal, or linseed, 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: he told me that he had found it impossible to raise roots successfully without the use of concentrated manures, even if they cost him $50 p. 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, as it will require no extra capital; and although it may seem costly, a small quantity goes a long way. It is more easily applied to the land than farm-yard 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 managed. 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,

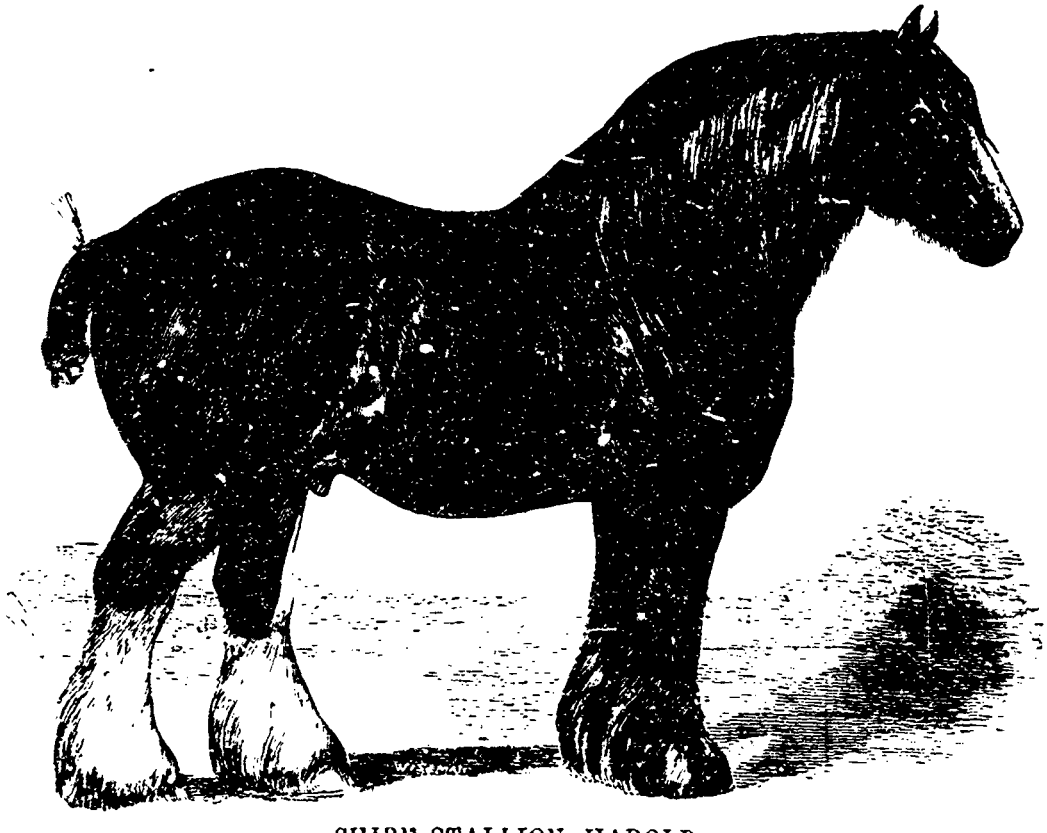
ARTHUR R. JENNER FUST.

at any rate, a little can be used profitably in conjunction with dung, so as to insure a quick start.

Before closing I should like to advise your readers that, as the value of different fertilizers varies so much with different soils, it would be well for them to make limited trials of different sorts before deciding what is best suited to 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 fertilisers than he can afford to harvest his crops in the same way as his grand-father did a hundred years ago.

Fairfields.



SHIRE STALLION, HAROLD.

Neither Libeler nor Theorist.

The *New England Homestead* copies our recent remarks on the Dutch cattle, known nowhere except in America by the name of "Holstein," and not brought from Holstein, but from their native Holland. It heads the article "A Libel on the Holstein-Frisians," and adds:

We think Dr. Hoskins is gravely in error in some of the above statements It is true that many cows of this breed yield thin milk, but they possess grand and sterling merits, or they would not have become so remarkly popular as they have in such a comparatively short time. We propose to thoroughly investigate the adaptation of this breed to the rough farms and cold climate of Northern New England, and if the verdict agrees with Dr. Hoskins' theoretical opinions, or emphatically disagrees with them, we shall have performed an important service to our practical farmers who find it so necessary to invest only in the stock best adapted to their wants. We therefore call upon all farmers and breeders on the cold and rough farms of Northern New York and New England, including Berkshire county, Massachusetts, to favor us with a brief statement of the facts learned by their own experience with this breed. We particularly wish to hear from those who have given up this breed after experience with it.

