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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

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..THE..

Journal of Agriculture and Horticulture

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Notes by the Way.

Soot.—We have no experience in the use of soot derived from the combustion of wood, but we have used a good deal of soft-coal soot, in England, on meadows and wheat. The quantity spread on an acre used to be about 40 bushels, and its cost varied from 12 to 15 cents (6d. to 7½d.), the value depending on the more or less perfect combustion of the coal; for instance: the soot from the town of Gloucester, where the chimneys were low, as they were very few of them attached to factories, always sold for 3 cents a bushel less than the soot from Bristol, a town full of factories with lofty chimneys.

We remember a farm, half way between the two towns, on which were grown, every year, 30 acres of potatoes manured with nothing but soot, and the farmer told us that he was well satisfied with the returns of the crop.

One remarkable fact we observed: wherever, by accident, a shovelful of soot fell in a heap on a meadow, and was allowed to remain there unspread for a few days; not only was the grass burnt up, but the first green thing that appeared on the vacant space was *couch-grass!*

An immense quantity of soot used, in our time, to be drawn from London on to the farms on the *chalk* in the counties of Kent and Surrey, some 20 to 25 miles from the metropolis. The farmers knew their business, and if the soot had not paid for this long cartage, they would not have gone to the expense of sending a waggon, four horses, a man and his "mate" to fetch it. There was no guano, no superphosphate, and but very few bone-mills in the south of England in those days. In fact the only aids to farmyard dung we knew of before 1843, were soot, shoddy from the cloth-

factories, and the skimmings from the sugar-boilers, the last, doubtless, containing a fair proportion of spent-bone-ash.

Dakota crops.—It is really marvellous that men should patiently go on farming lands that at their best cannot yield much profit; but when we read, as we do in the Rural New Yorker, of a man cultivating 300 acres of land in the Great West, the yield of wheat on which is only 6 bushels to the acre, we begin to think that the American is not so shrewd as we have always thought him to be.

The farmer in question uses the most modern implements, and returns his cost of cultivation as extremely low. Labour, from first to last, he gives as 75 cents; a bushel of seed, 50 cents; interest on purchase of land, etc., 75 cents; in all, about $3.09 an acre, nothing being allowed for taxes and general expenses. Now, 6 bushels of wheat brought him in, this past season, $3 12: where are the profits? And yet he says that, as he does a good deal of the work himself, he gets good wages! Is it worth any man's while to cultivate 300 acres of wheat for the sake of earning the wages of a day-labourer? The English farmer often grows on 45 acres of land as many bushels of wheat as this Dakota farmer grew on his 300. The latter had far better learn how to farm, when he might grew his 1,800 bushels on 100 acres, and let the rest of his land run down to pasture.

Christmas-beef.—A nice little supply of meat was sent to the London markets for the Christmas trade. The total quantity was 11,018 gross tons (12,340 of our tons) against 9,668 in 1897, and 11,810 tons in 1896. The Christmas trade lasts for five days, from Monday, December 19th, to Saturday, December 24th.

Yield of poor land.—Prof. Wrightson, the well known head of the Agricultural College of Downton, near Salisbury, Eng., whose large farm is situated on the downs, i. e., on chalk land, holds the same opinion as that we have often put forward in lectures, and on paper; viz., that crops, in general, are more a question of cultivation and manure than of the quality of the soil.

Mr. Wrightson says: "If ever good crops are to be taken as proof of good land, all I can say is that great injustice will be done to hundreds of enprising tenants, and this Mr. C. S. Read knows perfectly well. I have plenty of land, which can under management produce 19 or 20 sacks (78 to 80 bushels) of oats to the acre, not worth more than 5s. an acre rent. It is, as Mr. Read surmises, on the chalk, and is not soon affected by dry weather. It is poor, but it is kind and grateful and easy to till. It is safe-cropping land, capable of growing any kind of crop when under fair management, but soon runs out, and is readily reduced to absolute incapacity to grow corn. It is done almost entirely by cake feeding. If the matter is gone into, it will be seen that the extra expense attending the management is quite equivalent to a rent of £2 per acre. For instance, it is close-folded with sheep, which, for the sake of argument, receive 1 lb. of cake and corn per day. Further, and also for the sake of argument, we shall assume 250 sheep to pass over one acre in one week. That is, there is consumed on every acre 250 x 7 = 1,750 lb. of cotton or linseed cake. That is, 15 cwt. of cake fed on the acre. Am I wrong? Let us try it again; 1 lb. is not a great deal too much. Two hundred and fifty sheep is not a very heavy stock for 1 acre of turnips for one week, but if it is, try it your own way. Now, if we say half-a-ton of cake instead of three-quarters, and if we assume £6 as the price per ton of mixed linseed and cotton cake, there is £3 per acre spent in cake which, on good land, would not have been necessary. Hence the cake is a sort of equivalent for rent. You pay rent, I spend cake, and I am no better off than you."

You see by this, that "there is nothing like sheep"; and if at some future time, when the market for dairy-goods begins to fail us, our people could be induced to grow rape and vetches, feeding them off with sheep eating cake, or grain, or pulse, they would soon find out the benefit of the change.

Artificial manures.—Nitrate of soda and sulphate of ammonia have in England, at last changed places; the latter, owing to its supply and demand being now about balanced, has maintained a level of price about 20 to 25 per cent over that of nitrate, whereas, two years ago, it was worth 10 per cent less than nitrate, which, as the sulphate contained at least 4 per cent more nitrogen than the nitrate was an abnormal state of things. The truth is, that nitrogen in every form, except in nitrate of soda, has become enhanced in price.

Very little Peruvian guano is shipped nowadays.

We recollect it in its earlier days, when the average percentage of nitrogen was 14, and of phosphoric acid 12, with perhaps 4 or 5 of potash, and marvellous effects it had on our lighter soils in the south-eastern counties of England, as well as in the moister climate of the west of Scotland.

Phosphates of most kinds, too, have gone up 25 per cent.

Nitrate of soda shipments, this last season, have exceeded the demand by from 30,000 to 40,000 tons; the price in Liverpool is now £7 10s. to £7 15s. per gross ton, equal to about $1.65 per 100 lbs, cheap enough, considering that 250 lbs. make a fair dressing for an acre of wheat, and 200 lbs. on an acre of mangels will add some tons to the crop. Add 15 per cent for dealer's profit, and $5.00 for freight and insurance, and it will easily be seen that it could be sold here for $45.00 the 2,000 lbs., or $2.25 a hundred pounds.

Sulphate of ammonia, at present, is worth, in Liverpool $48.60 a gross ton, and should be sold here for about $55.00 a ton of our computation. Not so much bones and bone-ash in market as usual, owing to less exports from South America; prices up from $4.00 to $4.25 a ton. Mineral phosphates up from 20 to 25 per cent.

Weather in England.—How the rainfall varies in England! In Holker Gardens, Lancashire, there fell in August last 8 inches of rain, i. e., one-third of the whole year's rainfall in the eastern division of Wiltshire, in which county, there only fell in August, the great harvest month, 76/100 of an inch! The total fall, snow included, in the two counties, was:

In Wiltshire	24. 48
" Lancashire	45.298

In the latter part of the island the farmers are beginning to dread a return of the "fluke" in the liver, which played the very mischief with sheep, hares and rabbits in the 'eighties.

Milk analysis.—We append a very interesting letter, and the reply, on a disputed point in the purity of milk, which we take from the *English Agricultural Gazette:*

"I have heard from the company to whom I sell my milk, in reference to a sample taken from a churn at Paddington, as follows: Total solids, 12·05; fat, 3·90; solids free from fat, 8·15; showing 7 per cent of added water. Do you think that a sample showing such a percentage of fat as 3·90 would be likely to be so deficient in other solids as mine is represented to be unless water were added? Of course, I send the milk off pure. My cows average nearly 9 lb. per day of feeding-stuffs, principally decorticated meal and cake, and I am quite at a loss to understand the result of the analysis, unless the milk be tampered with in transit. If you would reply to this, and could give me any hints in explanation or assistance, I should be greatly obliged. My point is that I cannot understand how milk showing such a percentage of fat, should be so deficient in other solids."—C. H. M.

"The chemist who analysed your milk adopted the standard of 8·5 per cent for the solids other than fat, and because your milk does not come up to this he returns it as watered in proportion to the difference between this figure and 8·15. Your case is quite a common one, and illustrates once more the unsatisfactory state of our 'standards' in analysing milk. Prof. Stokes, a London analyst, recently took samples from cows himself and found that a very large proportion had milk with 'other solids' considerably below the 8·5 standard, while the writer of this reply has had several instances of the same within his own knowledge. Your milk is perfectly natural, and we do not believe it has been watered, either at the farm or *en route;* it is the chemist's standard which is at fault. The only remedy we can see for this state of matters is to endeavour to get the fat and total solids only taken into account in an analysis. So long as milk has 3 per cent of fat or over, and a total of 12 per cent of solids or over, it is satisfactory, and the 'other solids' may be left out of account."

