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THE JOURNAL of AGRICULTURE. ILLUSTRATED

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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—EDITORIAL MATTER. All editorial matter should be addressed to A. R. Jenner Fust, No. 4 Lincoln Avenue, Dorchester Street West, Montreal—or to Ed. A. Barnard, Director of the *Journals of Agriculture*, &c., Quebec.

OFFICIAL PART.

Table of Contents.

Notice.—Herd-books.

Dr. Couture, 49 rue des Jardins, Québec, is the secretary of the herd-books and stud book of Canadian cattle and horses, and of the swine and sheep registers recently opened by the Council of agriculture.

In future, all requests for registry in the above books as well as all letters, documents, &c., connected with them, should be addressed to him.

All letters requiring an answer must contain a 3 cent stamp.

ED. A. BARNARD,
Sec. Coun. Agriculture,
Director of the *Journals of Agriculture*.

Agricultural Clubs —Important Notice.

The agricultural clubs already in existence and those shortly to be instituted, are requested to apply to the secretary of the Department of agriculture, who will forward to them, gratuitously, for the use of their members, certain pamphlets on agriculture, and all the information on that subject that the department is able to afford them.

H. G. JOLY DE LOTBINIÈRE,
Pres. Council of Agriculture.

IMPORTANT NOTICE

The tour of inspection of Canadian cattle, for the purpose of making entries in the stud-book, will take place in July. Those who have animals for entry are requested to send their names and addresses to the undersigned before the first day of July *prox.*, if they wish their stock to be inspected this year.

(Signed) J. A COUTURE, D. M. V.
19 rue des Jardins Quebec.

Nitrate of soda.—As mentioned in a note in the May number of the Journal, Mr. Evans finds he cannot afford to sell this manure at less than $3.00 the 100 lbs., in bags containing 300 lbs., each. I am sorry for it, because I fear the great rise in price, from, $2.25. will prevent its use from becoming as general as I was in hopes it would be. By the bye, I may as well mention that I have nothing to do with the sale of this or any other manure. I received an order from a farmer in the Quebec district the other day to buy him a certain quantity of fertilisers, I " executed the order ", for once, but I really have no time to spare for such business. If any one wants artificial manures, he should write direct to the Capelton factory for superphosphate, &c , to Mr. Evans for nitrate of soda, Mr. Wm. Ewing for Indian bone-meal, and to Mr. Vasey, Hochelaga for sulphate of ammonia. A. R. J. F.

Barley for the English market.

Great complaints have been made in England about the quality of the barley sent thither from Canada for malting purposes. I really do not see how anything else could be expected There are two principal points that strike the eye of an English maltster in looking at a cargo of any foreign barley : 1. Is the grain equal in quality ? 2. are there many broken grains in it ? As regards the first point, if the quality is not equal, that is, equally ripened all through, the pickles will not grow equally on the floors, and, consequently, when some of it is ready for the kiln, the *plumule*, or *acrospire*, as the maltsters used to call it, being nearly up to the end of the grain, the rest will be found some half-way up the grain and others only just started on their journey. " Ah," then says the buyer, " this is only fit for " brown malt," for porter-brewing," and of course the price suffers in consequence.

As for broken grains, of which Mr. Saunders' report says . " unless the Canadian barley can be threshed so as to avoid the large proportion of half and broken grains, which cause excessive mould on the floors, the trade won't materialise. All English maltsters agree on this point." Yes, I should think they did, for mouldy malt would invariably be rejected by any brewer that made *fine ales*, as it causes a secondary, or rather continuous, fermentation that never stops, and ales brewed from it never become really bright.

Now the first of these two vital faults in our barleys seem to me to arise from the following causes . 1. the want of due preparation of the land. If the land intended for barley is not rendered homogeneous, that is, of equal fineness all over, the grain will not come up synchronously, and some will ripen before the others ; 2. The selection of the seed. If mixed seed is used, some from heavy land, some from light land, some fully ripe before cutting, some only half-ripe, the same effect as before will be produced. Equal depth of depositing the seed, and wide ridges, or lands, are also points to be attended to. As I have remarked before, narrow ridges, with some plants growing down in the open furrows and others on the crest of the ridge, cannot produce an equally ripened crop. Lastly ; *barley for malting must be dead-ripe before it is cut.*

Again ; they complain in England that " Shippers have not kept faith with the purchasers as to quality , the bulk was not equal to the sample." How could it be, when the bulk was probably made up of lots from hundreds of farms, all slumped together, no two lots of which were perhaps grown or harvested alike. In my day, Essex, Hertfordshire, and Cambridgeshire maltsters never mixed the grain of even two farms, though contiguous, without the most careful inspection In Canada, this would be impossible, but some plan *must* be contrived to grade the purchases, so that light and heavy, bright and discoloured, lots be no longer mixed together." Well may the reporter say : " The returns received for some of the shipments have been very unsatisfactory, having resulted in loss to the shippers. This disappointment, however, is clearly traceable to want of care in threshing, cleaning, and grading the grain."

If a farmer is careful enough to thoroughly clean out the threshing machine before he entrusts it with the duty of threshing his barley, one great cause of mixed samples of seed barley will be obviated.

In Essex, and the malting counties of East-Anglia, no maltster in 1850 would buy barley threshed by horse-power. They complained of broken grains that turned mouldy on the floors. I had a great job,in 1852, getting them to see that my steam threshing-machine, with its 5½ feet drum and its unvarying pace, never broke or bruised a grain. The flail was then always used for barley, though for all other grain it had long been abandoned. In the modern machine, the straw goes in sideways, and comes out as unbroken as it went in. There is nothing in it but a drum and a cylinder , there is no beating-action, but only a rubbing. Not a grain is broken, and I may almost say, not a grain is left in the ear unthreshed. Owing to the uneven pace of horses in a mill, sudden rushes cannot be avoided, and it is here that the much complained of breakage of the grain takes place, and I do not believe that any great improvement can take place until steam is substituted for horse-power, and the wide-mouthed English machine with its *rubbing* action for the narrow-mouthed *beater* at present in use.

The buyers in the barley districts in Ontario paid up to the close of navigation from 8 to 12 cents more per bushel for the two-rowed than was offered for the six-rowed ; but in many instances no care seems to have been taken to grade the purchases, but light and heavy, bright and discolored lots, were all mixed together, making a very uneven sample. Much broken grain was also found in some lots. The returns received for some of the shipments are said to have been very unsatisfactory, having resulted in loss to the shippers. This disappointment, however, is clearly traceable to want of care in threshing, cleaning, and grading the grain. The fault lies partly with the farmer, who must exercise more care in handling this crop if it is to bring him its full value. In a letter written by a practical Canadian maltster who recently visited England in connection with the barley business of his firm, he says, when referring to the disappointing sales. " Shippers have not kept faith with the brokers or purchasers as to qua

lity, the bulk was not equal to the sample." Again, "All brewers who saw the Government farm samples at the brewers' exhibition were charmed with them, and millions of bushels could have been sold, but the general crop did not equal the samples."

Other evidence of the same kind comes from all sides. A buyer who visited England on this business says:

"It is a mistake to suppose that the English maltster does not require color; he does, and the bright sample will in every case take the market there, as in the United States. I desire to impress strongly on farmers the necessity of growing from pure seed, and in harvesting and threshing, to carefully avoid mixing."

As a rule, we may take it for granted that a fine sample of malting barley cannot be grown on *new* land.

The difference of price between first-rate malting barley and second and lower qualities, on the English market, is very striking. This last year, prices ranged from 80 cents a bushel to $1.30; the former for distiller's purposes and perhaps porter-brewing; the latter for the Burton and other fine ales. In our best English barley-districts, the grain is always sown on a "stale-furrow." The Scotch, I believe, generally plough twice for barley, but even a Scot will not pretend that the barley of the North is to be compared with that of the South East. Scotch barley is heavy enough, but the true flavouring quality is wanting, or else why do the Scotch brewers import such a lot of Norfolk and Suffolk barley for their fine Edinburgh and Alloa ales? (1) A. R. J. F.

OUR ENGRAVINGS.

A Canadian Farmstead; v. p. 104.

Jersey cow, Snowflake; winner of first prize of the R. A. S. E. in 1891.

Middle-white English sow and pigs: first prize, 1891. v. p. 103.

DE OMNIBUS REBUS.

Manure-heaps.—Mixens, or *middens*, as we call manure-heaps in England, are made in this country without much care being bestowed upon them. Even in this Island of Montreal, it is no uncommon thing to see sleigh- and cart-loads of manure of good quality flung down in a scattered heap anyhow, without any consideration being paid to the fact that the larger the surface of dung exposed to the air and the rain, the larger must be the loss of its most valuable constituents. In November last, on the land opposite Montreal College, in Sherbrooke Street, I saw load after load of dung carted out in little heaps of perhaps, six to the load, and there they lie now, unspread, frozen hard (April 24th), and not worth more than a third of their original value, besides delaying the operation of ploughing until both the manure and the ground underneath it are thawed out. This, I need hardly say, is not the way to treat dung, which is a much more valuable commodity than most people seem to imagine.

As there is a tendency apparent among the theoretical class of *agronomes* to do away with the alternative system of farming, in which grain, roots, pulse, grass, and cattle all had their share, and to substitute for it a system of growing grain, without keeping any live-stock, by the cultivation of pulse-crops to be ploughed in, assisted by chemical manures, I shall show, by the test of certain experiments at Rothamsted, that dung is, at any rate, a profitable application to the land.

(1) Mr Andrew Dawes, of Lachine, told me, on the 13th June, that his 2-rowed barley from Moosemin was already on the point of going down! Too much dung Mr Dawes is as bad as too little A. R. J. F.

A TEST CASE.

There has been during the last thirty-nine years a series of experiments proceeding at Rothamsted on wheat and barley, grown consecutively under very varied treatment, which it is not necessary to explain further, here. In the case of the barley, plot 7 was dressed annually for twenty years with fourteen tons of farmyard manure, with the result that 48¼ bushels of grain and 28¼ cwt. of straw were annually yielded and removed. Side by side, and in striking contrast to the farmyard manure plot, is one which has received no manure of any kind during this period, and here the average result has been 20 bushels per acre of grain and 11¾ cwt. of straw. The difference in yield is clearly due to the action of the dung, and is represented, in these days, in money, as follows:—

	£	s.	d.
Average increase owing to farmyard manure:—			
28¼ bushels of barley at 3s. 6d. per bushel...	4	18	10½
16½ cwt. of barley straw at 6d.....		8	3
	5	7	1½
Cost of dung.....	4	0	0
Profit per acre per annum from the use of dung..	1	2	1½

It therefore appears that the dung paid in this extraordinary case, but I ask especially attention to the following additional fact.