The editor of the *Homestead* calls our statement a libel, calls on its readers to furnish the facts to show whether our "theoretical opinions" are true or not, and then puts in a claim in advance for doing an "important service to practical farmers" if its readers back up our "libel." We submit to an intelligent public whether, in that case, it is not the WATCHMAN, rather than the *Homestead*, which will have done the "important service,"—or is nothing ever known until the *Homestead* knows it? Our "theoretical opinions" are formed upon a twenty years' knowledge and observation of these Dutch cattle and their grades. We know of no practical farmer that has attempted to breed and keep them for dairy purposes who has ever been able to convince his neighbors that they are profitable stock on our hill farms, either for the dairy or for beef. Rich breeders and importers in New York and Pennsylvania have been booming them for years, but where are the "Holstein" butter or cheese dairies to be found? The breed is no novelty. It has been known in Vermont for over sixty years.

Dr. Hoskins.

Sawdust as an Absorbent.

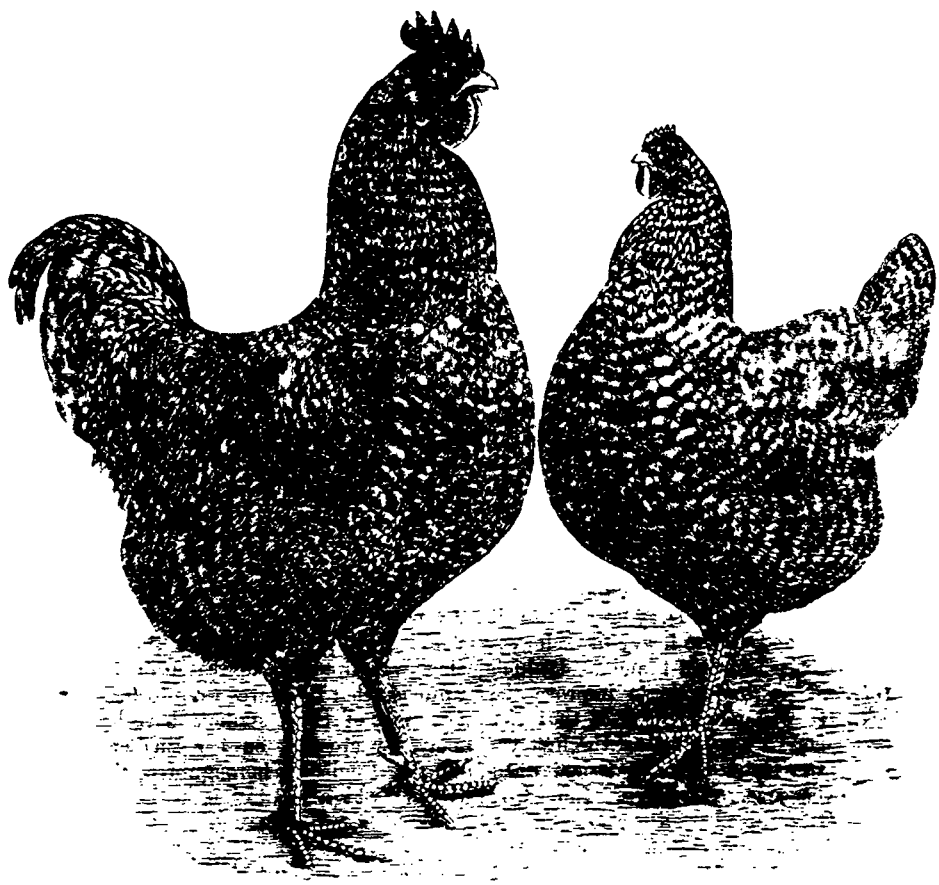
A correspondent of the *Mirror and Farmer* tells a bad story about sawdust. He says that on the farm of T. W. Pierce of Topsham, Mass, where "are kept one hundred head of cattle and twenty horses, they had used until within

two years one hundred cords of sawdust annually for litter. In connection with this farm is an extensive greenhouse. For a long time there had been great difficulty here in the propagation of plants. They failed to produce vigorous growth, became stunted and nearly void of vitality. One manager after another would be tried, with always the same unfortunate result. Finally a new man was obtained who reversed the order of things. His first observation was: "The sawdust in the manure is killing the plants. It propagates fungus and vermin." By his order the plants were taken up and all the soil removed from the greenhouse. New soil was substituted enriched with manure uncontaminated by sawdust. The plants were then put into this and the result was they at once sprung into new life, and for rapid growth and elegance of bloom this greenhouse has since then had no superior. Upon the result of this experiment the use of sawdust on the farm was abandoned; for, it was argued, if manure impregnated with sawdust would destroy the growth of plants in the greenhouse it would have a corresponding effect on vegetation wherever applied on the land. Loam and sand, therefore, were substituted for litter for cattle, with straw for the stable."

We cut the above from the agricultural department of the Brattleboro *Phœnix*, the editor of which remarks as follows:

Sawdust is extensively used by our farmers for bedding cattle. For that purpose it is one of the cleanest articles that can be found. A cord of hardwood, sawdust contains ten or fifteen cents' worth of mineral fertilizers; not nearly so large a quantity as an equal weight of straw or refuse hay such as is not used for litter; but it costs little or nothing except drawing, is cleanly, and is much used in the stables of farmers in this neighborhood. If it is as injurious to manure as this writer represents, the fact should be better known. A few have always believed it had a bad effect, while others have thought that it was of some value of itself, besides its value as an absorbent and as a divisor of the solid portion of the manure. Carefully-conducted experiments are needed to test its effect.