Improving an Orchard.—A correspondent of the *Journal of Horticulture* gives a remarkable example of the renovation of a very old and worn-out orchard in Ireland. It consists of three acres, and came into the possession of the Rev. Mr. Smith, of Oaklands, Boyle, in 1894. The trees, about 140 in number, were then about eighty years old, badly cankered, and covered with lichens. The crop of 1894 was worth only £4 10s. and Mr. Smith decided to plant some new trees, and to graft those of the old trees that were fit for the purpose. Consequently, in the autumn of 1894 he bought 100 young trees of Bramley's Seedling and planted them. In the April of 1895

he cut down to within 3 or 4 feet of the ground 130 old trees, and crown-grafted with 1,700 scions of Bramley's Seedling. Nearly all grew, and there is no mistaking the clean, healthy growth of the sturdy and powerful-leaved variety on these various stocks. Nearly all the trees bore good crops last autumn, and the apples are described as remarkably fine. Mr. Smith expects to get a return of £100 a year from the orchard hereafter.

LONDON MARKETS.

(January 23rd.)

HAY AND STRAW.

London, Cumberland market.

Best meadow hay . . .	75s. to 80s.
Good " " . . .	70s. to 75s.
Best clover " . . .	80s. to 97s. 6d.
Good " " . . .	70s. to 75s.

Per load of 2,016 lbs.

CATTLE.

Milch-cows £19. 0. 0. to £22. 0. 0.

The following quotations are for the primest of each class per 8 lb. (sinking the offal) :—

	To-day			Corresponding day last year.	
	s. d.	s. d.		s. d.	s. d.
90 to 95 stone Scotch	4 6	—	...	4 6	—
100 " "	4 4	—	...	4 4	—
55 Runts	4 3	—	...	—	—
90 Norfolks	4 4	to 4 6	...	4 4	—
100 " Shorthorns	4 2	—	...	4 0	—
110 " "	3 10	to 4 0	...	3 10	—
90 " Irish (Dub.)	4 4	—	...	4 2	—
90 " Fat cows ...	3 8	—	...	3 6	—

Leading pens of sheep made per 8 lb. as follows (sinking the offal) :—

	To day.			Corresponding day last year.	
	s. d.	s. d.		s. d.	s. d.
7½ to 8 stone Downs.....	5 8	—	...	5 8	—
8 " Scotch.....	5 6	—	...	5 6	to 5 8
9 " Downs.....	5 6	—	...	5 6	—
10 " Downs.....	5 2	—	...	5 4	—
10 " Half-breds ...	5 0	to 5 2	...	5 2	—
10 " Ewes	4 2	—	...	4 4	—
11 " Hampshires.	5 0	—	...	5 0	—
12 " Lincolns	4 10	—	...	4 10	—

The Farm.

THE WHEAT QUESTION.

Dr. J. A. Voelcker, Consulting Chemist to the Royal Agricultural Society of England, resumed his course of Thomson lectures on "Chemistry in Rural Life" in the hall of the Free Church College, Aberdeen, a fortnight ago. There was a considerable attendance of students and others. Dr. Voelcker, who was received with loud applause, said that in the four lectures that had gone before they had considered the elements of chemistry, plant life, soils, and the different agencies that had been at work in producing the crops of the farm, which they were to deal with in that lecture. Crops were divided into four classes—cereals, root crops, albuminous crops, and grasses, which included certain leguminous crops, such as clover. Cereal crops were grown for the sake of the grain and straw. They were essentially dry crops, as distinguished from root crops, and in them starchy matters predominated—mostly of an insoluble nature. Cereal crops were thus grown for the purpose of giving starch or heat formers. Root crops, on the other hand, were essentially water food, and contained very little indigestible matter. Cereal crops varied little in their composition, but they were affected to a certain extent by season and climate. Roots, on the other hand, altered very considerably, *e.g.*, the percentage of sugar might vary much in different crops, and might be affected by the character of the season. The leguminosæ were such crops as clovers, beans, peas, and vetches, and they were grown for the production of corn and straw, or to be gathered, in a green state, as clover, or dry, as hay. Variation was determined not so much by the soil as by the age of the plants. In addition to the leguminosæ, they had to consider the grasses, which were of different kinds. They had the pure gramineæ, and with these they had a certain mixture of leguminous constituents, such as clovers. The main distinctions between the gramineæ, and the leguminosæ were that the former were not so highly nitrogenous, and, in the green state, provided succulent fodder. They were also noted for the large amount of cellulose which they contained. Dr. Voelcker then proceeded to consider the chief purposes for which these different kinds of crops were used. Cereals were grown for producing

starch. They served as human food, and, to a certain extent, as food for cattle. Root crops were almost entirely consumed on the farm as food for the cattle in the stalls or the sheep on the land. Only rarely could farmers sell roots, and that was when near a large town where there were dairy farms. The leguminosæ were largely used on the farm, while grasses were consumed by cattle on the farm, and also occasionally sent into towns in the form of hay for feeding horses. But the cereal crops were those principally sold away from the farm. The others were used for the production of live stock on the farm. Passing on to the essential constituents of plants, the lecturer remarked that crops had to be considered in two different ways—as they were reaped, and in the dry state; and, by means of tables thrown on the screen by limelight, he showed the weight and average composition of ordinary crops. Root crops removed from the soil something like 4,000 pounds weight per acre per annum of dry matter; and with the aid of slides the lecturer showed how this dry matter was made up. Nitrogen was removed from the soil to a much greater extent by root crops and leguminosæ than by cereal crops. He also explained the way in which the other constituents were removed by plants from the soil. They could see how former scientists came to the very rational conclusion that what had to be done in manuring was to put those constituents back into the soil. But other inquirers had shown that they could not settle things quite in that way, and that other points had to be borne in mind. Liebig put forward the mineral theory, which was found to be incorrect; and, as Lawes and Gilbert pointed out, the growth of plants did not depend so much on those mineral constituents, as on nitrogen, which exercised an important influence. It was also shown that growth depended on the power which crops had of assimilating constituents present in the soil. If they were all alike, and acted with equal power, the mineral theory might be perfectly good. But great differences had been found. If they took a cereal crop they discovered that it had not the power of taking nitrogen from the air, but a clover crop had that power, and so, though the produce might show a larger amount of nitrogen in clover than in barley, that did not come from the soil, so the extra nitrogen supplied in manure was not needed. Root crops had very much the same amount of phosphoric acid as cereal crops. A cereal crop grown upon a soil with a fair amount of phosphoric acid in it would utilise it, whereas the root crop would not grow. Therefore the phosphoric acid must be supplied in the form of manures. They had also to consider the conditions in which those constituents were in the soil. They had to be in an available condition for the plants, and so the analysis of the crop was no guide in manuring. Thus the mineral theory was incorrect, because it put all crops upon a level, whereas practical experiments showed that they had different powers of absorbing constituents from the soil. In the case of cereals the most essential constituent was nitrogen; in root crops phosphates; and in the leguminosæ potash. But he (Dr Voelcker) did not mean to say that they would get the best results by using these by themselves. The best result was obtained by using combinations. It was the minimum quality that ruled the whole question. If the essential constituent were absent it could not be made up by any excess of the other constituents. Experimental trials could be made by growing plants in pure sand. *The ordinary farmer, however, had his own soil to deal with, and each must make experiments for himself,* though the experiments made by scientific men were to a certain extent useful. A number of slides were at this point thrown on the screen showing the effect on the growth of certain plants of the presence or absence of any constituent in the soil. It made a good deal of difference how the seed was sown, and further slides explained the results of different methods. The best results were obtained when the seed was sown at regular depth and not too thickly. The question of wheat supply had been discussed very much of late, and Sir William Crookes had opened up to them the dreadful prospect that the country would not be able to provide wheat enough for its increasing population. In other countries land was getting poorer. His solution was that we must get nitrate of soda. But the quantity imported from Peru was diminishing, and so the only way would be to make use of the nitrogen in the air. For that purpose the aid of the chemist would have to be called in. As against that, Lawes and Gilbert have shown that the real reason was that in foreign countries the land was not being cultivated properly, although the soil was much richer than that at home. In their own land they had been able to produce much richer crops, and they argued that if that was the case in their land, how long would it take to exhaust other lands which were much richer?