After dung had been applied for twenty years, the plot was divided into two parts, and half was left unmanured, while the remaining half still continued to receive its usual dressing of dung. During the next twenty years, the half of the plot which received no manure yielded upon an average 34½ bushels of barley, or an average increase of 15 bushels of barley, with a proportionate amount of straw, over the continuously unmanured plots. The effect of the dung is not yet exhausted, and the case is clear that, after leaving an immediate profit every year during the period of its application, it has continued without further expenditure to return 15 bushels of barley, or an annual revenue of £2 12s. 6d. per acre.

We all know that dung is slow in its action, but, in revenge, it is clearly lasting in its effects. Now, let us compare the cost of producing an acre of barley by dung with its cost by using artificial manures. Lawes, you will have observed, charges his farmyard manure at 5 shillings a ton:

	Average annual yield.
14 tons of dung gave.....	48 bushels an acre.
Mixed minerals and ammonia salts.	46¼ " "
" and nitrate of soda.	49¾ " "

The cost of the artificials being £2. 15 an acre and the cost of the dung £4. 0, it is clear enough that the barley grown by the aid of the former was got at far less cost than the dunged barley. But, whereas the effects of the artificials were evanescent, the effects of the dung were lasting, as may be clearly seen above. And how came it that the dung cost 5 shillings a ton? It can be only accounted for in one way: if Lawes sold his beasts for exactly what they cost to rear, feed, and look after, the dung cost him nothing. If, on the other hand, he lost money by them, it is clear that the sum lost divided by the number of tons of dung they left behind them, is the cost or value of that dung per ton.

And, now, let us set about making a manure-heap or mixen. First, calculate how many square feet your mixen is likely to occupy if raised to a height of, say, 4 feet. Over

this superficies cart about a foot deep of earth—ditch-scrapings, &c., anything will do—, and on it lay the loads of dung as fast as you can draw them until the depth of earth and dung is about 2 feet. Then, having spread the dung already laid down pretty level, cart the rest on to it, making the horse draw cart and all on to the top of the heap, and spreading each load as it is upset. When all is drawn on to the mixen, throw up any loose dung that may be lying about, trim up the sides, making them as square as possible, level the top, and cover it with about a foot of earth of any kind. The manure will not stand much chance of losing its valuable properties, if treated in this way.

Ten days before you intend using this mixen, give it a turn-over; throw all the outsides into the middle; break up every lump; mix the top and bottom layers of earth well with the dung, (1) and let the heap heat; the heat will kill most of the seeds of weeds—and there *will* be seeds of weeds in all manure however well the cultivation may be looked after—, the manure will be of equal goodness all through—not, as too often is the case, rotten dung here, and straw there—, and, being thoroughly *made*, will, as soon as it is deposited in the land, be ready to *at once* provide the plants with their suitable nourishment.

I fancy I can always tell a good farmer by the neatness of his mixens.

In carting dung on to the mixen, towards the last, it may be necessary to take small loads, or, what is much better, to have a *trace-horse* to help the one in the shafts.

I do not think you could find a farmer in our best cultivated districts in England who does not treat his manure in the above way. (2)

Agricultural lectures.—The newly established County Councils, in England, have already inaugurated a set of lectures on agriculture on a very liberal scale, but the farmers do not seem to be too well affected towards them. Mr. Hunter Pringle, a well known *agronome*, and, at the same time a first-rate practical farmer, doubts very much if paying young lecturers $25 a day, and travelling expenses, for addresses that leave no practical effect behind them, is a wise proceeding. He believes that science, to be palatable or nutritious, must be delivered in combination with practice, but he thinks it "very doubtful whether science can ever be generally useful to farmers. There are numerous questions concerning the composition of soils, food, manures, &c., upon which our most learned authorities differ among themselves" For instance, at a lecture followed by a discussion, at Cirencester, the other day, the subject of which I have forgotten, I find that Prof Voelcker did not agree with Prof. Lloyd, and both of these learned and experienced agricultural chemists disagreed with Prof. Rinch of the Royal Agricultural College!

Aryan.—In professor Couture's article on the Canadian horse, in the April number of the Journal, he speaks of the 'Aryan type, with flat forehead." It may interest some of my readers to know that we ourselves are of the Aryan race. The word is Sanscrit, and means "the plougher," the root being *ar*, which appears in our words *earth*, *harvest*, *heart*, &c. So, in the English Bible, the text "The oxen that *ear* the ground," means the oxen that plough the ground. In the Scotch saying, "two months from earing to shearing," the meaning of course is, from the time wheat comes into ear until reaping-time.

(1) At the farm above mentioned in Sherbrooke St., one row of dung carted from a heap was good rotten stuff, the next two rows were all straw, the heap had never been turned. How can the potatoes grown with it be an equal crop? A. R. J. F.

(2) Except, of course, those who feed their beasts in sunken boxes. A. R. J. F.

Green-manuring.—The last part of professor Paul Waggners' lecture, on "The cheapest way of obtaining nitrogen and phosphoric acid" is now before my readers, and one lesson, at least may be learnt from it. the ploughing in of any other than leguminous crops is useless as far as the capture of the free nitrogen of the air is concerned. Thus, buckwheat, green rye, and other crops of like nature are not endowed by nature with the same power as pease, clover, lupines, tares, and beans.

For a long time, farmers were told that if they grew a heavy crop of tares or clover and fed it off with sheep, the land was not enriched unless the sheep received an additional supply of food—cake, grain or beans—imported from another piece of land. He knew better, because his experience showed him that; on good land, he would grow, *too good* a crop of barley after such a treatment of a field. Why, this was so, the chemists of that day could not tell him, neither could they explain why a better crop of wheat could be grown after a twice or thrice cut crop of clover unmanured, than after a manured root-crop.

Then came the theory that nitrogen was assimilated by the leaves of plants. This, however, was speedily disproved by Boussingault, fifty years ago, and Sir John Lawes, some twenty years after, showed that in plants grown in sterilised soil, there was no evidence of the assimilation of free nitrogen; that is to say that if leguminous plants are grown in sterilised soil with the ashes of similar plants added, and so enclosed as to keep away all microbes, there is no gain of nitrogen.

Now came Hellriegel and Wilfarth, two Germans, who showed the connection between the assimilation of nitrogen and the existence of nodules, containing organisms, upon the roots of leguminous plants. They found that if a portion of the soil of a field in which a crop of the same kind as that under experiment had been grown were added to the sterilised soil in which the experimental plants were to be grown, nodules on the roots would be formed and nitrogen gained. Lawes and Gilbert having tested and approved of the truth of this decision, we may now safely conclude that 'the fixation of free nitrogen in the growth of leguminous (*pea-bearing*) plants under the influence of suitable microbe-infection of the soil, and of the resulting nodule-formation in the roots, may be considered as fully established.'

Well, it is satisfactory enough to know that our old-established practice of growing wheat after clover, and barley or oats after pease, is founded on a rational theoretical basis. But I do hope no one will immediately run away with the idea that all we have to do is to sow plenty of leguminous crops, plough them in, and sow grain. I was sorry to find so thoroughly a practical farmer as Mr. MacPherson, at the agricultural meetings this spring, stating that he sowed clover every third year. If he continues in the same road, I can assure him he will find before long that his land will refuse to grow clover at all. Had he seen, as I have seen, thousands of acres of the finest grain-producing land in the Eastern Counties of England become clover-sick, so sick that they would not grow that invaluable plant under any compulsion, he would pause in his dangerous experiment.

Pease and tares, too, are neither of them crops to be played with. On very heavy land, the abundant root-growth of these plants may perhaps be beneficial in breaking up the texture of such soils and making them, so to speak, lighter. But I have known very fine land, of fair consistency, made so "shattery" by the growth of pease, and especially of tares, that, as my old farm-tutor used to say: "There is no use my trying to grow wheat after either of those crops, though the land is full of dung, unless I can first get a crop of turnips or rape. Then, the treading of the sheep in feeding the roots off will solidify the land and the crop will stand up."

Milk-fed veal.—I was surprised the other day in passing the shop of the leading butcher at the West end of Montreal on seeing on a placard, in large characters, the following epigraph: MILK FED VEAL FOR SALE. Why, what on earth should calves be fed on for veal except milk? Now, I begin to see why the veal one gets in Montreal is so wanting in delicacy. What says Mons. le Marquis, in Molière's "Bourgeois Gentilhomme? "A joint of Normandy veal so tender and succulent that it seems to melt in the mouth." (I quote from memory.) No veal fed on anything except milk, is fit for tables where the *convives* know how to eat.

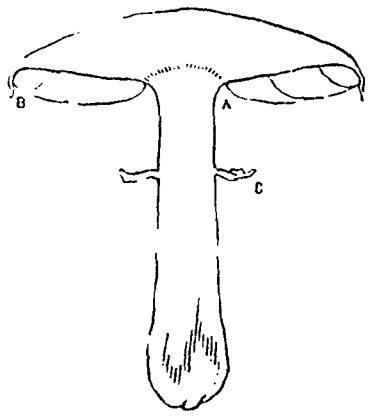
Trees.—A letter from Mr. Stockwell, on fruit-trees, &c., will be found in a late number of the Journal. Mr. Stockwell seems to be at "all in the ring," as I see he deals in drugs and chemicals, shorthorn cattle, nursery-stock of all kinds, Berkshire pigs, fancy poultry, seed-potatoes, &c, and, strange to say, English *beagles*, which he justly calls "the best *rabbit-dogs* in the world. Many a hundred rabbits have I shot to them in the dear old Kentish woods.

Rain-makers.—That rain can be produced at will is not a new idea. Some thirty years ago, a civil-engineer, Powers by name, and an American of course, wrote a pamphlet on the subject, citing instances, in proof of this theory, of the sequence of rain after great cannonades. And, now, companies are at work in the "bad-lands" of the Western States trying to get contracts with combinations of counties to bring down the rain of the upper regions of the air! They have not succeeded yet, and I do not think they ever will.

Mr. Powers quotes, in support of his argument, that great battles are always followed by rain, six cases which occurred during the war with Mexico, in 1846 and 1847; nine cases of battles, or skirmishes, are cited which occurred in 1861, in the war of the rebellion, and which were followed by rain at no great interval, forty such cases are cited for 1862, thirty for 1863, twenty-eight for 1864, and six for 1865. Eighteen similar cases are also cited from among the great battles which have occurred in Europe during the past century, making a total of 137 cases. The author thinks that if these facts are insufficient to convince, it would be in vain to expect to do so with a greater number of cases; and I should have agreed with him if he had worked out the subject in a more careful manner. Does he not know that, in most of the regions he refers to, the normal rain-fall is high, and that rain occurs, on an average, at least once in three days? To make his argument complete, he should have determined, from a careful comparison of a large number of cases, what is the average interval between a battle and the next succeeding rain—*all* the battles within a particular circuit being included—and should have then shown that this interval is less than it would be if the battle had no influence in the production of rain. Although, on these, and other grounds, I do not consider that Mr. Powers has proved his case, I am strongly of opinion that great battles and great fires do exert some influence in the production of rain. The idea is by no means a novel one. It was revived during the Franco-Prussian campaign, and several communications on the subject appeared in the *Cosmos* and other scientific journals; and the American papers report that the terrible fires in Chicago, Wisconsin, &c., were followed by deluges of rain.