Well, Brother Howe, we have been conducting just such experiments for a great many years. Mr. Pierce, like a good many fancy farmers—and a good many, too, who are not—is too hasty in jumping at a conclusion. He commits the very common error of generalizing from too small a collection of facts, or rather from a single fact. (By the way, there is no "Topsham" in Massachusetts, but perhaps Mr. Pierce lives in Topsfield.)



PLYMOUTH ROCKS.

The same trouble that Mr. Pierce's gardener experienced from the sawdusty manure he would surely have experience from any manure containing vegetable matter that had not been sufficiently rotted. Most sawdust rots much more slowly than straw; but when thoroughly rotted it is as safe for the propagating bench as any other form of mould. We suppose that the fact that the wood is cut into fine bits by the saw is in itself no objection; in fact, it is an advantage, for "chip manure" is much worse to "propagate fungus and vermin." And yet everybody seeks for "wood's earth" to use as a constituent of potting mould, and what is wood's earth but rotten wood? But it is thoroughly rotten. As to sawdust for bedding in stables, we have used it most profuly for twenty years, and on field crops have never seen anything but

good effects from it. Mixed with the soil, spruce sawdust rots very quickly, and entirely disappears in a few months, so that the grains cannot be washed out from the soil or distinguished under the microscope. But sawdust of hemlock and hard-wood does not decay so quickly. When heavy dressings of fresh sawdust manure are plowed in, the abundance of cut-warms and wire worms ("vermin") will mark the spot, and on a heavy soil, or even on a light one in a wet season, fungoid growths will attack vegetation growing there. On the benches of a propagating house, with its bottom heat and moisture, the evil from the use of such manure would be immensely increased, and "damping off," "stunted growth" and "lack of vitality" would indicate the incompetent stupidity of the propagator, who in using such manure would simply show that he did not know his business. The slower the decay of the crude vegetable matter of manure (be it straw, sawdust, or the partly digested food of animal dung), the longer it should be composted before using on the propagating or the potting bench, or in hot beds or cold frames. Unfortunately, a great many men who pass themselves off upon unskilled employers as "gardeners" are densely ignorant of the elementary principles of science as applied to garden work, and the more ignorant they are the more ready they are to lay the blame of their own failures to the manure, the sand, the loam, the water, the fuel, the furnace, the house, or anything rather than to their own thick-headed ignorance.

Dr. Hoskins.

SHIRE HORSES.

The Shire and Suffolk Punch are the only breeds of agricultural or heavy draft horses that attract attention now-a-days in England. The latter has long been quite popular in the county from which it takes its name, and in the adjacent districts as well as in London; but of late the Shire, larger, slower and somewhat more unwieldy, is advancing faster in public favor. It is a composite breed, made up in recent years of selections from choice specimens of the old English Black Cart-horse and the Lincolnshire Dray-horse, and it contains a great deal of the blood of the heavy draft horses of Normandy and the still heavier horses of Flanders,(1)which were imported into England for centuries to improve the native agricultural stock. It was not until 1879 that the Shire Horse Society was formed in England, and the first volume of the Stud-Book of the breed was not issued until February, 1880—a trifle over seven years ago. Indeed, it may be said that the Shire Horse breed is still to some extent in a formative stage. Although the eighth volume of the Stud-Book has lately been issued, few of the entries in many of the books can trace their genealogy back for more than half a dozen generations. Some of the most prominent horse breeders in the country, however, among them several of the nobility, have lately taken a decided interest in the race, and are rapidly improving it.

The Shire is certainly the largest horse in the world. At the age of two and a half years the colts are often 17 hands high, and full-grown horses frequently reach the elephantine height of over 18 hands. In London, Liverpool and other large cities these horses are employed chiefly by brewers, coal dealers and others engaged in heavy traffic, and strung out, tandem fashion, they present a splendid appearance as they move slowly and majestically along. They are usually of a sooty black color with frequently a white lozenge-shaped mark on the forehead or a "blaze" on the face. They generally have one or more feet and part of the legs, and not unfrequently the muzzle, white. Their bodies are massive, compact and round; their limbs stout; chests extremely broad, and necks and backs short. The mane is thick and generally somewhat frizzled; and the legs below the knee and hock are hairy down to the heels. The main defects of a Shire horse are his enormous bulk, his slowness, and want of action and mettle. The owners of these horses take special pride in their size; hence breeders employ large stallions and use every other means to favor the development of great size. They are most extensively bred in Derbyshire, Lincolnshire, Lancashire, Yorkshire, Oxfordshire, Staffordshire and the other central counties of England.