They showed that while mineral constituents were removed by corn crops, yet it took a long time to remove them, and some of them were not so nearly exhausted as some people supposed. By means of suitable manures crops could be increased immensely, and they need not fear any failure of the land to provide crops. If there were people ready to give the farmer the prices of the wheat, they would be able to grow it in considerable quantity.

LUCERNE (MEDICAGO SATIVA).

The recent dry weather caused farmers to take note of crops of a drought-resisting nature. Those who are acquainted with lucerne, or alfalfa as it is known in the Argentine, where it is largely cultivated, look upon it as indeed a valuable subject in such a season as the present.

It would be well for those who do not know the plant to become quickly acquainted with its great value as a fodder plant. Against this plant there is, in the mind of many farmers, a great prejudice, occasioned, I think, by ignorance of the immense qualities it possesses. Many persons of my acquaintance, who were for a long time sceptical of its value, are gradually becoming alive to the fact that lucerne has many more properties than they gave it credit for, and are now regretting their obstinacy in rejecting its value for summer food. Lucerne, or, as previously noted, *medicago*, the latter name was given by Dioscorides to a median grass, of which there are now at least forty species. It belongs to the order of Leguminosæ, or pod-bearing subjects, and is really a hardy, herbaceous perennial.

M. *sativa*, or common lucerne, is the only variety of value to the farmer. It is said to have been brought from Asia to Greece. The Romans were well acquainted with its properties as a forage plant, especially for horses. Therefore it cannot be considered in any sense a new plant, as some persons appear to think it is. It is one of those subjects which becomes neglected until its real value is tested by such circumstances as farmers have experienced during the last three months, especially in the Southern and Midland counties.

As previously noted, lucerne is grown extensively in the Argentine, also in India and in the Danube valley. In these places of occasionally long drought its resisting powers in that respect make it invaluable. The whole secret of its value in dry weather is the marvellous manner in which it grows when once established. Its deep rooting nature is the sole cause of its success. I have seen roots 4 feet long, just one straight, taplike root with but few fibres. With a root of this description the plant is practically inured from the most exceptional drought that ever was experienced.

In the Argentine, roots of lucerne have been found growing in stone fissures 25 feet in length. Some farmers would (and do say) that such a deep-rooting plant is a dire robber of the soil. A knowledge of the order to which it belongs (Leguminous or pod-bearing), at once knocks this theory into the proverbial "cocked hat," as it is well known that all pod-bearing, plants are saviours of nitrogen because they obtain their portion of this element from other channels than through the root, viz, through the leaves, (1) like all other pod-bearing plants, such as sainfoin, peas, clover, and vetches. As a robber of future crops, then this plant is quite free from that stigma.

From the year 1886 to ten years later, there was an increase of 12,535 acres in England alone in its cultivation, showing that farmers were greatly realising its value more in accordance with its intrinsic worth.

I have no hesitation in saying that the next ten years will see a further advance in the cultivated area of this plant.

All kinds of stock—horses, cattle, sheep, and pigs—are fond of it in a green state. Some writers say it is valuable as hay, but I cannot recommend it for that purpose. In my opinion it is far too "woody" to be of much value in that capacity. The stems become too stout in growth, partaking too much of twigs when allowed to remain until long enough for a hay crop. In this respect it differs from sainfoin, which is hollow in the structure of its stem.

The solid nature of lucerne growth imparts thus a real stick-like character when made into hay.

It is strictly then as a fodder or green plant that therein lies its virtue. I do not go so far as to say either—as some do—that it is rich in nutrition; all cattle that eat it maintain condition, but I should not like to say they become fat on this alone.

I do not think it thrives so well in damp districts, it seems to love the drier counties, such as

(1) Rather, from the *bacteria* in the nodules on the roots.—Ed.

Cambridge, Hertford, Kent, Surrey, Sussex, and Hants. It is not impervious to severe frost during its early stages of growth, especially if the frost follows a wet autumn.

Deep calcareous loam is the most suitable soil for its growth, where its taproot may easily penetrate to a considerable depth, and be thus comparatively independent of rain.

For sheep, perhaps, it is the most valuable as, growing vigorously, it may be eaten off by them four times in a season. Some horses do not take so kindly to it as they do to trifolium or vetches, owing to its being somewhat bitter in the juice. In a short time, however, they become accustomed to it.

I would caution sheep farmers when first turning their flock into it to carefully watch the ewes, and even the lambs, as they are apt to "blow," especially when taken into it with quite an empty stomach. (1) In such case they are sure to eat ravenously. Shepherds quickly get accustomed to its danger in this respect. Cleanliness is essential to success; some writers go so far as to say that the most satisfactory results are obtained by first sowing in wide drills, keeping the ground afterwards clean by hoeing. This is not my experience, nor would I recommend such a plan, on the score of labour entailed in this detail of cultivation. I have seen it succeed for ten years without once cleaning the land after it was sown. Therefore, on this evidence I cannot add to its expense by recommending a constant use of the hoe. A thorough preparation of the land previous to sowing the seed is advisable, not only in point of cleanliness, but in enriching the soil sufficiently to carry the crop over a term of years noted. A turnip or swede crop, followed by oats or barley. With either of the latter, if the seed be sown, a reasonable chance of success is assured. Deep ploughing and the preparation of the seed bed to ensure a thorough tilth are elements of success not to be lightly disregarded. The month of March, along with either of these cereals, is a good time to sow the seed. After the latter is drilled or sown by hand, as the case may be, the lucerne may be sown at the rate of half-a-bushel to an acre by the aid of the hand seed-barrow. The final harrowing for the cereal is all that is required for the lucerne. (2) At the end of September the crop following the harvesting of the corn may be mown, but it is not advisable to allow sheep upon it the first season, or even the second, as they are apt to injure the crown of the plant by biting too low. The whole of the crop should be mown as often as desirable.

The third season, if all has gone well, the whole crop can be given to the sheep if required by the exigencies of the season. Should grass grow freely amongst the plants after a few seasons' growth, as it may do if several winter dressings of manure are applied as a top-dressing to the surface; a couple of turns each way with iron harrows would scratch portions of this weed from amongst the plants. The early part of October, if the weather is dry, would be a suitable period for this work, and would tend to cleanse the ground, and subject the lucerne less to smother and weakly growth.

E. MOLYNEUX.

(1) Let the sheep fill their bellies and then turn them in; but it is not the best way to consume lucerne. ED.

(2) Always roll afterwards. ED.

WHEN SHOULD MANURE BE SPREAD.

(B. M. VAUGHN).

On the question of the advisability of spreading manure in winter on frozen ground, opinions expressed in recent issues differ so radically that it seems as if the experience of some of our manure specialists might be of interest. Or perhaps it would be still better to have the opinions of practical farmers on the subject, and have each one, in addition to his opinion, answer the following questions about the land on which his manure was spread and give other attendant circumstances, upon which his opinion is based: Upon what kind of soil and how far down from the surface is the water level in this soil? Was the land steep, gently sloping or nearly level? Was your land in sod or not? If the soluble parts of your manure washed out, would it wash beyond the limits of your own farm? What kind of manure did you spread upon frozen ground—coarse or fine? How deep was your ground frozen? Was there snow blanket enough on during that winter to permit the ground to thaw out first from below? What did you intend to use your land for in the spring?

Some or all of the facts and conditions called out in the answers to the above questions may furnish reason for the opinion of the farmer in each case, whereas another farmer surrounded by different conditions might be justified by experience in adopting a different course. Our own

farm contains a great variety of soils, ranging from sticky clay to light sand, mixed with gravel, and also has several beds of muck. Parts of it, too, are quite steep, others gently rolling, while other ports are quite level. On the sticky clay and muck we would not spread manure in winter, because it greatly impedes the drying out of the soil in spring, and also form a mulch which keeps the frost in the ground far later than it would otherwise remain. Nor would we spread a thick coat of manure in the winter on any soil which we desired to work early in the spring, for the same reason. And this is specially true of coarse manure. We have often known it to make two weeks' difference in the time of working lands in the spring.