Mushrooms.—Are there any infallible rules for distinguishing the true mushroom from all other *fungi*? Situation is one important point; in Kent, on the chalk-hills, where the pastures are, in a dripping September, often white with mushrooms, the general rule is never to gather those fungi, however fascinating may be their appearance, that grow in the shade of trees. But there are other ways of judging, which, if not always unerring, are at least worth knowing as a protection against the poisonous agarics of our fields.

The true mushroom has a peculiar intense purple-brown colour of the spores. But a writer says:—"Several dangerous species, at times mistaken for this mushroom, have these spores umber brown, or pale umber-brown, in colour, and belong to *Pholiota* or *Hebeloma*. In the accompanying figure is



SECTION OF THE TRUE MUSHROOM.

shown a vertical section of the true mushroom, which differs—when the colour of the spores are taken into consideration—from almost all other agarics, and certainly from all poisonous ones. One of the principal points to be observed is the distinct and perfect collar at C, quite encircling the stem, and the edge of cap at B, overlapping the gills, in some poisonous allies, as *a. æruginosus*—generally found on and about stumps—this ring is reduced to a few mere white flecks or scales. Lastly, the gills never reach or touch the stem A for, on inverting a mushroom, a blank space will be seen all round the top of the stem where the gills are free from the stalk." It appears that the true mushroom always grows in grass fields, has purple-brown spores, a clothy collar, gills which do not touch the stem, and a top with overlapping edge.

Manures for Mangels.—The most satisfactory manure-mixture for mangels has been found to be, in the South of England; 224 lbs. of nitrate of soda, 448 lbs. of superphosphate—(mineral), containing 14 % of phosphoric acid, and 448 lbs. of salt, per acre. I say, the most satisfactory, because other mixtures produced greater yields per acre over the unmanured pieces, but the one under consideration grew the crop at the lowest cost per ton, which of course is the point aimed at. My readers will observe that there was no dung employed in this experiment, and for that reason superphosphate had to be used. With dung, as I said in the May number of the Journal, I do not consider that superphosphate in any form pays in growing mangels, and, in proof thereof, I may say that, in the same series of experiments, a mixture of dung and artificials was tried and the result was as follows:

	Tons.	cwt.	lbs.
2 cwt. nitrate of soda 4 do superphosphate 4 do salt	25	19	56
20 loads dung 4 cwt. superphosphate	22	18	7
20 loads dung	22	12	63

when the 4 cwt. of superphosphate, costing at least $6.00, only added 6½ cwt. to the crop. Here, you see the wonderful effect nitrogen has upon the mangel crop. I think I was right when I told my readers—more than once—that any one

who sowed mangels without a dressing of nitrogen, in some form or other, was throwing away money: the labour, interest of the money, or rent, are always constant.

Potatoes.—I said, last month, that I should always aim at growing ten tons of potatoes an acre, disease or not; sixteen tons an acre I have seen, and twenty two were grown by the late Shirly Hibberd; but we must all hide our diminished heads. Forty-two tons an acre have been yielded, near la Rochelle, France! So says Vice-consul Warburton, at least, though I cannot see how the land, in drills or on the flat, could hold them. The grower in question ploughs deep, *selects sound tubers of moderate size for seed*, which he *plants whole, and manures liberally. Well, those are exactly* the proceedings I recommended last month, and which I have followed out ever since I began to grow potatoes, now some 45 years ago, but I never grew ten tons an acre in my life. But, then, I did not know of the remaining process through which our la Rochelle friend's seed was passed: he steeps the seed-tubers for twenty-four hours in a bath of 6 lbs. sulphate of ammonia, 6 lbs. nitrate of potash, and 25 gallons of water. After the potatoes are taken out of the bath, they are left for another twenty-four hours, to allow the germs to swell before planting. It is to the increased activity of germination produced by this stimulating bath that the grower attributes the wonderful result he says he has obtained. It may be so; but "though great effects from little causes spring," I cannot advise my readers to put much confidence in 12 pounds of anything producing 72,000 lbs. of potatoes.

The old story of pulling off the flowers from the potato haulm, thus leaving all the vital energies of the plant to be devoted to the production of tubers, is, I see, being brought forward again; I, and many others, have tried it, and there is nothing in it.

If the following extract from the Montreal *Witness* is to be trusted, we must need do something to increase the yield of potatoes in this country. Our average of, say, at most, 100 bushels an acre will hardly pay at 25c. the bag of 90 lbs. Why on earth did he not give them to his stock?

CHEAP POTATOES.—NO DEMAND FOR THEM IN CANADA —THE UNITED STATES MARKET CLOSED AGAINST THEM—THE BRITISH MARKET TO BE TRIED.

A farmer from Eastern Ontario has been in the city for some days trying to sell his potatoes. He has over 250 bushels of first-class tubers of a good table variety, and he found it impossible to dispose of them at a fair price. The best offer he received was 25c per bag. Of course, the United States market is materially closed to Canadian potatoes by the McKinley duty of 25 cents per bushel of 60 lbs. Under these circumstances the farmer and a commission merchant, are going to make the experiment of shipping the whole lot to Great Britain though the prospects are not very enticing.

Canadian-cheese—I trust the great success our cheese is meeting with in England will not lead any of us to become careless. I print this month a lecture from Dr. Francis Bond, director of the Glo'ster Dairy-school, and an appreciation of the qualities of Canadian cheese from Dr. Hoskins' paper the *Vermont Watchman*, which may well rejoice the heart of my dear friend M. J. de L. Taché:

Canada leads us by one-half to three fourths cents per pound for the highest grade of cheese of which over 4,000 carloads were sold and shipped to Europe last year. If we expect to obtain Canada prices, we must make that brand *Vermont Watchman.* ARTHUR R. JENNER FUST.

Milk, Meadows, and Manures

A meeting was held last week at the Town Hall, Berkeley, under the auspices of the Berkeley Hunt Agricultural Society, in order that Dr. Francis T. Bond, honorary director of the Glo'ster Dairy School, might deliver a lecture on "Milk, Meadows, and Manures." The chair was taken by Lord Fitzhardinge.

Dr. Bond said he had no doubt many of them were present about a month ago at a discussion of an extremely interesting and important problem for that part of the country; namely, the question what was the cause of the deterioration which was assumed to have taken place in the manufacture of cheese in the Vale of Berkeley of late years? He said it was assumed to have taken place, because the object of the meeting was explicitly to suggest a remedy. He proposed that day to briefly take up the threads of the few remarks which he ventured to make on that occasion, and to deal with another aspect of the subject from that which was so ably and interestingly dealt with by Miss Waddy. There were three solutions of the problem which they were met to discuss. The first was dealt with by Miss Waddy indirectly, if not explicitly, giving the reply that the cheese was not made so well now as it was in former years. He was bound to say that he did not wish in the least to depreciate the force of the answer which Miss Waddy gave by endeavouring to point out what were the points to be observed in making good cheese. He himself very strongly believed that a portion of the deterioration in question was to be attributed to the fact that the cheese of to-day, for one reason or another, was not made so carefully on the whole, or with so much attention as it was made by their grandmothers, if he might be allowed to say so. But while admitting that, there were also two other points to be considered: in the first place there was the fact that their standard of cheese had perceptibly risen of late years. The public were not satisfied to eat or to pay the best price for an article which their grandfathers and grandmothers considered a first-class cheese. The results of cheese making in their own country had very distinctly improved, and the cheese-maker of the present day in Berkeley and other parts of England was brought into competition with a very improved manufacture imported into this country from the United States, Canada, and now, to some extent, from the Antipodes. In the two former countries, *especially in Canada*, it was admitted on all hands that the manufacture of cheese had enormously improved as a result of the method of intelligent instruction which the Government had during the last two or three years *promoted by sending instructors among the cheese-makers*, and the result was that Canadian cheese topped the market in regard to price. That was to say cheese of a certain class. (1) That was the second answer that might be given to the question.

There was, he thought, a third, and it was that there had been unquestionably some deterioration in the pasture of that vale, as well as other parts of the country going on for some time past. In the first place they were all aware of the fact that for some years they had a succession of extremely cold and wet summers, and the result was to stimulate, especially in that part of the world, a growth of herbage not favourable to cheese-making. That was a fact of which there was no question, and the consequence had been that in an appreciable way certain pastures at any rate had very materially deteriorated. Then there was another point to which he more particularly wished to draw their attention, and that was the process of *grazing meadows, and especially grazing meadows by cows* used for dairy purposes, tended to remove from the meadows

(1) The Stilton, North Wiltshire, &c., are not interfered with by the Canadian cheese. A. R. J. F.

a very important constituent of the soil, a constituent which was amongst the least widely diffused, which was only reproduced, if he might say so, very slowly indeed, and yet was essential to the process of cheese-making, and that was the phosphates.

One or two words on the composition of milk from a cheese-making point of view. He did not speak of cheese-making as an art in any sense, but he might briefly refer to the composition of milk from a cheese-maker's point of view, as it was important for the object he had to lay before them. Milk might be considered briefly as a fluid holding in solution, or in a state of imperfect solution, something called casein. The substance in which the casein was held in that state of diffusion contained certain soluble constituents, namely, sugar, and certain salts. They need not consider the sugar, and the only salt they need consider was the phosphates. If the phosphates were removed from the milk they could get no curd fit for cheese-making at all, and on the relative value of the phosphates, and the extent to which they were combined with the curd, depended its stability for cheese making purposes. There were strong curds and weak curds, or strong forms of curd and weak forms, and by strong form he meant a curd which possessed in a high degree the two properties, tenacity and elasticity—the ability to hold together, and at the same time to expand and contract, and especially to contract. They were all of them in the habit of using a press as an adjunct to cheese-making, and he ventured to say the worse the cheese-maker the more use he made of the press, and the better the cheese-maker the less use he made of it. And the reason was that a well-handled curd possessed the property of contracting on the whey it contained, as to very largely eliminate it by the process of spontaneous contraction, so long as the curd was maintained at a proper temperature, and that therefore lessened, if not abolished, the necessity of the press. There were some cheeses of a certain size which were made without any press. A strong curd, by possessing the properties of tenacity and elasticity, could be handled during the whole process of cheese-making in a way to produce an eminently satisfactory result. On the other hand a weak curd, which was just devoid of those properties more or less, produced a cheese which had very little power of spontaneous contraction, and however much they might use the press they could not eliminate the whey, except at an extravagant loss, and they made a cheese which was liable under unfavourable conditions to all those fermentation changes which constituted the difficulty of cheese-making, or cheese-curing he should say. The absence of phosphate of lime from the curd made a weak and unmanageable curd, and hence, unless the milk contained a due proportion of phosphates, it was in that proportion unfitted or badly fitted for cheese-making. The process of continually cropping pastures must necessarily tend to the removal of the phosphates, which were among the scarcest of the constituents of the soil, and of which the soil would, therefore, be sooner or later robbed, unless they were systematically replaced. (1) That replacement of the phosphates had been to a very large extent neglected, and that even where it had been supposed, and had to some extent been carried out by the introduction to a limited extent of farmyard manures. The effect was far less than had been generally assumed, from the fact that the composition of farmyard manure was a very uncertain thing. In the great majority of cases phosphates were allowed to escape from it, and even under the most favourable conditions the replacement was not nearly so effective as it should be.