Within the last half dozen years considerable importations of Shire horses have been made to this country, chiefly to the Mississipi Valley, where they are growing steadily in popular favor for use both between the shafts and before the plow. Steps have already been taken to secure the early publication of a Stud book for the breed in this country, and a society has been organized for this purpose, with Charles Burgess, Winona, Ill., as Secretary. The largest and most unwieldy kinds are not the favorites here, however. Americans seldom want horses over 16.2 hands high, and those that can trot with their wagons are preferred. We also as a rule prefer clean-legged, clean-jointed animals; with a good deal of spirit.

At page 90 is a likeness of the Shire stallion Harold, the winner of the Champion prize, valued at 100 guineas, for the best animal in the show, at the late Shire Horse Exhibition at London, England. He also won the prize of 20 guineas for the best stallion in the first three classes, and the 50 guinea prize for the best stallion. He is six years old, and is acknowledged by all to be the finest specimen of the breed now in existence. At the show there was a brisk trade in Shire horses, several of the prize-winners being sold at prices ranging up to 600 guineas—$3,060. Large prices are also paid for the services of choice stallions for stud purposes. The second prize-winner at the late London Shire Horse Show was hired for the season for 300 guineas ($1,532),with a proviso that 80 mares were to be served. Considerable exportations of Shire stallions have been recently made to Germany, for crossing on her smaller agricultural horses, and, like the English Thoroughbred, the English Shire Horse is winning a high reputation on the continent.—*Ex.*

(1) The Norman horse was the *destrier* of the knight. As he probably weighed about 11 cwt., and carried a man in armour, to say nothing of the war-saddle and his own steel appendages, it may be easily divined how far the romances may be trusted when they describe the two cavaliers as "clashing together like lightening from the clouds." A R J F.

POULTRY YARD.

PLYMOUTH ROCKS.

M. R. P. H. Scudder, a sound poultry authority, writes us that many agricultural journals complain that too much attention is given to the fancy qualities of poultry, such as the shape and carriage of the head, comb, and tail, and too little to plumpness of breast, lack of offal and of egg-producing capacity. We think that those who examine the fowls shown at page , will admit that in the ideal Plymouth Rock of to day we have the offal parts reduced to a minimum, while the meat-bearing portions are developed to the highest extent. Who can doubt that the introduction of such a male as that shown in the picture, into any ordinary poultry-yard would result in a lot of fowls with a far greater development of breast and meat-bearing capacity than their parents? Mr. Scudder estimates the annual poultry crop at $600,000,000. What would be the gain to poultrymen if one pound could be added to the weight of each chicken, and one dozen of eggs added to the laying capacity of each hen? This can be done, and it can be done only in one way; by the proper introduc-

tion of thoroughbred males, selected for the end in view, eggs or meat.

It is claimed that the Plymouth Rocks still stand at the head of the poultry world as every day farmers' fowls. There are periodical "booms" ... all kinds of stock, but sooner or later business swings back to the best, and the "boomed" stock drops back into its place. By glancing over the entries at poultry shows or the advertising columns of poultry papers, it will be seen that the Plymouth Rock leads all other breeds of poultry in numbers and wide distribution. The hottest competition at shows is always found over Plymouth Rocks. A year or two ago the Wyandottes rivaled them, but now these latter fowls are gradually falling back to a second place. The P. R has been tried in every part of our country, and when properly cared for, never found wanting.

Mr. Scudder has hatched, in an incubator and raised in a brooder, P. R. chicks which, at 11 weeks, weighed 7 pounds live weight per pair. Pure-bred fowls will average nine pounds for males, and seven pounds for females.(1) The mongrels found on many farms will not weigh over seven and five pounds, as has been found by repeated weighings, and the same food fed to the pure-breds and the mongrels will produce these different results. It is charged that fanciers attain their results by stuffing their poultry with all kinds of rich and stimulating foods. This is a very mistaken idea. Any fancier who followed such a plan would soon reach the end of his rope. Breeders of fine poultry simply aim to give their birds enough to eat, and see that they are forced to drink clear water and take plenty of exercise.

Little things about the farm betray the character of the owner. There is a good deal in the appearance of a farmer's poultry. A neat, well-kept flock shows that the owner of the farm is a man who can take pleasure in the beautiful and thoughtful phase of country life. American farmers are too apt to lose sight of the fact that there is something to be done in this life besides eternally grinding out dollars and cents. Flowers, trees and all other beautiful things have their legitimate place on the farm, and where one can combine beauty and utility in any implement or animal it is duty to do so. Let us improve our flocks of poultry.

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(1) In 1852, my Dorking pullets, 9 months old, averaged 18 lbs. the pair. They were *not* bred for feather. A. R. J. F.

Introduction to Lynch's "Scientific Dairy Practice"

BY PROFESSOR L. B. ARNOLD,

Dairy Lecturer at Cornell University.