On our steeper lands, experience has shown us that winter spreading manure is not advisable, and this is especially true, as the leachings run into ditches that open into a river, so that some of soluble parts of the manure would be lost. On sod-lands one may safely spread manure in the winter, when, if not in sod, much would be lost. So, on fall plowing, manure may be spread with little or no loss; when on smooth land without sod, through otherwise the same, much would flow away in the drainage water. The above are a few of the facts that our experience bears out. Let us hear the experience of others, keeping in view the same questions, and suggesting any others that may have a bearing on winter manuring of frozen ground. It is of much interest just now.—*New Eng. Ag.*

GRASS MANURING EXPERIMENTS

In some experiments on the manuring of grass land carried out for the Agricultural Department of Nottingham College during the past season, dung had the greatest effect, the drought having prevented the artificial manures from acting freely. As the dung was applied in the previous autumn, it had a better chance of operation than the artificials, all of which, except the basic slag, having been applied in the spring. On the average of five years, however, the greatest gain in hay over the produce of the unmanured plot at Retford, on old grass on clay soil, was 11 cwt. 3 qrs., abtained with the help of 1½ cwt. of kainit and 1 cwt. of nitrate of soda. Next came 9 cwt. 2 qrs., on the plot dressed annually with five loads of dung. Basic slag alone, 3 cwt. per acre, gave an average increase of only 1 cwt. 2 qrs. Strangely enough, 1 cwt. of nitrate of soda alone appeared to do more harm than good, and the same may be said as to the use of superphosphate alone, or raw bones. These, however, are anomalous results. At Eggington, Derby, the greatest average increases in two seasons were those on plots to which both dung and artificials were applied; but they were not enough to pay, if the dung be valued at 5s. a load, as we think it should be. The greatest increase of hay produced by artificials was 13 cwt. 3 qrs. obtained on a plot dressed with 3 cwt. of basic slag, 2 cwt. of kainit, and 1 cwt. of nitrate of soda. The nitrate alone gave an increase of 9 cwt. 2 qrs., and the slag alone appeared to diminish the yield, as did superphosphate also. At Kingston, Notts, where sulphate of ammonia was tried against nitrate of soda, with other artificials, or dung in all cases, the former gave the better results; but then the same quantities of these two manures were used, which made the trial unequal, as there was more nitrogen in the sulphate than in the nitrate.

The Orchard and Garden.

(Conducted by Mr. Geo. Moore).

POMOLOGICAL SOCIETY.

Interesting papers on orchard preparation, spraying fruit trees, and landscape gardening.

The proceedings of the fifth session of the sixth annual meeting of the Quebec Pomological and Fruit Growing Society began yesterday afternoon with a paper on Orchard Manuring by Mr. J. C. Chapais. It was of a technical character and betrayed considerable research and experience.

Mr. Chapais started with the assumption that fruit trees took away the fertility of the soil in the same way as other plants did. Hence it was of paramount importance to maintain the fertility of orchard soil. How was this to be done? The fertility of the soil should be secured first when the orchard was set out. It should also be maintained at a certain degree during the early years of the growth of the young trees. Lastly it should be the object of special and continuous attention

while the orchard was in full bearing. As regards the work of soil fertilization, before planting, something in addition was needed besides the usual process of cleaning dressing, sub-soiling and mellowing. Unless the soil should prove very rich, it would be found advisable to spreed sixty single loads of good barnyard manure per acre. Good results would be obtained if this were spread one year in advance of plantation.

It was also necesrary to maintain the fertility of the soil during the first years of the cultivation of the orchard. Good barn-yard manure was effective at this stage also. It contained sufficient nitrogen to ensure a strong wood growth, as well as phosphoric acid, potash and lime.

Forty single loads of barnyard manure, per acre, distributed every autumn would be found sufficient to feed the plants cultivated between the trees, as also the growing orchard, and yet leave a surplus of fertilizing elements for future wants.

Coming to the fertilization of the soil when the trees begin to bear fruit, Mr. Chapais found that something further was required besides barnyard manure. The high requirements of fruits bearing trees necessitated that the fertilizing elements taken from the soil by the trees should be returned to it. Mr. Chapais gave some interesting figures, the result of experiments made by Dr. Steglich, of the Agricultural Station at Dresden, Saxony. This eminent autority had estimated the elements of the composition of fruit trees after one year's growth Apple trees ten inches in diameter contained ten pounds of wood, nine pounds and four ounces of leaves, and thrirty-one pounds of fruit. After being desicated the result was Nitrogen 2.72, Phosphoric Acid 0.50, Potash 2.30, Lime 4.91.

In the case of pear trees of similar diameter, there were ten pounds and six ounces of wood, five pounds and twelve ounces of leaves, fifteen pounds and seven ounces of fruit. This contained after being well dessicated, Nitrogen 2.61, Phosphoric Acid 0.37, Potash 2.88, Lime 4.26.

Cherry trees ten inches in diameter gave nine pounds and four ounces of wood, nineteen pounds and fourteen ounces of leaves and twenty-six pounds and seven ounces of fruit. This contaided after dessication, Nitrogen 2.48, Phosphoric Acid 0.88, Potash 2.80, and Lime 5.43.

These results showed that every tree of a certain diameter drew from every squared yard sheltered by its foliage, an area which represent that of the extension of its roots in the ground, a certain well defined percentage of the four principal elements of its growth, namely, Nitrogen, Phosphoric Acid, Potash and Lime. This was valuable data in computing the quantities of fertilizers which should be supplied to fruit bearing orchards.

There was no doubt that chemical fertilizers were superior to barnyard manure for fruit bearing orchards. It was well known that manure does not give up all its fertilizing elements to the soil the first year of its application.

Mr. Chapais found that the propo·tion of fertilizing elements to be restored to orchard soil was as follows : One of Phosphoric Acfd to three of Nitrogen, four of Potash, and eight of Lime. Good hardwood ashes were valuable when available. They could be used advantageously in the autumn at the rate of 30 bushels per arpent.

After a brief discussion on the paper, Mr. R. W. Shepherd moved a vote of thanks to Dr Saunders for his presence at the meeting and the valuable information which he had given to the Society. This was unanimously carried and brought forth a suitable reply from Dr Saunders.

CANNING FRUIT.

The next paper read was by Mr. W. Craig, jr. His subject was " Canning Fruit. "

Mr. Craig first gave a brief historical outline of the subject. The process of preserving fruits and vegetables in hermaticaly sealed jars was discovered by a Frenchman about eighty-five years ago. The industry had made remarkable progress since that time. Fruits were canned on a commercial scale in the Old Country as far back as 1825. In 1842 sweet corn was canned in Maine. The stampede across the Continent to the California gold mines in 1849 gave an impetus to the industry in America, and America as a canning Continent now leads the world. The pack of sweet corn in the United States and Canada in 1891 amounted to 2,799,453 twenty-four can cases. Over 20,000 canning factories employed 1,000,000 persons. It is estimated that Canadian canners now pay annually to farmers $500,000 for fruits and vegetables.

The principles of canning were the destruction of germs and the exclusion of the air. The jars should be thoroughly sterilised. Sugar was not necessary to fruit to put up in this way. Perhaps the best method of canning was as follows :

" The fruit, retaining its natural form, should

be prepared and put at once into the jars. The jars are placed in a boiler of warm water, with some perforated support underneath, so that they will not rest on the bottom ; by this means water will be underneath as well as round them, and there will be no danger of breaking the glass. Then make a syrup of water and sugar, pour this boiling solution into the jars ; cook five minutes and seal up at once."

Mr. Craig thought that a system of canning fruit and vegetables in season should be encouraged.

Mr. R. Hamilton read a very valuable but technical paper upon the subject of "Indigenous Plums of the North Western States and Canada." The discussion which followed the reading of this dissertation brought forth an instructive address from Mr. F. A. Waugh.

This gentleman exhaustively discussed the question of identity of the Prunus Americana with the Prunus Canadensis. In his opinion the later is a variety of the former, and he has given to it the name of Prunus Americana nigra, which will probably be generally accepted.

A PAPER BY THE PRESIDENT.

The president of the Society, Mr. C. P. Newman, read a paper on the subject of Cold Storage.

Some people thought that the flavour of fruit was injured by cold storage. This he believed was a mistake. For such varieties as Fameuse, Winter St. Lawrence, an extension of season could profitably be made. The storage people, doing a large and important business in butter and cheese, were rather independent of fruit growers. This was to be regretted.

The discussion on the paper was participated in by Messrs. R. Hamilton, F. A. Waugh, R. W. Shepherd and W. T. Macoun.

Mr. Craig announced that last winter at Cornell he and a friend had busied themselves in classifying and perfecting a system of nomenclature for Canadian fruits. He did not ask the Society to adopt this but suggested that the system be incorporated in the annual report of the Society. Mr. F. A. Waugh had assisted in the work of classification. The meeting gladly agreed to this.

A meeting of the directors was held immediately after adjournment, at which it was decided to hold the summer meeting of the Society at Joliette.

LANDSCAPE GARDENING.

At the evening session an interesting discussion took place as to the best methods which should be employed in combatting the many enemies which annoyed the fruit grower and destroyed the results of his work. The merits of scientific spraying were described and emphasized. After this informal talk was over, a most interesting and instructive illustrated lecture upon "Landscape Gardening" was given by Professor F. A. Waugh, Horticulturist, Vermont State Agricultural College.