What, then, might be asked, was the remedy? It was the systematic application of phosphates in an artificial form, that was in the shape of artificial manure. He proceeded to point out that of the several phosphates which were available, that which was lately come into use in this country and on the continent, namely, basic slag, presented very great advantages in its relative cheapness and in the readiness with which it gave up the phosphates to the plant. He referred to the results of the work of Professor Wagner, of Darmstadt, and the experiments recently made by Mr. Archibald, and the action of basic slag, showing by the results which had been obtained the high power which it possessed of supplying those constituents that were essential to the growth, not only of the plant as a whole, but suitable to its fruiting element, which is so indispensable to the production of milk.

(1) Attention to this is requested A. R. J F.

WINTER BUTTER-MAKING.

SPLENDID RESULTS OF THE EXPERIMENT AT THE OXFORD CHEESE FACTORY.

Woodstock, April 28.

The East and West Oxford experimental creamery, which was started by Prof. Robertson, of Ottawa, some months ago, has been closed for the season. Mr. J. A. Ruddick, who has had charge of the creamery, returned to the east this evening. At a meeting of the patrons, held the other night, it transpired that the total number of pounds of butter made was 11,663, a much greater quantity than was expected. *The creamery was started on the cream gathering plan*, but, by the 26th of March, the business had increased so much that it was found necessary to introduce a centrifugal cream separator. The result was most satisfactory, inasmuch as from 15 to 25 per cent. more butter was obtained, especially from the milk of *stripper cows*. The milk was paid for according to the Babcock tester, each patron's milk being tested every day. The average percentage of fat in the different milk varied from 4.00 to 2.93. The result of the Government experiment in the creamery line here has been more than satisfactory. Several of the leading patrons gave it as their opinion that they had made double as much out of their cows as they otherwise would. Before the meeting closed the following resolution was unanimously carried: Moved by Joseph Blow, seconded by J. W. Chambers,

That we, the patrons of the East and West Oxford Experimental Creamery, established by Prof Robertson, dairy Commissioner of the Department of Agriculture, Ottawa, and under the immediate direction of J. A. Ruddick, desire to give expression to our hearty appreciation of the efforts so put forth to introduce and foster winter butter-making under the creamery system; and further, that by the introduction of winter butter making a much larger return from our cows will be realised than has heretofore been obtained.

It was unanimously decided to operate the factory as a creamery again next winter.

(From *The Empire*.)

A First Prize English Middle-White Sow.

This picture (reëngraved for the *Country Gentleman* from the London Live-Stock Journal) shows one of the very best "Middle-White" swine living, the sow Holywell Beauty 2d, bred by and the property of Mr. Sanders Spencer, Holywell Manor, St. Ives, England. She was exhibited at the Suffolk and Bedford shows with a litter of twelve fine pigs, and won first prize.

THE GRAZIER AND BREEDER.

A CANADIAN FARMSTEAD.

EDS. COUNTRY GENTLEMAN.—The accompanying plans and bird's-eye view of farm buildings are intended to represent a convenient housing of everything required (except the dairy) to carry on a farm of sufficient capacity to winter thirty cows in milk, with all the young stock necessary to keep up the herd, a stud of six brood mares and their produce until old enough to market, forty sheep, four brood sows, and a hundred fowls.

It is not my intention to crowd your columns with a lengthy description of this plan, although there are some points which will require explanation.

It will be seen that it is intended to be built on a hillside, with the natural surface on the upper side about one-half the height of basement story, to allow for small windows close to ceiling on that side, and building up inclines to entrances on front and at the ends of grain barn.

The covered passage from barn to poultry-house and thence to dairy (which adjoins the dwelling) is for the purpose of keeping a clear track for the truck on which is carried the cream from the separator to the dairy, and more especially for the convenience of my wife, who is sole proprietor of the poultry, foster-mother of colts, calves, &c., and supervisor-general of every animal about the place. This passage would be necessary only in a climate like ours, where the snow is just now on an average of four feet deep, with drifts within sight of our windows ten feet deep.

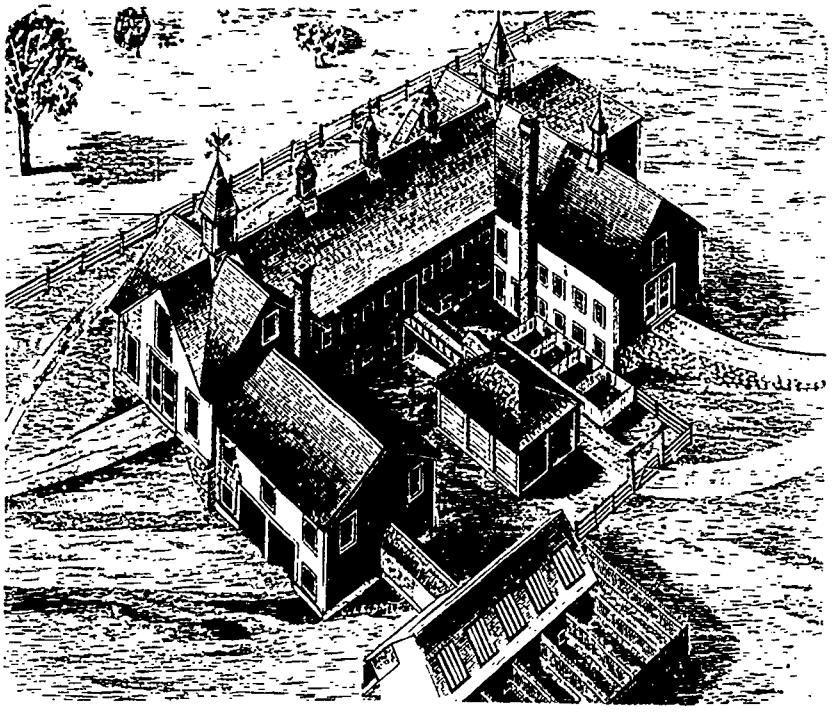
I have shown on the first-floor plan of an engine of the horizontal pattern with two drive-wheels, from which I belt two shafts, one for the thresher and grinding mill, and one for the ensilage-cutter, drum for hoisting hay to lofts, and then belting down to basement for the root cutter and separator, which are directly beneath. It was my first intention to supply the engine with steam from boilers in the basement. But it might be a better plan to use an "Acme" for all this work, as, especially in the summer when haying, and at many other times, it would be more convenient to fire up than an ordinary steam boiler for wood or coal. For winter use, it would be necessary to have farm boilers for heating water and cooking food for cattle.

The ensilage-cutter is shown in front of silos, but it is intended to hoist it into the loft above when silos are filled, for cutting hay, and belt up from same shaft.

The thresher is shown in position for work, and it is intended to take the straw from it to the loft above by a carrier worked by the same shaft and power. When not in use, the whole apparatus is to be taken apart and stored in the room near it.

The centre of the grain-barn on first floor is to be 13 feet high, while the bays are to be 8 feet; so that when the grain is drawn in from the fields it is unloaded on the bays, there being 5 feet of height in which to work. The ground-grains are to be stored in bins, the bottoms of which are on a level with these bays, where indicated by dotted lines in front of silos, and over the ensilage-cutter; the grain to be drawn down to the basement and first floor through chutes indicated. A larger chute is shown for hay from loft and from silos when first opened. The larger of the ground-grain bins is of capacity for one carload of 12 tons of bran, and the other for cottonseed meal, oil cake meal, and ground oats, peas, corn and barley mixed, a combination which we call *moulée*. It will be seen that we have learned by experience that Prof. Stewart's combinations of finely cut and ground and thoroughly mixed foods, in the correct quantities, are what our animals require and on which they do the most work for the least money. We have, therefore, tried in this plan to provide all the conveniences for carrying out his instructions, combined with the little experience we have had.

As to the manure question, I have read with great interest the numerous opinions expressed by your readers, and have come to the conclusion that they are nearly all correct—correct for the locality in which they live, and I have tried in



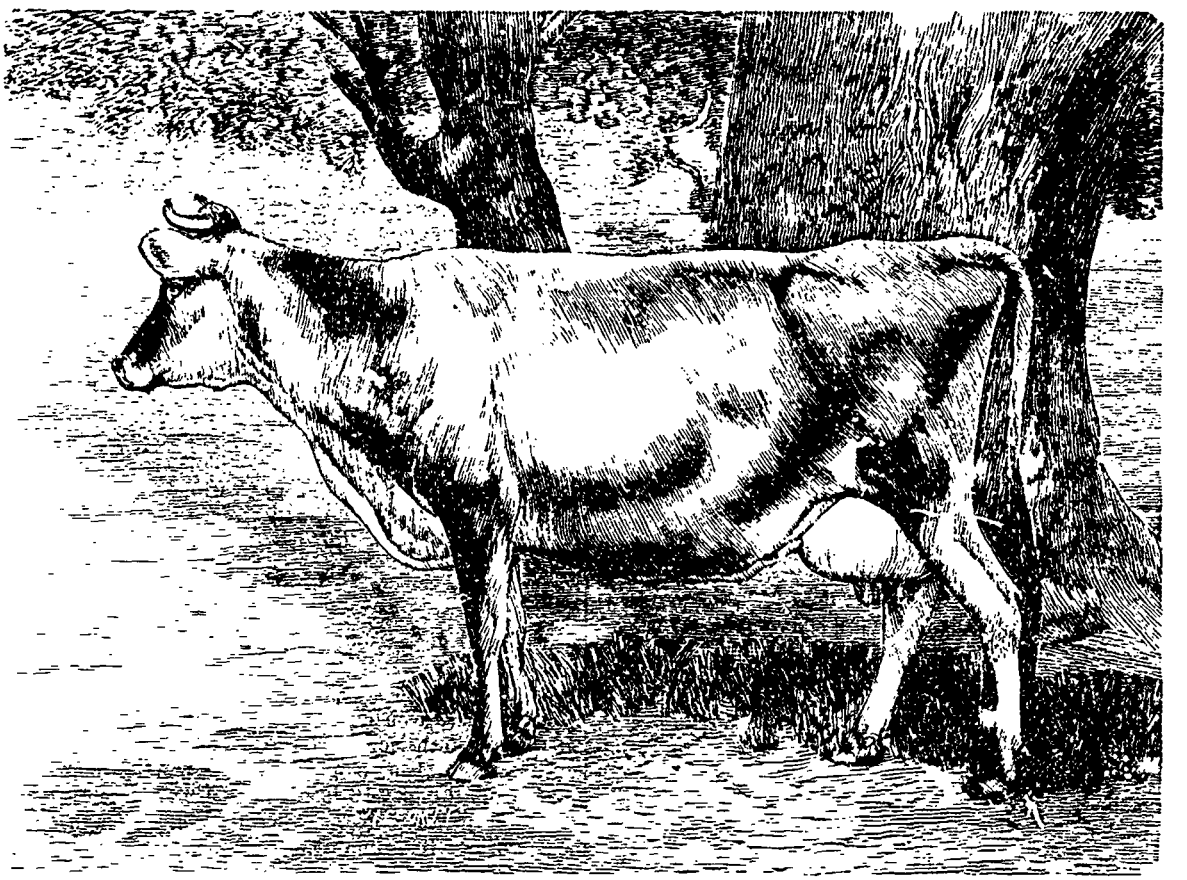
A CANADIAN FARMSTEAD.