THE SETTLED PORTIONS OF CANADA are perfectly natural to grass, which is the basis of food for the dairy; all kinds of grass flourish within its borders. If the winters of Canada are long and severe, requiring careful housing of stock, the short summers are hot and stimulating to vegetation, and are more abundantly supplied with refreshing showers than are the longer summers of lower latitudes. All these conditions conspire to force a rapid and luxuriant growth of forage plants, which makes them succulent, sweet, rich and tender, and easy of conversion into larger yields of high-flavored milk. With plenty of such food, a salubrious climate and an abundance of pure running water, Canada furnishes a natural home for the dairy, and one that is nowhere excelled on the continent.

But, while the character of dairy products is moulded, to some extent, by peculiarities of soil and water, and by climatic influences, variations from these causes are slight, in comparison with variations due to *difference of skill in manufacture*. The natural advantages, while essential, are not alone enough to guarantee success; more depends upon the manipulation of milk into desirable forms of human food. The history of the Canadian cheese industry furnishes a good illustration of this fact. In its early years, with the best of milk, it struggled at the foot of the ladder. Less than ten years ago it was occupying a position confessedly inferior, as compared with American cheese. By a system of personal instruction, fostered by the hand of a generous government, and energetically directed by intelligent dairymen, the superior skill of the few was so far extended to the many that the cheese product of the country has now, in so few years of such effort, assumed a commanding position, and to-day leads American cheese in the markets of the world. I speak knowingly, and with the pride and satisfaction of one who has been actively concerned in the initiatory work of this great improvement in the character of Canadian cheese.

Milk of a quality to make superior cheese will also make superior butter. With the same fostering care extended to the butter-wing of the dairy which has been extended to that of cheese, there is no reason apparent why it should not reach a similar eminence and magnitude. The butter branch, however, cannot be so easily reached, nor reached in the same way. The cheese product is all made in factories, which are large centres of manufacturing, and can be easily reached for purposes of instruction. Butter-making in creameries, so far as it goes, is similar to cheese making in factories, and could be improved by similar means. But the great bulk of butter is, and must continue to be, made in private dairies, which are, too broadly scattered and too numerous for all to be reached by personal visits of public instructors. They must be reached in some other way. How best to do this has been

a problem. What the future may evolve is not easy to say, but it does seem that perhaps the very best means in present view of reaching the class designed is the plan of sending to the homes of private dairymen a plain and concise explanation of the latest and most approved methods of butter-making, as suggested and carried out by the author of "SCIENTIFIC DAIRY PRACTICE."

While regarding, as I do, butter-making as a very practical operation, bordering even on empiricism rather than on science, I cannot go so far as Mr. Lynch in making it a science. I take great pleasure in expressing entire approval of the general character of Mr. Lynch's book, the correctness of its teachings, and its adaptation to the mission it was designed to fill. I would here direct the attention of the reader to the description of the latest methods of separating cream, and to the distintion pointed out between ripening cream and souring it. I would especially call attention to the new method of washing butter in the churn in GRANULAR FORM, instead of gathering it in large masses, filled with butter-milk; also to the still newer process of salting butter partially or wholly with brine, instead of with dry salt alone—these methods enabling the operator to avoid entirely the injury done to butter in working it in the old-fashioned way. These are points of great importance in the production of fine butter, and their explanation has been made so plain as to make it easy to follow out the methods.

The pleasure of eating butter equal to the finest in the world, and the advantages in developing a large and profitable import trade in butter, is within the grasp of the Dominion! It may be brought about by intelligent and persistent efforts in educating the butter-makers of the country.

In the effort to enlarge the butter interest, it would seem desirable, rather than turning into butter the milk now made into cheese, to keep more cows and so reduce the area of grain for export; with a view not only to greater profit, but to increasing the fertility of the soil, in place of exhausting it. Selling butter, if the manure and by-products of the dairy are properly cared for, exhausts the soil of nothing, but leaves it to grow richer by the steady decomposition of its plant-food previously insoluble.

Not so with grain. An acre of wheat, for example, producing 27 bushels, exhausts the soil of the weight of one of those bushels in ash and nitrogen that at present prices would cost over seven dollars to restore to the soil, to leave the soil in as good a condition as it might be left by butter production.

When the apparent income to the farmer from the sale of butter and grain are equal, it ought not to be difficult for a farmer or a statesman to decide the production of which it would be wiser to encourage. L. B. A.

Rochester, N. Y., May 2nd.

Quebec, 12 May 1887.

Dear Mr. Lynch,—I am really sorry I could not before tell you how pleased I was in reading your book on Scientific dairy practice. It is truly invaluable. There is in fact so much in it, in very close type, that I have not as yet found time to *digest* it all, but I have seen enough to be sure that it is the best I have had the luck to read so far.

It is a work that as should be found in the hands of every dairy farmer worthy of the name.

Wishing you every success, believe me

Yours very truly,

ED. A. BARNARD.

I hope to review Mr. Lynch's valuable contribution to the dairy industry in next month's Journal. A. R. J. F.

The Potato Rot.