The lecturer proceeded to define the two great kinds of gardening. As English or natural, and architectural or geometrical. In the former style, it was the aim to have the grounds very much as nature intended them to be There should be no straight lines. Shrubs and trees should be massed naturally. They should be of one variety. There should be no sharp colour contrasts, but rather gentle gradations. If it was decided to follow the architectural methods, then a definite geometrical design should be adopted and rigorously adhered to. It was impossible to get good results without unity. The scheme of decoration and improvement should be carefully thought and planned in advance.

Mr. Waugh laid down five essential principles which must be followed in landscape gardening if the best results were to be obtained. There must be unity, variety, character, propriety and finish or smoothness.

He was a poor gardener who worked for years adorning a piece of ground or landscape without leaving in the general effect a clue to his character. The best work should and would express individuality. The lecturer claimed that the decoration of terraces or garden plots with rows of monotonous looking empty beer bottles or telegraph insulators, constituted a grave breach of the proprieties of landscape gardening. Some gardeners were either incautious or indelicate in this matter. No one could be persuaded that nature had a hand in thus arranging the bottles.

Finally, the best scheme of landscape gardening would be seriously marred if there was not finish or smoothness. By this the lecturer meant a general neatness in the surroundings. The lawns must be kept smoothly shaven, and the wheelbarrows removed therefrom. If the architectural plan be adopted, the shrubs should be kept trimmed and the dead wood carefully removed. By the manifestation of this care and neatness, finish or smoothness would be obtained and this was essential, no matter what plan of landscap

gardening was adopted.

At this session, Mr. W. W. Orr, vice-president of the Ontario Fruit Growers' Association, contributed some valuable notes on spraying in 1898.

The meeting passed a resolution of sympathy with Mr. A. Dupuis, the president, in his illness, which made his removal to the hospital for treatment necessary. A vote of thanks, moved by Principal Peterson and seconded by Mr. R. W. Shepherd, was given to Prof. Waugh and M. Orr.

The Society will hold its next meeting in August at Joliette.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

EARLY TRAINING OF CHILDREN.

To ensure good and permanent results this training cannot be started too soon. Few people have the strength of mind to do this, more especially with the first baby, the tendency of everybody is to look upon a new baby as a toy, a dear little plaything, to love and pet; and quite right too; no mother can be anything but proud of her firstling, no thought is given to training; happy and proud of her possession, she starts to pet and spoil at once, never thinking, or dreaming, what she is laying up for the future, till some day she wakes up to the fact that her darling treasure has developed into a hard taskmaster, whose slightest cry must be attended to night or day, well or ill. Nobody knows but those who have to do, or have done it, how much time and care has to be devoted to the proper management and looking after a baby; and not till other duties have to be attended to at the same time, will the test be brought out of the good or bad training of the same baby.

A baby for the first six months of its life wants nothing but its own natural food, with PLENTY of sleep If possible, start at a regular time every morning to bathe, dress, and feed it; after which, lay it in its bed where it can sleep undisturbed, which it will do for two or three hours at a time if it has the good fortune to be a strong, healthy child.

Never mind if the eyes are not closed when you do this; it is part of good training which, if started very early in the little life, will prove a great blessing and help to a mother on many occasions. Never start the bad habit of rocking and it will never be missed or wanted, and will give many an extra half an hour for other necessary demands on the time of a busy mother.

All this sounds rather harsh treatment, but one has only to look round and notice the spoilt children of the present day, who are often a nuisance to themselves and their belongings, and they will soon feel that it is worth a grand effort to see that their child shall not develop into one of these same spoilt darlings. A friend of mine (the editor of this periodical) thinking to save a very little girl from harm who was hanging on to a cow's tail, got snapped at him the crushing answer: "'T'aint your cow; 'tis Willie's cow"!

RECIPES.

THE AMERICAN WAY OF COOKING BEEFSTEAK AND CHOPS.

Trim the steak carefully, cutting off all ragged pieces for soup-meat. Put in the pan a piece of butter the size of a filbert, and a teaspoonful of Worcestershire sauce. Lay the steak upon the butter and sauce. Butter thinly the side that is up, and sprinkle with salt and pepper. Cover closely. Let cook about three minutes, then turn over. This browns both sides and keeps the juice in the steak. Turn once or twice more while cooking, which should take about ten minutes for a steak of medium thickness. Chops should be cooked just as steak, except that, being thinner, they will require rather less time.

CHOPS WITH TOMATO SAUCE.

Prepare the chops as above, but when half cooked pour over them a cup of cold, stewed tomatoes, into which has been previously stirred a teaspoon of flour and two tablespoons of soup-stock. Cook until the chops are done, when you will find your sauce ready too.

WHITE LAYER CAKE.

An excellent recipe for a very white layer cake is one cup of soft white sugar, one half cup of sweet milk, two and one-half cups of sifted flour; two teaspoonsful of baking powder, one half a cup of butter, the stiffiy beaten whites of three eggs.

GOLDEN FILLING.

Place one cupful of milk in a double boiler, sweeten to taste and add a teaspoonful of corn starch, dissolved in a little milk. When wel

scalded add the beaten yolks of three eggs and stir until thick allowing it to cool before flavoring or placing between the cakes.

DIGESTIVE BISCUITS.

Rub two ounces of butter into one-half pound of whole meal, having previously mixed into the meal two tablespoonful of baking powder, together with two ounces of sugar. Beat up one egg and add to the meal, and mix in as much milk as may be required to make all into a stiff paste. Roll out this paste to any thickness that may be like cut into round biscuits, prick the top of them with a fork, and bake till ready in a moderate oven.

A PIGEON PIE.

This makes a reliable dish for supper or luncheon. Lay a rim of puff paste round the sides and edge of a pie-dish. Next sprinkle a little pepper and salt over the bottom of the dish, on which place a thin beef steak. Pick and draw two or three young pigeons, wash them clean, and cut off their feet. Press the legs into the sides. Put a bit of butter and a seasoning of pepper and salt inside each bird, and lay them breast upwards in the dish, the necks and the gizzards between them. Sprinkle more pepper and salt over them, and put in a wine-glass of water. Lay a thin sheet of paste over the top, and with a pastry brush wet it all over. Then put a puff paste half an inch thick over that, brush over with egg and ornament the top, sticking four of the feet out of it, and bake. When done, pour in a little good gravy and let it get cold before serving. Some people consider hard-boiled eggs an improvement to this dish.

CHICKENS' LIVER AND BACON.

This is a most appetising dish and one easily made by keeping back the livers of fowls when cooking the latter. Cut some very thin slices of streaky bacon. Divide each liver into two, lay it on a slice of the bacon, tie it round with a piece of string, and fry till the liver is cooked through. Have ready pieces of buttered toast; rounds stamped out of a slice of bread are the nicest; serve each roll on a piece of this after taking away the string and sprinkling with a dash of cayenne pepper.

BROILED SARDINES.

Select twelve good-sized firm and fine sardines. Arrange in a broiler, a double one is the best, and broil for two minutes on each side on a very hot fire. Place six fresh dry toasts on a hot dish, lay the sardines on them, being careful not to break them. Pour some maître d'hotel butter over them, made as follows:—Put 1 oz. of butter in a basin, with a teaspoonful of finely minced parsley, adding the juice of half a lemon, and a dash of grated nutmeg.

SARDINE CURRY.

Remove the skins of the sardines, and put them in a baking-tin covered with oiled paper. Put one tablespoonful of butter and one of flour into a saucepan, blend well and add half a pint of boiling water slowly. Then add one teaspoonful of curry powder and one of onion juice, stirring all constantly until boiling, add a small teaspoonful of salt and one of lemon juice. Toast some thin slices of bread, cut off the crusts, place them on a platter with the sardines on them, and pour the curry sauce over the whole.

APPLE FRITTERS.

Choose some large apples of equal size, peel them, and cut in rounds about half an inch thick, stamp out the cores, and lay them singly on a flat dish. Strew over them a spoonful of castor sugar and pour over that half a glass of sherry; let the apples soak in this for at least an hour. Make a light batter with one or two eggs, according to the quantity wanted, and flour and milk in proportion, just at the last pour in the liquid off the apples; with a fork dip each slice in the batter and fry in boiling fat till soft. Serve on a napkin or a dish paper with sugar sprinkled over.

APPLE SHAPE.