this plan to combine them and boil them down to a consistency that will suit this climate. This plan contemplates what no one can deny is a necessity, a cement floor sloping from all sides to the centre. The floor to be one foot below the level of the yard, with a stone foundation, wall on which the sill is bedded in cement This sill should be of cedar or tamarac. The horizontal planking is placed on the inside, as they cannot then be forced off the nails by the pressure of manure. The top plank to be hinged to open for ventilation when necessary.

There is no doubt that where it is possible to do so, manure should be put on the ground as fast as made; but in a climate like ours, where the ground is covered with from two to four feet of snow for five months of the year, some provision should be made for keeping manure where it will not freeze, and where the cattle and horse droppings and the refuse of all kinds may be thoroughly mixed, and a compost made that may be applied in the spring with good results.

We hope that some of your readers will see wherein these plans can be improved, and will not hesitate to make such criticisms as their greater experience may suggest.

Montreal, March 25. J. P. HILL.



JERSEY COW SNOWFLAKE.

THE PROPERTY OF MR. W. ARKWRIGHT, WINNER OF FIRST PRIZE R.A.S.E. SHOW.

MILDEW OF THE GRAPE.

The disease particularly referred to in the following is known among viticulturists as "downy-mildew," "brown" or "gray rot" of the grape, and to scientists as *peronospora viticola*, was very severe last year in many grape-growing districts. It has been particularly destructive in the Eastern and Central States, and also in Western Ontario. Last year it was prevalent in vineyards in the Province of Quebec, and also in Ottawa Valley.

As a rule it is first noticed on the fruit—when about half formed—presenting a downy and frosted appearance, which gives place to a grayish brown in the later stages. The berries shrivel and fall to the ground when slightly shaken. Beginning with one or two varieties in the vineyard, the disease if allowed to run its course will spread rapidly, attacking other kinds which were at first entirely exempt.

It usually affects the leaves and wood later in the season, sometimes in the case of early varieties after the fruit has been gathered. This stage of disease was prominent as affecting the Roger Hybrids in the Experimental Farm vineyard last season.

At first it is seen on the upper surface of the leaf showing in brown spots, while the lower surface presents the frosted appearance resembling that form of the disease affecting the fruit. This particular leaf form is not easily detected on grapes having the thick pubescent leaves characteristic of the Concord family.

TREATMENT:

Carbonate of copper	2 oz.
Ammonia	1½ pint.
Water	25 gallons.

As soon as the mildew made its appearance last year on our vines they were thoroughly sprayed with the above mixture. Two applications and the removal of all diseased berries had the effect of checking the spread of the malady, but at the same time demonstrated — when compared with the results of my former experiments—that the proper line of treatment leading to complete success, lies in the early application of the remedy.

When the vines are uncovered, spray with a simple solution of copper sulphate 1 lb. dissolved in 15 gallons of water.

Spray, using the above formula, soon after the fruit sets; make two or three additional applications at intervals of ten days or two weeks as the necessities of the case seem to demand.

Remove and destroy diseased parts of fruit and foliage.

(Signed) JOHN CRAIG,
Horticulturist to Experimental Farm.

REMEDY FOR APPLE SCAB

HOME MANUFACTURE OF COPPER CARBONATE.

As the precipitated form of carbonate of copper is not always obtainable from druggists, directions are herewith appended for the easy preparation of this material at a cost much less than the usual wholesale price.

In a vessel capable of holding two or three gallons, dissolve 1½ pounds of copper sulphate (blue vitriol) in two quarts of hot water. This will be entirely dissolved in fifteen or twenty minutes, using the crystalline form. In another vessel, dissolve 1¾ pounds of sal soda (washing soda) also in 2 quarts of hot water. When completely dissolved, pour the second solution into the first, stirring briskly. When effervescence has ceased, fill the vessel with water and stir thoroughly; then allow it to stand five or six hours, when the sediment will have settled to the bottom. Pour off the clean liquid without disturbing the precipitate, fill with water again and stir as before; then allow it to stand until the sediment has settled again, which will take place in a few hours. Pour the clear liquid off carefully as before, and the residue is *carbonate of copper*. Using the above quantities of copper sulphate and sal soda, there will be formed 12 ounces of copper carbonate.

Instead of drying this, which is a tedious operation, add four quarts of strong ammonia, stirring it well, then add sufficient water to bring the whole quantity up to 6 quarts. This can be kept in an ordinary two gallon stone jar which should be closely corked.

FORMULA.

Each quart will contain 2 ounces of the carbonate of copper, which when added to 25 gallons of water, will furnish a solution for spraying, of the same strength and character as that obtained, by the use of the dried carbonate, and one which can be prepared with little labor, and kept ready for use throughout the season.

CARBONATE OF COPPER IN SUSPENSION.

When the carbonate is to be used in suspension, instead of adding the ammonia to the sediment, add water until the whole quantity is made up to 6 quarts. Stir this thoroughly until the sediment is completely suspended (entirely mixed throughout) and pour the thick liquid into a suitable jar, when it will be ready for use.

Before using, shake the contents thoroughly, so that all the sediment may be evenly distributed in the water. Pour out a quart of the thick fluid and mix with 25 gallons of water.

(Signed) JOHN CRAIG,
Horticulturist Experimental Farms.

How Lucerne Improves Soil

Mr. M. C. MEAD, page 633, wants the fact explained that land in Colorado that has raised large crops of alfalfa will raise much larger crops of wheat and barley than when the land was new. This is not difficult of explanation Wheat, barley and other small grains obtain their nourishment from the five or six inches of top-soil, and when that is materially diminished these crops are reduced, and the fertility must be renewed before large crops can again be raised. Leguminous plants, such as peas, red clover and alfalfa must go deeper for nutriment. Peas draw mostly from 6 to 10 inches, clover from 8 to 16, and alfalfa goes straight down to great depths, and draws all its nourishing matter to perfect its great crops from depths much below any of the others mentioned.(1) So it will be seen that for all small-grain crops alfalfa does not impoverish the soil at all, however long it may be raised, as it gets all its nourishment from a strata much below the one worked in ordinary agriculture. It has often been estimated, based upon careful experiment, that the roots and stubble of red clover are equal in weight to a large crop above ground, and thus they estimate the manurial value of the roots of well out clover as equal to 5,000 lbs. of clover hay.

This would contain some 300 lbs. of ash, which ash would contain about 10 lbs. of potash and 30 lbs. of phosphoric acid, besides lime, magnesia, &c. The hay would also contain 100 lbs. of combined nitrogen in the best form for nourishing crops. Sir J. B. Lawes made, perhaps, the most thorough investigation of the stubble and root growth of clover. After the last crop of clover was cut in the fall he found that the *dry* weight was, of :—

Stubble.....	2,669 lbs. per acre
Roots 1st 9 inches....	3,017 do.
Roots 2d 9 do	275 do.
Roots 3d 9 do	191 do.
	6,152 lbs. per acre.

He went deeper, but this is quite sufficient to show that the stubble and roots are equal to the best crop of clover-hay. It is thus safe to say that the stubble and roots of well set clover would furnish the fertilisation for three to four crops of wheat or other crops of small grain. And if the result is produced by raising clover, which draws its principal nourishment from the first 16 inches of soil, how much greater must be the enrichment of the top soil by the growth of alfalfa, which draws its principal nourishment from a much greater depth than clover.

These very large roots of alfalfa, boring so deeply into the earth, perform a wonderful service in bringing up these vast stores of fertility to the top soil within reach of the roots of all the small grains. It gives command of all the fertility in a depth of six to ten feet—a storehouse practically inexhaustible for a century.

The late Dr. Voelcker made a study of the clover plant in England, and in an admirable paper in the Journal of the Royal Agricultural Society for 1868, he made a very concise summary of his views as to the effect upon the soil of the clover crop, a few of which I will give :

" There is fully three times as much nitrogen in a crop of clover as in the average produce of the grain and straw of wheat per acre."

" During the growth of clover a large amount of nitrogenous matter accumulates in the soil. This accumulation, which is greatest in surface soil, is due to decaying leaves dropped during the growth of clover, and to abundance of

(1) Frequently from 14 feet in dry subsoils. A. R. J. F.

roots, containing, when dry, from 1¾ to 2 per cent of nitrogen."

"Clover not only provides abundance of nitrogenous food, but delivers this food in a really available form (as nitrates), more gradually and continually, and with more certainty of good result, than such food can be applied to the land in the shape of nitrogenous spring top-dressing."

This enrichment of the top-soil by the clover plant applies in still greater degree to the alfalfa plant If we estimate the roots of alfalfa to have a dry weight of 8,000 lbs. per acre, then these roots would contain 184 lbs. of nitrogen, 120 lbs. of potash, and 50 lbs. of phosphoric acid. This will explain to M the cause of the increased crops of wheat, barley or other small grain. This adaptability of Colorado to raising large crops of alfalfa, will double its resources for stock-keeping.

This leguminous plant has great advantages over red clover in being perennial, insuring large crops indefinitely without reseeding. But it should be cut before flowering for the best hay, and for soiling before heading. Ten acres of the best alfalfa would feed 40 milch cows through the summer, and when properly preserved in silo, would make a most excellent milk food in winter. Neither clover nor alfalfa should be plowed under as manure, when all the nutritive qualities may be utilized by the dairy cow, and 90 per cent of the fertilizing power remain in the droppings for the land. E. W. S.

(*Country Gentleman.*)

THE POULTRY-YARD.

A SUMMER DAY WITH GROWN CHICKENS.