A correspondent of the *Gardener's Monthly*, vouched for by the editor as an expert, claims that the diseases of the potato come from the immense strain to which it has been subjected in the shape of gross feeding, high cultivation, unnatural treatment, and all the greed of the exacting cultivator with his determination to have the "last pound of flesh." The writer thinks that if we were to treat in a similar way any other like kind of vegetable that is propagated by the bulb or tuber—such as the tulip, the hyacinth, or the narcissus—pretty similar results would follow. "In fact all vegetables and animals, when pressure is put upon them like it is upon the poor potato, must, "like riding a free horse to death," finally succumb to its treatment; for all ought to be impressed with the important lesson that if we break nature's laws we certainly shall, sooner or later, have to pay the penalty." This may all be true; but if it be culpable in a farmer to raise as large crops of potatoes as he can, how is it with other crops? As for ourselves, we do not believe that the above quoted theory will bear investigation. Potatoes rot under poor as well as high culture, and we have been assured by a good authority that disease affects even the wild potato, at times, just as the black-knot affects the wild cherry.

Invisible Cream.

A writer in the *Rural New Yorker* makes the following pertinent query, which we commend to the attention of our friends of the *Homestead*:

Will those apostles of the Holstein Frisian breed who keep talking and writing about the unchurnable butter-fat or "richness" there is in their milk which, because of the minuteness of the butter globule, as they allege, will not rise when the milk is set for creaming, but, which they allege, is utilized when the milk is devoted to cheese-making, explain how it comes to pass that the Massachusetts official chemical analysis of Holstein milk yields only 3.29 per cent of fat, while the Massachusetts Jersey milk yields 4.34 per cent? The story about there being elements in milk that vanish in the hands of a chemist and a butter-maker, and "materialize" in the hands of a cheese maker, is good "flap-doodle to feed fools with" Square honesty is the best policy. If neither a common churn, nor a chemist, nor an oil test churn can make butter fat "show up" in "common scrub" proportions in Holstein milk or cream, how metallic is the "check" that assumes that in some charmed way it puts in an appearance in a cheese!—as though rennet had more than mortal power to evoke something out of air, to abstract something from nothing!—(*Wait a little.* A. R. J. F.)

Clover Sickness.

BY SIR J. B. LAWES, LL. D., F. R. S.

EDS. COUNTRY GENTLEMAN—The valuable article on clover sickness by F. P. ROOT which was published in your paper of Feb. 3d (p. 84) establishes the fact that in the soils of the United States, as in the soils of Europe, clover sickness prevails wherever clover has been grown too long, or been too frequently repeated. The author describes the results just as they occur elsewhere. First, the benefit which the wheat derives from the growth of the clover; then the benefit which the clover derives from plaster, and finally, the inability to grow clover, which is followed by bad crops of wheat.

Considering the immense difference in the amount of fertility which is found in different soils, it is not surprising that those who farm in the most favored localities are sceptical in regard to the failure of the clover plant. Having farmed all their lives without having experienced any failure, they see no reason why disease should ever occur. The cause

of clover sickness has attracted almost as much attention as the source of the nitrogen in plants, and, as far as I can see, both are likely to form subjects of inquiry for a long time before the final solution of the problem will be arrived at. Although clover sickness has occupied our attention almost from the commencement of our experiments, for a long time we hardly advanced beyond the fact that no combination of manures, natural or artificial, would cause clover to grow upon land which was clover sick. Of late years, we have gathered two or three scraps of knowledge which have enabled us to mount a step or two up the long ladder on the top of which is the problem.

In the first place, we have grown red clover continuously for 35 years upon an old garden soil without the application of fresh manure. The soil and sub-soil to the depth of 18 inches was exceedingly rich in nitrogen, and it is evident that dung in large quantities had been trenched to this depth into the soil. The top soil has lost an enormous amount of its nitrogen, but it is still very much richer than the soil of the farm. The sub soil, in fact contains much more nitrogen, even now, than the surface soil of the farm. This large reduction in the fertility of the surface soil is contrary to what takes place when red clover is grown on the farm, although the crops grown are made into hay and carried off the land; and even when the roots of the clover are, as far as possible, picked out of the soil, we still find an increase of nitrogen to have taken place.

Although the crops of clover grown on this garden soil are equal to, if not larger than, those grown on the farm, they are very inferior to those grown in the earlier period of the experiment. At first the clover did not require to be re-sown for four or five years, now it is re-sown every alternate year. We have evidence here that, while red clover has been grown for 35 years without the appearance of disease, on the farm it is hardly safe to repeat the crop until from eight to twelve years have elapsed since the previous crop was grown.

We have a field which has been under experiment for nearly 40 years. Part of this field received no manure during the whole of the period. Another part received mineral manures (phosphate and potash), and a third part has been very highly manured with rape cake, salts of ammonia, and minerals. Turnips are grown, or rather an attempt is made to grow them, every fourth year, but the unmanured turnips grown with mineral manures yield 8 or 9 tons per acre, and the highly manured turnips yield over 20 tons per acre. Upon one half of each experiment all the turnips are carried away, and on the other half they are cut up and plowed in. The wheat, barley, and clover or beans which are grown during the other three years of the four rotation crops, are all carried off.