Peel three pounds of baking apples, and lay in cold water as finished, stew till soft in as much boiling water as will cover them, add the peel and juice of one lemon and ¾ lb of loaf sugar. Soak 1 oz. of gelatine in 1 gill water and stir over the fire in a lined pan till dissolved. Beat up the whites and shells of two eggs, put the whole into the pan and boil for one minute, stirring all the time, run it through a piece of muslin, wet the mould and fill it. When wanted wrap a cloth

wrung out of hot water, round the mould, and when the heat begins to go through, turn out.

MEDICINAL USES OF EGGS.

According to the "*Medical Record*," eggs are useful in the following applications: "A mustard plaster made with the white of an egg will not leave a blister. A raw egg, taken immediately, will carry down a fishbone that cannot be extracted. The white skin that lines the shell is a useful application to a boil. White of egg, beaten up with loaf sugar and lemon, relieves hoarseness, a teaspoonful taken once every hour. An egg in the morning cup of coffee is a good tonic."

The Dairy.

HOW CHEDDAR CHEESE IS PREPARED IN ENGLAND.

This cheese is prepared in England very much as its imitation is made throughout Canada. It is made extensively in the western counties of England, where the art of cheese making was already considerably developed at the beginning of this century. As a rule it is made from a mixture of morning's and evening's milk. The cheeses are cylindrical in shape, 60 lbs. in weight, on an average, and are about 10 or 12 inches deep, with a diameter of 14 or 15 inches. The heaviest cheeses weigh up to 100 lbs., while the lightest only weigh from 18 to 20 lbs. (1)

The preparation is as follows :— The milk is first coloured with anatto, and often indeed with the juice of carrots or marigolds. It is allowed to thicken, at from 80° to 90° F. in from 60 to 75 minutes. The curd is then broken up with the ordinary cheese-knives. The milk is previously warmed in round cheese-vats, made of oak, by adding a portion of strongly-heated milk to the rest of the unwarmed milk, or by the addition of hot water to the milk. In the preparation of cheeses of 60 lbs. in weight, the cutting up of the curd occupies about 20 to 25 minutes. Before the separate pieces of the curd are reduced to the proper size, they are left for fifteen minutes in the covered cheese-vat, a portion of the whey is then removed, and the work of breaking up the curd is finished. After this, the whey is all removed, with the exception of a very small quantity, and the curd is drawn together and covered over with perforated boards which are weighted with about 30 lbs. When it is observed that no more of the whey is being driven out in this way, it is removed, and the board is weighted with 65 lbs. The mass of curd after a short time is broken up, in some districts with the hand, in others with the curd-mill, and then submitted for some time to a pressure of 100 to 125 lbs., 2½ or 3 per cent of salt being then worked into it. The curd-mass is finally sewn up in cloth, and is placed in a round chest of wood or tin, with perforated sides, and put under the press. Long iron or wooden pegs are stuck through the holes of the mould, in order to facilitate the removal of the whey during pressure. After a short time, the cheese is removed from the mould, is broken up and put into a fresh cloth, and again pressed for a short time. This treatment is repeated several times, till finally the cheese is allowed to remain in the press, under great pressure, for several days. In the meantine it is turned repeatedly, and care is taken that the whey flows from the mould.

The pressure is increased to such an extent that it finally amounts to 15 lbs. per one pound of cheese. After the pressure has been finished, the cheese is taken out of the mould, divested of its cheese-cloth, brought into the curing-room, and treated in such a way that a hard rind is imparted to it. This is done by allowing it to remain for several days in a brine solution, or by rubbing salt into it. The cheeses which have salt rubbed into them, especially if they be very fat, are sewed up in linen, so that their shape may not be lost.

As soon as the rind has been made sufficiently firm by the action of the salt, the cheese is dipped for a moment in warm water or warm whey. It is then dried and put back in the ripening-room, where it is turned daily until it has become perfectly dry. When it has become dry, it is turned in summer three times and in winter twice a week. From time to time it is rubbed with butter.

At an average temperature (60° F.), Cheddar cheese ripens so as to be ready for sale in from three to four months. Cheese of an average size of 60 lbs. do not attain their highest perfection till from six to ten months have elapsed. Large

(1) And there used to be, when we were at a private tutor's in the neighbourhood of Cheddar, in 1840, a very rich toasting-cheese, made in the fall. Ed.

cheeses require nearly two years before they are ripened. In the curing-room, the Cheddar cheese loses in the course of a year about 15 per cent of its weight. Those cheeses which are most highly prized, and which are exported in quantity, possess a firm wax like appearance, but are at the same time porous. When ripe in the inside, as well as near the rind, a small bright green development of mould may be observed. About the same quantity of milk is required, by this rather antiquated method, to make a pound of Cheddar cheese, as is required in this country to make a pound of the cheese that goes by the same name. (1)

H. WESTON PARRY.

January, 18th, 1899.

(1) And which is, in the best specimens, very good, but not equal to the original, in spite of the great, the very great skill of the makers. ED.

Competition of Milch-Cows.

NOTICE TO AGRICULTURAL SOCIETIES AND FARMERS' CLUBS.

Table showing the way in which prizes are to be assigned in the Competition of Milch-Cows.

No.	Quantity of Milk.	Richness in fat.	Pounds of fat.	Price of fat by the pound.	Value of the fat.	Skim Milk.	Price of skim milk by the 100 lbs.	Value of the skim milk.	Daily return.
1	40 lbs.	5 %	2 lbs.	15 c.	30 c.	38 lbs.	20 c.	7 $\frac{60}{100}$	37 $\frac{60}{100}$
2	45 "	4 %	1 $\frac{80}{100}$	15 c.	27 c.	43 $\frac{20}{100}$	20 c.	8 $\frac{64}{100}$	35 $\frac{64}{100}$
3	35 "	5 %	1 $\frac{75}{100}$	15 c.	26$\frac{1}{4}$c.	33 $\frac{25}{100}$	20 c.	6 $\frac{65}{100}$	32 $\frac{90}{100}$
4	40 "	4$\frac{1}{2}$%	1 $\frac{80}{100}$	15 c.	27 c.	38 $\frac{20}{100}$	20 c.	7 $\frac{64}{100}$	34 $\frac{64}{100}$
5	40 "	4$\frac{1}{4}$%	1 $\frac{70}{100}$	15 c.	25$\frac{1}{2}$c.	33 $\frac{80}{100}$	20 c.	7 $\frac{66}{100}$	33 $\frac{16}{100}$

The profit is calculated by adding the value of the fat (col. 5) to that of the skimmilk.

By the above table it is easy to see that the first prize will not necessarily fall to the cow giving the greatest quantity of milk ; since, not only must the quantity of milk be reckoned, but also the richness of that milk and the value of the skimmilk.

Thus, cow No. 1 wins the first prize ; the second falls to cow No. 2 ; the third to cow No. 4 ; the fourth to cow No. 5 ; and the fifth to cow No. 3.

THE VALLEYFIELD MEETING OF THE DAIRYMEN'S ASSOCIATION.

Abstract of M. G. A. Gigault's address.

This year, the exports of cheese to England have decreased. Mr. Lister, an Englishman, who was present at this meeting, tells us that, whereas the consumption of cheese in England has decreased, the consumption of butter has increased. He, therefore, advises us to turn our attention specially to the production of butter. According to his views, if we were to make twenty times our present production of butter, it would not lower its price by two cents. We must pay great attention to this advice of Mr. Lister.

Besides, we should do our best to expand the demands of our home-market. If the exports from the States of cheese have decreased, it is not only because we make better cheese than they do, but also because their people eat a great deal more cheese than formerly. When MM. Bourbeau and Henry visited the Western States, they found that the people were using a great quantity of a new kind of cheese, called "Brick-cheese." It seems that it pays better than Cheddar, and might

easily be made here, especially in winter, if the Dairy-school were to take up its instruction. It is to be hoped that our makers will turn their attention to the making of "brick-cheese" this winter. The paper, *Farming*, of Toronto, has just published an excellent article, in which it strongly recommends dairymen to pay great attention to the demands of the home-market, and to endeavour to increase the consumption of dairy-products.

There is no good in dreaming of increasing our exports of cheese, but, on the other hand, as the production of milk has increased and is still increasing considerably, we have got to find profitable markets for our dairy-products, either by expanding our butter-trade, or by making such varieties of cheese as shall be more suited to the taste of Canadian consumers than the cheese we are now turning out.

The facts that look us in the face show that the competition in the English market is becoming annually more intense. They who will finally win in the contest are those who will learn how to produce the best articles at the most economical rate. It is to the quality of our exports that we must look, if we do not wish to see our dairy-trade go to pieces. Nothing but the production of first-rate commodities will save us. And to succeed, the first thing necessary is that our farmers supply the factories with milk in the best possible condition; for, unless it is delivered perfectly clean and pure, good butter and cheese cannot possibly be made from it. The makers, too, must be skilful and the factories well fitted up. A good ripening-chamber, also, is requisite, and the Minister of Agriculture is about to take measures to encourage the improvement of these chambers.