The energetic Brown Leghorns are up and away some time in the morning before I am ready to feed them. There is not a lazy bone in their active little bodies, whatever may be the case with larger folk. A constitutional, they know, is good for their health, but if I insist upon too long a one here they come trooping out of their own yard, across the bit of orchard intervening, and over the short grass, even to the very door of the dining room, to see if I have dared eat my own breakfast before bringing them theirs. Not finding me there, they meander gently round to the kitchen door where Sally, my highly colored assistant, is busily mixing their soft food while I apportion the various ingredients. Soon all is ready, and together we start for the poultry yard, Sally with a bucket of fresh clabber in one hand and one of mixed food in the other, I with some dry grain for the grown fowls and some soft bread for the young chicks, while part of the delighted flock run on before to show us the way, and others more provident follow after, their bright eyes on the alert for scattered crumbs.

When the hen-house door is unlocked—for these early birds have flown down through a window half way—I catch sight of a few lazy Plymouth Rocks still upon their perches, awaiting my arrival at their ease. I try to give the flock at breakfast just three-fourths as much as they would like to receive, mostly soft food, which, being quick of digestion, keeps them busily scratching all day, trying to supplement it. Grass and insects really form the principal part of their diet, together with windfalls gathered under the fruit trees. By nine o'clock the milk has all been consumed, and as they have only two meals in warm weather, fresh water is their only refreshment until evening, consequently the yard has little attraction for them, and they scatter out over the orchard and neighboring grass lots in every direction.

At noon Sally and I go the rounds again, she to refill their water troughs, and I with some food for the young chicks and a basket for gathering the eggs. These hot days eggs should be brought in at mid-day, the air is too warm for them out in the yard, even in the shade. Then, too, the hens have favorite nests on which one after another sits from morning till evening. I also noticed that some of them, the restless Bownies especially, have a great curiosity, prompted perhaps by hunger, to know what is at the bottom of the nesting material, and while scratching away among the new laid eggs, some of them are apt to get broken, when they are of course devoured, and thus the hen contracts the almost incurable habit of egg-eating.

At four in the afternoon, a liberal and much appreciated allowance of nice, cool clabber is given, and the remainder of of the eggs brought in. At six, both young chicks and old get their supper, the most impatient of the flock coming to meet me, as in the morning, I try to give them as great a variety as possible, watching every crop that is harvested; so, after the wheat was cut, but not threshed, I persuaded the men to bring in, for the chicks' benefit, a number of sheaves, one of which the latter receive for their evening meal, supplemented by a small ration of whole corn. They are charmed with this new wheat, the plump brown kernels being more beautiful in their eyes than so many diamonds, and the fun of getting it out of the chaff lasts them till dark.

After sundown, as it is pleasant out in the yard, I often take advantage of the interval between closing-up time to pound some broken crockery for the flock, and so glad are they to get it that many of the hens will leave their food to gather round and snatch pieces almost from under the hammer. In another corner of the yard is a pile of crumbling limestone rock, mixed with ashes, taken from the site where a barn was burned last winter; this affords them much scratching in their leisure hours, and noticing how greedily they devour the tiny bits of limestone, I sometimes pound up a fresh lot for their delectation. In a sheltered spot I also keep some slaked lime, together with bits of old plastering, and it is wonderful how fast they disappear in the busy laying time, especially when there are many little Brownies about.

At closing-up time, the rule is to imprison every hen that is found on her nest, as the longer they sit the harder they are to break. It is scarcely necessary to say, however, that few Brown Leghorns are ever found on the nest at this time, most of them being Plymouth Rocks, and the nearer pure-bred they are the more determined are they to sit. I verily believe that one would spend the whole summer brooding over a glistening glass nest egg, and if that gets misplaced, she hunts around till she finds it, and draws it under her with the utmost carefulness; or if the nests are in a rows, she fondly makes a collection of glass eggs, hoping to hatch—no one knows what. A FARMER'S DAUGHTER.

Country Gent.

SHEEP vs. DOGS.

The annexed is a copy of the law of the State of Massachusetts as to the losses of sheep by the attacks of dogs. It would be a good thing if such some law were enacted here.

MASSACHUSETTS DOG LAWS.

CHAPTER 102.

SECT. 94. Any person may kill a dog that suddenly assaults him when he is peacefully walking or riding without the enclosure of its owner or keeper; and any person may kill a dog that is found out of the enclosure or immediate care of its owner or keeper, worrying, wounding, or killing neat cattle, sheep, or lambs.

SECT. 95. If a person so assaulted, or finding a dog strol-

ling out of the enclosure or immediate care of its owner or keeper, within forty-eight hours of such assault or finding, makes oath thereof before a justice of the peace or police court for the county, or before the clerk of the city or town where the owner of the dog dwells, and further swears that he suspects the dog to be dangerous or mischievous, and gives notice thereof to its owner or keeper, by delivering to him a certificate of such oath signed by such justice or clerk, the owner or keeper shall forthwith kill or confine such a dog; and if he neglects so to do for twenty four hours after such notice, he shall forfeit ten dollars.

SECT 96. A person owning or keeping a licensed dog who has received such notice, and does not kill the dog or keep it thereafter from ever going at large, shall forfeit ten dollars if it is proved that the dog is mischievous, or dangerous; and any person may kill the dog if it is again found strolling out of the enclosure or immediate care of its owner or keeper.

SECT 97. If a dog, after such notice to its owner or keeper, by such assault wounds or causes to be wounded any person, or worries, wounds, or kills any neat cattle, sheep, or lambs, or does any other mischief the owner or keeper shall be liable to pay the person injured treble damage, to be covered in an action of tort.

SECT. 98. Whoever suffers loss by the worrying, maiming, or killing of his sheep, lambs, fowls, or other domestic animals by dogs, may inform the mayor of the city or the chairman of the selectmen of the town wherein the damage, was done, and determine whether the same was inflicted by dogs, and, if so, appraise the amount thereof not exceeding twenty dollars. If, in the opinion of said mayor or chairman, the amount of said damage exceeds twenty dollars, he shall appoint two desinterested persons who, with himself, shall appraise the amount thereof; and in either case, he shall return a certificate of the same, except in the County of Suffolk, on or before the first day of December, to the county commissioners, who during the month of December shall examine all such bills, and if any doubt exist, may summon the appraisers of all parties interested, and make such examination as they think proper, and shall issue an order upon the treasurer of the county in which the damage was done, for all or any part thereof, as justice and equity may require.

The treasurer shall annually, on the first Wednesday of January, pay all such orders in full, if the gross amount received by him for dog licenses, and not previously paid out under the provisions of this chapter relating to dogs, is sufficient therefore. Otherwise, he shall pay such amount *pro rata* upon such orders, in full discharge thereof.

The appraisers shall receive from the county or in the county of Suffolk from the city or town treasurer, out of the moneys received under the provisions of this chapter relating to dogs, one dollar each for every such examination made by them, and the Mayor or the chairman of the selectmen acting in the case shall receive twenty cents per mile one way for his necessary travel;

SECT. 106. Every owner or keeper of a dog engaged in doing damage to sheep, lambs, or other domestic animals shall be liable to an action of tort to the county for all damages so done, which the County Commissioners thereof have ordered to be paid, as provided in the chapter The treasurer of the county may, and, if so ordered by the County Commissioners, shall bring such action. In Suffolk County such owner or keeper shall be liable in like manner to the city or town for damages so done therein which the Board of Aldermen to Selectmen respectfully have so ordered to be paid, and the treasurer of such city or town, may, and, if so ordered by the Board of Aldermen or Selectmen, shall bring such action.

The laws of Maine, New Hampshire, and Vermont and of the remaining, New England States are almost equally as stringent, and are also those of Ohio and many other wool-growing States of the East.

New York State Station Bulletin No. 28 [New Series], April, 1891 (pp. 9).

PIG FEEDING EXPERIMENTS WITH COARSE FOODS, P. COLLIER, PH D. (436–445).—"At different times during the year 1890 and the following winter feeding trials have been made with various coarse foods that are commonly grown on the farm of the State, many of which are often recommended for swine."

Prickly-comfrey.—Two pens of Cheshire pigs, each pen containing two sows and a barrow, were fed from June 27 to July 18 "all the prickley-comfrey they would eat, and a little corn meal. The comfrey formed over 90 per cent of the total food consumed in both pens." The tabulated results show "a steady loss in weight with each lot for the period during which prickley comfrey was fed."

Oat and-pea forage and red clover.—The same pigs were fed from July 18 to August 8, one lot with oat-and-pea forage, and the other with fresh second-growth clover, a small quantity of corn meal being added in each case. The clover formed 89.6 per cent of the total food of one lot, and the oat and-pea forage 89.3 per cent of that of the other. The composition of each of the coarse fodders, average consumption of food, and gain in live weight, are tabulated. The lot receiving clover gained 0 09 pound per day for each 100 pounds of live weight, consuming 31 39 pounds of dry matter per pound of gain; and the lot receiving oat and-pea forage averaged 0.45 pounds of gain daily per 100 pounds live weight, consuming 7.37 pounds of dry matter per pound of gain.

At the current prices oat-and pea forage "would only be profitable with the forage at about $2 per ton. The pigs receiving clover made so small a gain that there would be a loss from the corn meal fed, even if the clover was considered as representing no value."

Clover with and without salt. - The same pigs were fed clover for 28 days longer, salt ¼ ounce per 100 pounds live weight daily being added to the ration of one lot. Those receiving salt made a better gain than in the preceding experiment, or than the lot receiving no salt.

In another experiment with two pens of Duroc-Jerseys, each pen containing three sows and two barrows, averaging 33 pounds each, a ration was fed consisting of clover (about 86.5 per cent) and corn meal, one lot receiving in addition 0.28 ounce of salt per 100 pounds of live weight daily. The results, as tabulated, show that from August 25 to September 29 the lot receiving salt averaged 0.34 pound of gain per 100 pounds of live weight daily, and the lot without salt 0 08 pound; the former consumed 10.97 pounds and the latter 48 pounds of dry matter per pound of gain in weight. "As with the other lots, those having salt made the better gain, the contrast being somewhat greater than before. The meager increase without salt was at a loss, and the gain made by those pigs having salt, without considering the manure was unprofitable even with the clover rated at less than $1 per ton.

Sorghum.—The two lots of Duroc-Jerseys, were changed to sorghum September 29, this coarse fodder forming 80 per cent of the food and a mixed grain ration being fed until October 20 One lot received in addition 0.24 ounce of salt per 100 pounds of live weight daily. The tabulated data show that the lot receiving salt gained 1.12 pounds and the other lot 0.7 pound per 100 pounds of live weight daily, the

former consuming 3 32 pounds and the latter 5.96 pounds of dry matter per pound of gain. "Much the better gain was made by the lot receiving salt, and it was a profitable one with sorghum rated at $2 per ton. The gain made by the other lot, although more rapid than any made when clover constituted a large per cent of the ration, was an unprofitable one at the fall prizes, even with sorghum rated at $1 per ton."