The soil which has only received mineral manures, and from which the turnips, as well as all the other crops grown, have been removed from the commencement of the experiment in 1848, must be, so far as organic matter and nitrogen are concerned, in a very impoverished condition. Where the turnips were plowed in once in four years, the condition of the land would be a little better, while upon the highly manured land the soil must be full of fertility, with where the turnips are removed and where they are plowed in, and in the latter case the fertility would be much the greater.

In 1874, and again in 1882, we grew crops of red clover over the whole of this land which was under experiment. In both years the crop was very large. Upon the highly-manured plot it amounted to 4 tons of clover hay each year; upon the land receiving minerals it amounted to nearly 3 tons each year, and upon the unmanured land it amounted to rather more than 1¼ tons each year. We now decided to take a crop of red clover again in four years. Wheat was grown in 1883, turnips in 1884 and barley in 1885. The clover was sown in the spring shortly after the barley. There was a very good plant upon all the plots during the autumn and winter, but in the spring disease began to show itself on both the highly-manured plots, being rather the worst where the turnips were plowed in. As is usual in these cases, the plant died off, bearing bare patches. Sometimes considerable strips were not attacked, in which case the plants that remained were very strong and vigorous, and the yield of hay in two cuttings amounted to 1½ tons per acre. It is probable that more than one-half of the crop was destroyed. On the two lands which had received mineral manures, and where the turnips and all the other crops grown had been removed since the experiment began, there was no disease whatever. On the portion where the turnips were plowed in there was some slight disease, though the crop appeared the most vigorous of the two; the yield, however, was slightly below the other, as the first yielded 2 tons 2 cwt. of clover hay per acre, and the other 2 tons 4 cwt. per acre. Upon the unmanured portion the plant may be said to have died of starvation, plantain and coltsfoot having taken its place. The plants that remained were barely high enough to cut with a scythe, and the whole produce, including the weeds, amounted to only half a ton per acre in the two cuttings.

The interest of the question lies now in the two manured plots. For all practical purposes the fertility of the unmanured land has been so much reduced by the removal of thirty-eight crops, that it has ceased to grow either turnips or clover. If we compare the condition of the land where there was no disease, and where the disease was the worst, we find that where there was no disease, no organic or nitrogenous manure had been applied, and all the vegetable matter grown had been removed, while the mineral manures applied contained more phosphoric acid and potash than what was carried off in the crops.

The land where the disease destroyed a large portion of the crop received, with the mineral manures, every fourth year, 2,000 pounds of rape cake, and 200 pounds of salts of ammonia, the large crop of roots and tops being also plowed in. As compared with the other soil, the soil contains vegetable matter in a different stage of decay, and provides suitable food for a great variety of under ground life. We find that the application of rape cake is followed by an immense increase of wire-worms; it is said among farmers that where the corn crops are attacked by wire-worms an application of rape cake will kill them, the fact being that they cease to eat the young corn and feed upon the cake. (1)

The analysis of the soil of these two plots shows that the land which had been highly manured contains far more organic matter and nitrogen than the other plot, while at the same time it contains very much less of these substances than the garden soil. The evidence points to a destruction of the clover plant by living organisms in the soil, a large increase in this life having been encouraged by the liberal supply of organic and nitrogenous matter. This does not however explain —supposing we have taken another leguminous crop, say beans, at the end of the fourth and the eighth year, followed by the red clover in the twelfth year—why the crop would, in all probability, escape the attack of the living agencies, and be free from disease. It is at this point that the difficulty of finding a satisfactory solution is the greatest, and it can only be met by assuming that the clover plant requires, as part of its food, a special organic compound.

It must be understood that on our experimental land,

(1) Alas! Mr. Charnock, who, in his prize essay on the "Farming of the West Riding of Yorkshire," published in the R. A. S. of England's magazine for 1850, first called attention to this fact, died at Lennoxville last month. A. R. J. F.

whether 4, 8, or 12 years elapse before the clover is repeated, the same operations are completed every fourth year. Instead of one application of rape cake and ammonia, there will be two or three, two or three crops of roots will be plowed in, and more corn crops will be grown. The only distinction that I know of will be that the earlier applications of manure will have gone through longer periods of decay, and have formed compounds of which we know little or nothing. These compounds, however, when we arrive at further knowledge upon the subject, may explain much which is obscure at the present time. That such compounds are formed, we have very strong evidence in another field, where we endeavoured to grow beans for a long series of years upon unmanured land. The crop became very small, the growth being only a few inches high. Analyses of the soil showed that it had lost a large amount of organic nitrogen, and it was very poor in nitric acid. The experiment was therefore given up, and the field was sown with barley and clover. The barley was by no means a fine crop, but the clover was magnificent, and the color of the leaf remarkable for the beauty of its green.