That the trade be profitable, it is indispensable that milk be produced economically. On this point, Mr. Macpherson has given us valuable hints. In his opinion, milk could be produced for 25 cents the 100 lbs., if we knew how to improve our pastures and meadows, and to improve the productive powers of our farms so as to enable them to yield abundant crops of green-fodder.

The selection, or weeding out, of our herds of cows is one of the best means of lowering the cost of our milk. With the view of encouraging this selection, the Hon. the Commissionner of Agriculture wishes the Clubs and Societies to organise competitions of milch-cows, in which nothing shall be considered but the yield of milk Registers will be furnished, and a special grant will be made to such agricultural societies as shall offer the highest prizes at these competitions in each county.

In Germany, an experiment has been made on 16 cows of the same breed, and receiving the same food. It was shown that the annual yield of cows of the same breed, etc., may vary by as much as 216 pounds. The best cow gave, in a milking period of 300 days, 350 pounds of butter, while the worst only produced, in the same period, 174 pounds. This fact shows how necessary it is to select our milch-cows carefully.

And, as to the bye-products of our dairies, Mr. Macpherson told us just now how important it is for the dairy-farmer to breed plenty of pigs. This is well understood in Denmark, the farmers of which country sell more than ten million dollars' worth of bacon annually. This is the best way of making the most of our skim-milk and whey. The fattening of hogs after the fashion prescribed by Mr. McPherson would constitute a new source of profit for our dairy-farmers.

We occupy, at present, an excellent position as to the reputation of our goods on the English market; and this position we may maintain, and even improve, if we set to work to put into practice the good advice given to us by the lecturers we have listened to at this convention.

A SKIM MILK CALF.

Ed. Hoard's Dairyman:—We send you by mail a photograph of a grade Holstein calf dropped last December, which was fed through the winter and spring on skim milk. We believe that there is no better or cheaper way to raise calves than by feeding skim milk. (1)

GRISWOLD BRO'S.

Madison Co., N. Y.

THE SHORT-HORN AS A DUAL-PURPOSE COW.

Ed. Hoard's Dairyman:—We have been much interested in the discussion of the "dual-purpose"

(1) Well, that depends: if you want plenty of bone for draught-oxen, it may be. ED.

cow, and for the benefit of the *Dairyman* and its readers, will describe ours.

We keep Short-horn grades, weighing from 1,100 to 1,500 pounds. Our poorest milkers will give between 5,000 and 6,000 pounds of milk in ten months. We have had pure bred Short-horns that would give above 12,000 pounds. One of our neighbors has a cow at this time (grade Short-horn) that will do this. Our steer calves and cull heifers sell easily for $20 per head at six months old.

Your correspondent from Canada quotes steers two and one-half years old at $25. Such steers must be "dairy-bred." Steers at that age are worth from $50 to $75 here.

A few months ago a correspondent from Iowa said that the average grade Short-horns of that state weighed only 800 pounds at two years old. We have in the barn yard an "average" Michigan grade Short-horn that will weigh 1,200 pounds and is only twenty months old. His dam is a good milk and butter cow.

We have had a few Jersey grades and now have two, one a Holstein-Jersey cross and one a high-grade Jersey, but do not want to keep them long or get any more of them.

The Holstein-Jersey is the best of that class we ever had, but no better than our average grade Short-horns. Our experience with the Jersey cross on native cows is that the milk is slightly better in quality and nearly always decidedly less in quantity.

As we have only grade cows, we have no bulls for sale and what heifers we do not want to keep, bring nearly as good a price for beef as our steers.

We do not want any stock here that is only good for one thing. Our sheep average as much wool of better quality than when we kept "special purpose" sheep, and our lambs bring top prices. The past season we worked a general purpose 23 year old horse in the same team with a Clydesdale grade 7 years old, and the old horse kept in better flesh on less feed. Our hens are "dual-purpose" hens, and if we want bacon hogs we feed to make bacon, and if we want lard we feed to make lard. And in this connection, I notice that the Chicago market reports quote "prime heavy," hogs higher than any thing else. Is your correspondent of a short time ago blind to facts or only a little untruthful?

Now in conclusion I will say that we like the *Dairyman* very much in some respects, especially its articles on feeding. I have not seen a ration formulated yet in which there was not something to be learned by study or comparison with other rations given. Keep right on publishing them. They are good reading whether one is feeding for milk and butter or beef, for lard or bacon, or for eggs or broilers. But we know the "dual-purpose" cow does exist and are going to keep right on breeding her for milk, butter, and beef, just as we have been doing. We do not claim that the Short-horns are the only "dual-purpose" breed, but they suit us best.

E. G. ROGERS.

Lenawee Co., Mich.

PRINCE EDWARD ISLAND DAIRYMEN'S ASSOCIATION.

Meeting at Wilmot Valley.

EDUCATION ! EDUCATION ! THE DUTY OF THE HOUR.

ED. HOARD'S DAIRYMAN :—A pleasing feature of this two days' meeting was the number of newspaper men present, all of the leading journals being represented.

John R. Edwards Esq., North Ulrshire, Vice-President of the Association, occupied the chair and opened the meeting in a happy speech.

Mr. Joseph Rogers spoke of the advantage of mixed farming. Special farming might do well when prices were good, but from his opinion in swine raising and dairying, mixed farming paid the best.

Mr. Turner criticized the programme.

William Thompson read a paper on "Farming and how to make it pay", and closed by asking a series of questions in reference to paying lines of farming.

Mr. Brown spoke of the Rattenburg pork factory, suggesting the appointing of a strong delegation to wait on the manager with a view of ascertaining the kind of hog best suited to their requirements, and placing the farmer and the packing house on more equitable terms with regards to weighing, dockage, prices, etc.

Mr. Pond advocated the building of the proposed co-operative packing house, at Summerside, P. E. I., forthwith.

"The hog as an adjunct to the dairy," was discussed at great length ; methods of feeding, breeds, weight, economy of bacon raising, etc., as

this subject may not be of an essentially dairy character, I forego comment. The discussion closed by the appointment of a delegation, composed of Messrs. Brown, President Grosby, and Wayne, to wait on the proprietor of the Charlottetown packing house, to see if better relations between buyer and seller could not be obtained.

Evening meeting—President took chair at 7 p. m. The members were greatly augmented, and as there were a number of speakers, the time of each was limited to 18 minutes.

John R. Edwards was the first speaker. He said, in part: "Farmers should mingle more with each other. We farmers, as a rule, are too isolated; we should cultivate a friendly spirit, look after our interests in a body, and embrace our opportunities; meet much oftener, and discuss the different modes of farming. We are partially cut off from the rest of the world, but we love our homes. A large number leave our shores, annually, going to foreign lands and to the cities, where they say they make money three to six times as fast as here. We should look into the future to view the good things, and to educate our young men to stay at home, instead of educating them to go away from the farms, as they are at present. Here we are crippled for want of funds; generally speaking, cash is scarce with the farmer, but the Creator of us all has given us an abundant supply of good things. We are robbing our farms of nitrogen, by selling the raw products of the farm, and something should be done to stop it. I would like to discuss this matter of nitrogen. It is the all important subject. The United States, last year, exported nitrogen in wheat, to the value of twenty-two million dollars. Nitrogen is worth in the market, $30.00 a ton, and at that price is almost prohibitive to replenish."

Mr. Simpson read a paper entitled. "A Few Observations for the Consideration of Farmers," in which he dealt at some length on the necessity of cheese inspection, and the need of the Dominion government, giving this matter of factory inspection more consideration than in the season just past. He also dealt on the great advantages of direct steamship communication with Great Britain now enjoyed. Mr. Dillon informed him that in serveral instances he had a had special request for Prince Edward Island cheese. This shows our cheese has taken a subjective stand in the markets of the world. We should continue to produce as good, and even a better article, if possible, and to do this, we require more rigid inspection. Many farmers show signs of improvement now, that could not be so, but for the introduction of dairying. We have sustained losses in bad crops, but for dairying would feel them much more keenly.

Mr. Turner was pleased with the tone and ideas of the preceding speakers. He thought agricultural education was sadly neglected. Our schools did not as much as teach it. Some move should be made to remedy this. He instanced several European countries in support of his contention—places whose progress was owing to the education they had received. If our boys were properly educated, the would not go to other countries, but would stay at home. He read extracts from ex-Governor Hoard's address at the Fort Worth meeting, touching on this all important subject of education.