Mangel-Wurzel.—From October 27 to November 24 the sorghum in the rations of the above two lots was replaced by mangels, one lot receiving, as before, salt in addition. The results indicating the composition of mangels and sorghum for comparison, are tabulated. "The pigs receiving salt at the rate of 0 24 ounce per day per hundred pounds here gave the poorest results, and the increase in weight was barely profitable with mangels rated so low as $1 per ton. The lot without salt made a profitable gain with mangels estimated at $3 per ton. * * * The mangels were eaten without waste, but no other coarse food was. The water-free food required per pound gain in weight was less than is usually obtained from any food excepting milk" After an intervening period, in which grain rations were fed, both the Cheshires and the Duroc-Jerseys were fed a ration of mangels and linseed meal, the mangels forming 95.7 per cent of the ration of the Cheshire and 97.5 per cent of that of the Duroc-Jerseys. As before, one lot of each breed was given a small quantity of salt in addition. The results of the trial are given in two tables. "At the prices of pork holding at the time of this feeding the gain made by the [Duroc-Jerseys] was profitable with linseed meal rated at $30 per ton and mangels at $2 per ton, without considering the manure. The gain made by [the Cheshires] was not profitable at these figures unless by taking into account the value of the manure."

A FIRST-PRIZE ENGLISH MIDDLE WHITE SOW.

DE OMNIBUS REBUS

New beds of nitrates.—Our children will rejoice, I doubt not, in the cheaper rate at which many natural productions will be laid at their feet, owing to the wonderful difference between the present price of freight and the price at which it will be profitable to transfer it from country to country fifty years hence. Half a century ago, the discovery was made that, in the interior of Spain, in the mountains of Estramadura, there existed large beds of phosphate of lime only awaiting exploitation to supply the English farmer with phosphoric acid at a cheap rate. Unfortunately, there were no roads fit for traffic, and as all the phosphate rock would have had to be carried to the nearest sea-port on mule back, nothing was done at the time, and since then, I suspect, the whole thing has sunk into oblivion.

But, now, news arrives from Africa that practically inexhaustible beds of *caliche*, the crude material of nitrate of soda, have been discovered in the Equatorial provinces, and as Dr. Peters, the German explorer, is the authority for the statement, there is every reason to believe it. Owing to the difficulty of transport, as in the case mentioned above, it will be some time before this new source of nitrogen will be available, but the partition of Africa among the European leading powers has been already followed by such extraordinary developments, that we may fairly hope that railroad communication with the interior will soon be established, particularly as Spain, the most sluggish of European countries, has nothing to do with it.

Agricultural education in England.—The two great English Universities, Oxford and Cambridge, seem to be about to take up the duty of instructing aspirants in agriculture. Not that the Senates of these great teaching bodies have conceived such a plan *ex proprio motu*, but the Board of Agriculture has "approached" them with a suggestion that some provision for training teachers in agriculture should be made by them. The Board advises the establishment of readerships in agricultural chemistry and botany, and so far, so well; but when it recommends the universities to carry on agricultural experiments. I conceive it is endeavouring to induce their leaders to embark ... a business *supra crepidam*.

Mangels.—Two new kinds of mangels have been brought out in Germany by Messrs. Simons, Lauker, and Simons. They are said to contain 11 % of sugar and only 82.2 % of water, the common mangel showing only 8.9 % of sugar and 88 % of water. Of course, though one per cent of sugar does not sound much by itself, when multiplied by the number of 100 lbs. in the crop it is a serious consideration. For, taking a fair yield of mangels at 20 tons an acre, the additional 1.1 % of sugar mounts up to 440 lbs., and the reduction of nearly 6 % of water is an important matter as regards carriage from field to root-cellar, being nearly 2500 lbs. per acre.

The Messrs. Simons recommend manuring for mangels with farmyard dung and bonedust, but not with nitrate of soda. The idea is that nitrogen produces a large crop, but that the quality of the roots is not so good as when they are less forced. Now, I want to grow the largest possible quantity of food on an acre of land, and I will compound for a slight diminution in the per centage of food constituents, so, I shall go on recommending nitrogen in some form to be added to the manure for the mangel.

Coffee —No wonder beans are dear, considering what a lot of their extractive matter must be swallowed in our country under the guise of coffee. Mr. Macfaclane, the Chief Analyst of the Dominion, has kindly sent me *Bulletin No.* 29—1891 : *Coffee*; and from it I make the following deduction : there is very little ground coffee sold in the Dominion in a pure state. The dealers in this business seem to be almost worse than some of the patrons of the cheese-factories. One hundred and forty samples were analysed, with the following results .

Sold as "compound"	31
Genuine	54
Adulterated	55
	140

If you like chicory (I don't), you can buy "compound," and you will get plenty of it, and some grain beside, sometimes; as, for example.

No. 10718 Coffee, compound... Adulterated with grain and chicory.
" 10719. " " ... Adulterated with starch and chicory.
" 10720. " " ... Adulterated with roasted grain and chicory.

Out of 9 samples from Quebec, only one is ticketed "Adulterated"; but, I regret to say, out of eight samples from Montreal, not one was found to be pure, the whole being described as "mixed with from 20 % to 30 % of roasted pease, grain, &c., and 20 % to 30 % of chicory." I need hardly say that none of these adulterated samples were taken from the stock of the leading grocers of St. James' Street and Ste Catherine Street. As usual, the poorer the purchaser, the less chance he stands of getting pure goods. the coffees tested having been bought in St Lawrence and St. Antoine Streets, and the far western part of St. James' Street.

Why buy ground coffee at all? A small mill does not cost much and is a very durable machine. I get my coffee, fresh roasted, every fortnight, and make it in a very simple way : a common saucepan, with a tight fitting cover, is kept on purpose for coffee-making, into this are put 3 heaped *dessert-spoonfuls* of fresh-ground coffee, mixed Mocha and Government Java, with one pint of water and the same of milk. When it boils, the whole is racked off—grounds and all—into an ordinary coffee-pot, two or three cupsful are poured out and returned, and after standing in a hot place for about ten minutes, the *café au lait* is fit to drink. This, with a couple of biscuits and a little fruit, has been my breakfast for the last twenty years. The saucepan must be taken off the fire the very moment the coffee boils, and the cover must be kept closed.

For *café noir*, I add a good teaspoonful of burnt-sugar colouring and either a little soleskin (*isinglass*), or the shell of an uncooked egg, broken up and mixed with the ground coffee before adding the water. As to tea, I find the *Indo Ceylon*, or TAMIL-KANDE, at 50 cts. a pound, far superior to any black-tea I can buy. It is also more profitable in the ratio of 3:2.

Price of milk.—The Experiment-stations in the United-States seem to have generally agreed upon the following principles as a guide to the payment for milk at creameries and cheese-factories : 1. Payment for milk on the basis of the fat contained in it is the best method yet proposed, mainly for three reasons : (1) The milk fat appears to exercise a greater influence upon the composition and yield of cheese than does any other constituent of milk, and therefore forms a just basis for estimating the cheese-producing efficiency of factory milk. (2) Payment for milk according to its fat encourages and induces dairymen to produce a better quality of milk (3) Payment for fat in milk removes any temptation to adulterate milk.

Now here is a case in which science has really been useful to the farmer : Yes, to the farmer, as well as to the proprietors of the factories, since it has taught the patron of dishonest proclivities that he cannot go on cheating, and the honest patron will no longer be robbed of a share of his fair returns to raise the average of the poor trash that is sometimes sent to the factories.

Useful horses.—I saw, one day last month, coming out of the stone-yards in Ste. Catherine Street, West, a pair of dark mottled-brown carthorses that took my fancy mightily. They were from St. Jérôme, and had brought a heavy load of stone from the quarries there; but the moment they were unloaded, off they walked home at the rate of nearly if not quite 4 miles an hour. A rare useful lot : half-bred Clydesdale and Canadian, I should think; and weighed about 1,400 lbs. each. No excuse for skimming over the land five inches deep with such a team before one. Wasn't the driver proud of my admiration of his horses?

Maize on sod.—A very intelligent young man from Métis, who, tired of the do-nothing life of that very dull district, has joined one of Mr. MacPherson's cheeseries at Trout-river, asked me, yesterday, if I thought it wise to sow maize for a crop on sod, or, as I should say, on lea. I could not answer in the affirmative for the simple reason that maize being a hoed-crop, and being almost invariably heavily manured, it should take the same place in the rotation as that occupied by roots where such are grown, viz., the first limb, as thus :

Maize.....	1
Grain with grass-seeds...	2
Grass for three or four years.....	3, 4, 5, 6
Grain	7

Pace Mr. Fisher, I should top-dress the grass the fourth year, which would divide the "mendments" pretty equally, and give the grain crop in the sixth year a fair chance of being a full one.

Artificial manures.—At Liverpool, *nitrate of soda* is worth, for best qualities, $36.00 a ton of 2,000 lbs.; here it is *offered* at $60.00!

Kainit, is worth about $11.00, same weight and place.

Basic slag of the very best quality, 80 to 90 per cent, passing through a sieve of 10,000 meshes to the square inch, guaranteed to contain 30 to 35 % phosphate (14 to 16 % phosphoric acid) is worth $7 00 a short ton which makes insoluble phosphoric acid cost 3½ cents a pound. No wonder the reports of the Liverpool markets for fertilisers say that "it sells very freely"; since, according to general statements, the phosphoric acid in basic slag is as available to plants as the same constituent in bonedust.

Sulphate of ammonia, 24 % gray, is quoted at $43 40, the short ton. So nitrogen at 11 cents a pound, and in nitrate of soda at 12 cents, is the price the English farmer has to pay, while it costs us 18¾ cents in nitrate of soda, quite 60 % of advance. How are we to grow wheat, &c.,

and send them to England at a profit with such an advantage on the side of the British farmer? See Mr. Vasey's letter in last month Journal.

Food's influence on the quality of butter.—Several interesting points were elucidated last year at the Maine experiment-station, on the effect of different foods on the quality and texture of the butter produced therefrom. Maine dairymen protest that no butter is so good as that made from the milk of cows fed on bran and corn-meal. Five of the station cows were fed, for three periods, on the following foods:

Period 1. Cotton-seed-meal, corn-meal and wheat-bran.
" 2. Pease-meal and barley-meal.
" 3. Linseed-meal, corn meal and wheat-bran.

The composition of the milk varied very little throughout the trial, though the relation of the quantity of fats to the other solids did vary somewhat, but apparently without reference to the food, and the following practical deductions may be made from the experiment:

1. Quite radical changes may be made in the kind of grain-ration fed, without affecting the quality of the milk.

2. The tendency of butter to melt in hot weather may be influenced by the kind of food, and the degree of hardness may also be thereby affected

3. A mixture of cotton-seed-meal or linseed meal with corn-meal and wheat bran, especially the cotton-seed-meal mixture, produced butter less easily melted, and of a more solid appearance, than did the pease and barley.