I have selected this experiment out of a number of others where the clover was even more luxuriant, as in all the others manure of some description was used. Here we have the fact of a soil which became poorer in organic matter, nitrogen, phosphates and potash, ceasing to furnish food for one leguminous plant, while it was accumulating food suitable for another plant of the same natural order. The soil of the garden where the clover has been grown for so long without disease, differs in two remarkable respects from the soil of the highly-manured rotation land, where disease occurred when the crop was repeated after an interval of four years. On the garden soil the accumulations from former manures were very large, and there was no fresh organic or nitrogenous manure to feed living bodies. It is quite possible that when organic matter has reached a certain stage of decay it may cease to be a food for much of the larger sorts of organic life in the soil, such as worms, &c.

Salts of ammonia appear always to have an unfavorable influence upon clover and to encourage disease. As far back as 1860 we published a map of a field, one half of which had received salts of ammonia in addition to the various other manures applied, and it was quite evident, from the size of the various blank spots, that the disease was, in some indirect way, encouraged by the application of ammonia. In a field which had received no dung or organic matter for a number of years, and had been growing barley manured with nitrate of soda and superphosphate of lime, with occasional crops of red clover, disease almost cleared off the plant when repeated after four years; but after eight years the crop was not attacked except where it joined the diseased portion, and it was evident that whatever was the cause of the disease, though it had passed over the border, it did not extend its ravages beyond a few feet. There are a few conclusions which may be drawn from these experiments:

1. That clover disease does not occur even when the crop is grown continuously, provided that the soil contains in abundance the appropriate food of the plant.

2. That clover disease occurs in highly-manured soils if the crop is repeated too frequently and sufficient time is not allowed for the formation of the appropriate food of the clover

3. That the fertility of a soil may be largely reduced by cropping, and absence of manures, while at the same time the food specially required by the clover may be increasing in the soil. The crops grown during the process of exhaustion may be partly, or wholly plants of the same natural order as the clover, provided that they differ from the clover in certain properties of their growth and the range of their roots.

4. That although clover does not appear to possess the same power of appropriating the mineral food of the soil as the cereal crops (for which reason mineral manures are often advantageously applied to this crop), still mineral manures cannot be depended upon to grow clover, on clover-sick land.

5. That all the evidence points to the soil as the chief source of the mineral and nitrogenous food of the clover; and if it should be ultimately proved that the nitrogen of the atmosphere played any important part in furnishing the nitrogen taken up by the plant, it is more probable that the nitrogen enters into combination with some ingredient of the soil, than that it is directly assimilated by the plant itself.

Dominion Butter Tub Factory.

We have received from Messrs. Williamson & Crombie, of Kingsbury, Q., their price-lists for their very excellent butter tubs. We have before us a beautiful, heavily tin lined tub which is highly recommended and which should be pleased to have tried by our readers engaged in dairying. The tin is guaranteed not to rust, so that the butter must keep in such tubs much better than in those not so lined. For price-lists, &c., apply as above.

The Popular Demand.

Professor Morrow of Illinois University says truly that there is a demand for horses with special fitness for heavy draught or for fast trotting, for cattle especially fitted for beef or for milk, for sheep remarkably developed in the way of either mutton or wool production, but the largest number of users of either class desire animals reasonably well adapted for more than one purpose. The horse best suited to the needs of farmers generally, or for most business purposes, is neither a heavy draught nor a typical roadster, and so of the other classes of animals, even to the hog, in breeding which too exclusive attention may be given to early maturity or to ability to lay on flesh. The professor knows what he is talking about; and he carries a level head on this question, certainly.

Cotton-Seed Meal.

Sir John Bennett Lawes of the famous English Experiment Station at Rothamsted has shown, not by theory, but by practical work upon his farm, that a ton of cotton-seed cake —a cattle food which was not known to farmers a century ago and which costs about $31.50 per ton—is worth as a manure, after it has passed through the animals which consume it, $28.25. This statement looks strange, but it comes from a source which is unquestioned. So it yields two, possibly three, profits. There is an increase in the flow of milk, if animals are kept for the dairy, they are in better condition, and, being so, actually consume less food, so there is a saving in forage—while, most wonderful of all, the farmer receives back, in the increased value of the manure as a fertilizer, within a very few dollars of the original cost of the feed. Can the farmer afford not to feed high? *Ex.*

The sanguine expectation of our farmers that we could keep our lands fertile by the continued plowing-in of clover was doomed to disappointment. After about fifteen years of this system of clover-growing and plowing-in, our wheat began to grow weak in the knee, and would fall so flat to the ground that it had the appearance of having been rolled down with a roller, and the wheat would be shrunken badly. The growth of straw would be large but the yield light. In the fall the wheat plant would have a healthy appearance, but in spring would change to a yellow, sickly hue, having the color of a man ill with jaundice. This sickly appearance at first showed only in spots over the field, but these spots were enlarged from year to year, and never recovered while we continued this system of clovering. C. G.