Comparisons were made, at the same station, and a summary of the average results given, with fodder-crops of 9 different kinds, of which southern corn and swedes proved the most profitable. But as only 14 tons of the swedes were grown on an acre, I do not think the experiment proves much. Theoretically, the Hungarian grass came next in order, which is rather surprising, as practically, it is but poor stuff at any period of its growth. I have used it as pasture, as cut for green-meat, and as hay cut when just coming into bloom, and "there is nothing in it".

Sweet corn yielded	1,870 lbs. of *digestible* dry matter	per	acre.		
Flint " "	2,208 "	"	"	"	
Hungarian grass yielded .	2,967 "	"	"	"	
Swedes " " ...	2,978 "	"	"	"	
Southern corn " .	3,850 "	"	"	"	

A fair crop of 20 tons of swedes would, proportionally, have yielded 4,254 lbs. of dry digestible matter, and the succeeding crops of grain and grass would, as far as my experience goes, have been much better than after corn. The harvested crop of Hungarian grass seems to have been large—18,740 tons an acre of green stuff = at least 2½ tons of hay, and these contained more than a third more dry matter than the 14 tons of swedes, but a great part of it must have been indigestible fibre. According to the calculation of the experimenters, two tons of timothy hay would contain 2,065 lbs. of dry *digestible* matter.

Notes from the Station reports of the U. S.—The amount of protein transformed, but not the storage of nitrogen in the body, is regulated by the amount of the protein in the food. The formation of fat in the body of neat cattle probably takes place irrespective of the presence or absence of fat in the food. The exact influence of protein on the formation of fat "remains to be determined," but the addition of non-nitrogenous ingredients to the food, without changing the protein, may cause an increased formation of lean meat. These materials may, under some conditions, produce as good results as the addition of a like amount of protein to the food. Which Lawes showed long ago (1853) in the Journal of the R. A. Society of England, in his article on "Pig-feeding."

Feeding a Holstein cow weighing 1,200 lbs. costs only 811 a year more than feeding a Jersey weighing 900 lbs; or, in other words, the expense of feeding the heavier animal is only 18 % more than the cost of feeding the lesser animal, whereas the Holstein exceeds the Jersey by 33 % in weight; that is, a small cow requires a larger maintenance-ration in proportion to her weight than a large cow.

So difficult to settle the relative yields of cows of different breeds! For instance:

Holstein, No 1. cost of food per	pound of butter..	22 63	cts.
" No 2. "	" ..	31.44	"
Jersey, No 1.	" ..	15 96	"
" No 2. "	" ..	23.08	"

See report of Maine station, 1890.

The 2d best Jersey gave 987 lbs of solids in her milk during the year, the best Holstein 1135 lbs.

Wheat depth of sowing.—The yields diminished with increased depth of sowing—depths, 1 inch, 3 inches, 5 inches. My experience is just the reverse, but, of course a great deal depends upon whether the wheat is sown in spring or in autumn, on a clover-lay or after summer-fallow, potatoes, &c.

Calf-feeding.—Whole milk made the best gain, but those on skim-milk and crushed flaxseed did wonderfully well, and only cost, each, 5 cents a day, whereas those on whole milk cost 7.8 cents. A little pease-meal scalded would have helped the calves. One pound and a-half per calf a day of crushed flaxseed seems to me to be an enormous ration. (1)

A sow and 7 pigs ate 2,032 lbs. of meal-corn, barley, linseed meal, bran—during 153 days, and increased in live weight 627 lbs. Took about 4 lbs. of meal to make 1 lb. of pork.

Plaster for top-dressing wheat showed "no effect." I cannot see how it should. Harrowing wheat, when the plants were 8 to 10 inches high, was, in this case, "a decided disadvantage to the crop." So I should think. Fancy harrowing wheat at that stage of growth! We always harrow it in England, but immediately after the winter is over—in early March—, and before any spring growth has begun. Then, the tillering sets to work, the harrows having broken the crust of the soil, and after horse hoeing and heavy rolling with smooth-roller and clod-crusher, we get our large crops of wheat.

Timothy-grass grows very rapidly till the blossom appears. The weight of grass per acre increases until the time of blossoming; it then decreases, the loss being water. It yields the largest amount of digestible protein when cut at the beginning of bloom.

At the *New York station*, in a test of cows of various breeds, for the first 6 months of lactation, several highly interesting results were arrived at; some of which my readers who are balancing in their selection of *butter-cows* may like to ponder over.

	Guernseys.	Jerseys.
Pounds of fat in 100 pounds of milk..	5 07	5 61
" of milk required to make 1 lb. butter.	18.40	17.50
" of butter produced per day.....	0.90	0.91
Time taken to churn in minutes	30	51

Not much choice between the two breeds, though the Guernseys being the larger animals would eat rather more perhaps than the Jerseys; but that would be amply compensated by the beef-value of the Guernsey when dry. Observe the very moderate yield of butter: only 6¼ lbs. a week for the first 6 months after calving. I have had many a *dairy-shorthorn* that gave 9 lbs. a week, regularly, for the same time. There is no statement of the food given.

Corn, according to the Maryland station report, pays well for a dressing of nitrate of soda. Thus, the yield per acre of

(1) Must mean an ounce and a-half. A R J. F.

the corn receiving nitrate of soda- costing $4 00—gave an increased yield of more than 10 bushels as compared with that receiving no fertiliser. In every case in which nitrogen was used, the yield was far above the average. So the extra corn produced by the nitrate of soda cost just 21 cents a bushel plus the expense of threshing &c. Would that pay?

Mr. Thorne, of the Ohio station, talks of *wheat growing* in that State It seems that "during the 40 year period under consideration, there have been seven seasons in which the average yield of wheat in the State of Ohio has fallen below 10 bushels an acre."

And yet the Ohio farmers are now spending yearly a million dollars in artificials! The average crop of the last periods—1860 to 1869 and 1880 to 1889 inclusive—has been as follows: for the first decade, 11 40 bushels an acre, and for the second 13 70 bushels One district the southern, only yielding 8 2 bushels in the sixties and 9 7 bushels in the eighties. Is it worth while to grow wheat for such miserable crops as these? Surely the climate or the soil must be in fault. Could not the farmers grow some other crop, one better suited to their district, sell it, and buy their bread-corn. Many a county in Scotland grows no wheat at all; and the reason is because it does not pay.

Potatoes, with rows 3 feet apart, were experimented on at the Rhode-Island station. Why 3 feet apart? 24 x 10 inches is plenty of space for all the finer sorts. If any one plants Champions, 40 inches x 15 will not be too much. Where whole tubers were planted, the yield was largest.

Says the report of the Nebraska station: "Results of our experiments go to show that, studied under the conditions that now largely rule in the sale of *distinct dairy products*, milk and butter, the breeds do not present the same points of comparison, but are divided into two classes, one giving large quantities of milk, the other yielding smaller quantities of milk rich in butter fat In the milk-class, the average cost of a quart of milk is less than in the butter-class, and in the butter-class the average cost of a pound of butter is less than in the milk-class." This station, again, was unfortunate in its selection of their shorthorns.(1) In the case of the Holsteins, the cost of the rations was considerably increased by the fact of their having had, as a coarse food, timothy-hay, 'one of the most expensive of foods," and one which probably did not aid much in milk production.

At the *New-York Cornell* station, hens fed on a highly nitrogenous diet, consisting of bran, shorts, cotton-seed-meal and skim milk were compared with hens eating carbonaceous food—cracked corn and corn-meal dough with the following results:

Eggs laid and gain in weight—hens.

	Live weight			No. of eggs laid.	Weight of eggs laid.	Average weight of eggs.	Gain in weight, including eggs
	July 26	Nov 27	Loss.				
	lbs	lbs.	lbs.		lbs	ozs	lbs.
Lot I.—Nitrogenous	23 53	21 31	2 22	79	8 25	1 67	6 03
Lot II.—Carbonaceous	23 56	22 00	1 55	26	2 92	1 80	1 36

But, *en passant*, the eggs laid by the nitrogenous food hens "were small, with a disagreeable flavour and smell, watery albumen, small, dark coloured yolk, and soon spoiled, while the eggs of the hens fed on carbonaceous food were large, of fine flavour, natural smell, large, normal albumen, an especially large, rich, yellow yolk, and kept perfectly in the same brine as the others for several weeks. (2)

1, There are shorthorns and shorthorns. A. R. J. F.
(2) Yelk, if you like A. R. J. F

Shallow planting of *cabbages* gave, at the same station, a larger percentage of good heads than deep planting. Still, if I were planting any one of the *brassicæ*, I should plant deep in hot weather, on account of the greater chance the roots would have of getting into moist soil.

Of grasses that stood the winter two years running, at the South-Dakota station, special mention is made of tall meadow oat, wood fescue, Kentucky blue grass, meadow fescue, creeping bent, red-top, sheep's fescue, orchard-grass, Rhode Island bent, hard fescue, and timothy. Of the clovers, common red, mammoth red, alsike, white, and lucerne, lived through the two winters, even under the test of close pasturing the second season.

Cotton-seed meal was compared with *wheat-bran*, as food for the production of butter, at the Pennsylvania station. The animals experimented on averaged 900 lbs. in weight, and were mostly grade cattle of all sorts. Six pounds of cotton-seed meal per head per day did not affect the health of the cows! The substitution of the meal for bran increased the yield of milk by about one-fifth: this is important, for supposing a cow gives to day 40 lbs. of milk on bran, she would, if the statement is correct, as of course it is, give, with a diet of the meal, 48 lbs., = ⁴ of a gallon more, worth, at Montreal milkman's prices, nearly 20 cents! The percentage of butter-fat in the milk was not materially changed, but the judges at New-York, to whom the butter was sent "for grading," rated the cottonseed-meal butter considerably lower than that made from cows eating bran.

A warning.—Three young calves were given daily a pound of cottonseed-meal mixed with hot water, and added to the skim-milk they received. *Two died!* "but the third has made a fair gain." Sir John Abbott, the premier, lost several of his Guernsey calves in the spring of 1881 from giving them the same thing. Linseed, or, as the United States people call it, flaxseed, and pease-meal, are the proper foods to mix with skim-milk for young calves. After they are three months old they may eat anything.

Last year, at the Vermont station, time and labour were wisely — very wisely—economised by mixing the bouillie-Bordelaise with Paris green, and sprinkling the potatoes with the combination. As a fungicide, the copper-mixture seems to have answered, but so many failures have occurred with it, that we require a good many more trials before it can be called a specific. ARTHUR R JENNER FUST.

NON-OFFICIAL PART.