Editor Cotton of the *Examiner* was pleased to note a marked improvement in the farming community. We are advancing, and the question is what are we going to do to still further advance. He considered education a most important factor. He also spoke of the great advantage of having direct communication with Great Britain, and of the benefit to be derived from those associations.

Mr. Carruthers said there was something grand and noble in the tilling of the soil. He considered we have shipped 7.3% of our farms to England in the form of nitrogen in produce, how to replace this in the cheapest way was the all absorbing problem. Mr. McDonald thought the majority were now moving in the right direction, but required education. Doctors, lawyers, and merchants were all well educated, why not the farmer as well?

SECOND DAY

The vim and interest of the delegates had not subsided, at 8:30 a. m. the meeting, with Mr. Carruthers in the chair, proceeded to business.

Mr. Turner, seconded by Mr. Stetson tabled a resolution expressing regret that the Professor of Agriculture had been removed from the Provincial College, and requesting that the Professor, or some one other, be appointed to that position forthwith.

Mr. Turner said our educational system was costing us a lot of money, from which we derive little or no benefit. The time has come when we must have an agricultural education. The way to begin was to have it first taught in the Normal

School, then in our schools throughout the province. The speaker pointed to the rise of Denmark under agricultural education.

Mr. J. R. Edwards strongly approved of agricultural education, but when such education was being taught the farmers showed lack of interest in allowing their sons to take advantage of it.

Mr. Stetson thought now was the time to train the child in the way it should go, or when he was old he would walk accordingly. Heretofore it had been the idea to bring the school to the children, now we must change that and bring the children to the school. In the past we have received material aid from Prof. Robertson. Mr. Gill spoke strongly in favor of education along those lines. Now we are teaching languages that are of no practical use to the farmer. This was a farming province, and agricultural education should be foremost in our educational system.

Mr. M'Lellan said the only objection was the cost. This, however, should not be considered, as we would receive good value for the amount spent. A Professor could be appointed who would do the required work in connection with the sciences now taught in the Normal school for a trifle more than what it now costs.

The motion being put was carried unanimously.

On motion, the following committee was appointed to wait on the government to press this question of agricultural education to a successful issue, viz.: Messrs. Turner, Edwards and Carruthers.

Mr. Turner seconded by Mr. Gill made a motion with reference to a program for next meeting in July. The newspaper men present volunteered to give said program the widest publicity free of cost. A vote of thanks was tendered the representatives of the press, to which Mr. Colton ot their behalf suitably replied. J. A. M.

SCIENTIFIC DAIRYING.

Connecticut Dairymen.

Dairy problems for 1899 was the subject of the opening paper. These problems, as outlined by the speaker, Mr. N. B. Douglass of Middlesex Co., Mass., were low prices, cost of living, bogus dairy products, competition of the west and foreign countries. Have we not, soid he, at times been inclined to attribute our lack of success to the milk contractor, the creamery shark, the dishonest commission mah, to tariff or free trade, the gold standard or free silver, or possibly to the changes in the moon, rather than to anything that might be amiss in ourselves or our management? Our most dangerous competitor is the poor cow. Not the lean kine of sacred history. On the contrary she is built on the other plan. She is usually more sleek and fat and more pleasing to the eye than her more useful sister. Our poor cow is of no particular breed, in fact she is found in all breeds. She has no distinctive color. It is not always her fault or the fault of her breeding that she is not a useful member of societg. Often she starts in iife with every requisite for a useful career, but is ruined by environment and training. Our worst foe is general apathy. It is not in large leaks that tsouble is most apt to come. Uncleanly utensils and surroundings lead to no end of loss. With the scales and the Babcock test within the reach of all we should know, not guess, what the animal is doing.

One must learn how to judge the dairy cow, to know a good one when we see her. The cow with the broad, straight back and heavy thighs, shonlders and neck, and that persists in covering her own ribs with fat, does not make a brilliant er long sustained record at the pail. A man can succeed best with the breed he likes best. Get a thoroughbred bull, look him over and study the record of his ancestors on both sides, and if right, be willing to pay a good price; he ts half the herd. Never use bulls first of one breed, then of another. We can raise better cows than we can buy. Upon the care and handling of the heifer during the first two months depends very largely her future usefulness. Feed her with bulky food to develop frame and distend the digestive organs. A cow with small barrel is like an engine with too small a boiler. Feed a variety of foods. Bulk is important. Linseed, cottonseed and gluten meals are very desirable by-products; also apple pomace, which can be had at trifling cost. I have fed an average of 75 tons a year of pomace. My cows agree with the experiment stations that its feeding value is about equal to corn fodder. When the supply gives out the cows shrink. It can be used if kept in the silo to help out, when pastures fail. I feed 2 to 10 lbs. of grain per day, according to needs and condition of the cow.

Questions: How preserve pomace? In silo. Weight it? No; fill at your convenience; you can

be filling it and feeding it out at same time. My pomace is convenient and I fill in two to five days. How often are cattle watered? Once a day. If I did not feed juicy food I should water ice. How much exercice? Only that obtained by walking from barn to water tank and return.

Retail production milk was treated in a thoroughly scientific manner by Director Voorhees of the New Jersey experiment station. The station farm is run on a business basis, likewise the milk route, and Mr. Voorhees by personal effort and supervision of the work has developed the enterprise and made it a practical success.

He found to begin with, that the local milk business was conducted by a rather haphazard manner. The quality, richness and purity varied greatly, although the price charged by each dealer was uniform. He assumed that consumers wanted uniform, pure and rich milk and then set out to obtain these qualities by thorough mixing, cleanliness in barn and dairy rooms and proper feeding. The experiment began in '96 with 23 grade cows. It took sometime to get the men trained to thorough methods, and the first year there were some complaints and the route grew slowly, but since '97 the sales have increased from 37,204 qts to 44,436 qts and are still growing. The milk began to sell itself when the conditions were right. There was no advertising or anything of the kind; the growth was natural. The price was 6 to 8c according to season. This was in competition with much lower priced milk, some as cheap as 3c. The increase in the route meant an increased income of $1000 per year. The improved milk cost somewhat more to produced. Missionary work should be done to educate the consumer in regard to the value of first-class milk. More attention should be paid to economy of sale, selling as well as producing to best advantage.

Questions: Are preservatives desirable? No; they should be regarded as alduterants because sure to be eventually harmful to consumers. How is milked cooled? By running it over a cool surface in a thin sheet after the usual principle of cooler. Ice? No; cold spring water at about 45 degrees. Can you bring back a cow that begins to shrink in milk yield? No; not completely. Doesn't all that has been said apply to milk for butter? Yes. Are bottles used? Yes; some prefer to buy in bulk from large cans, but welike the bottles. The waste by drip, overmeasure, etc, in dipping from cans more than balance the loss by breaking bottles. We average 11c per day per 140 qts by dipping from cans. Tne last milk in the can, too, is liable to be poorer in quality and condition by reason of the constant dipping. How do you get uniformity? By arranging cows according to the test of the quality of their milk so that milk in each large can will average about the same. With only a few cows I should advice to mix the milk. The quality of milk from cows of the herd varies from 2.8 to 6.4 per cent, but by arranging the animals we do not vary the product sold over ½ of 1 percent. If milk from each cow were sold strictly according to quality, some of the big milkers would be worth less than some of the small milkers.

How is milked sold? In advance. Men get a package of tickets (used only once) each day in envelope, which they return at night marked with number qts taken out, number sold, amount paid and with money inside. They must account for each tickct like street car conductors. How are so many bottles broken? Many in washing them by hot steam turned on too suddenly; some are broken in handling and some broken or lost by consumer. The bottle system takes twice as many wagons. Were cows tested or examined? Yes, by a veterinarian twice a year. The per cent of unhealthy cows was small. Cows are tested by tuberculin before bought. Have you notice ill effects from tuberculin? No. Why does the amount of cream rising in bottle sometimes fall below the indicated per cent by the test. The amount of cream will vary from changes in feeding, such as change from one kind of green forage to another.

Interesting addresses were given by Profs Conn and Jordan, H. W. Collingwood of N. J., and Mrs. Douglass ot Ct. Mr. Orrin Bent of Boston made the awards for the butter exhibits. The showing of dairy machinery and supplies was uncommonly large and complete.—*New. Eng. Ag.*

The Poultry-Yard.

POULTRY CALENDAR FOR JANUARY.

Burn a pound of sulphur in each pen, the first day of the month, so you will not forget it. Clean up the droppings every morning.

Kerosine the roosts and nest boxes once a week.

Change the litter in the nest boxes every week

or two, and sprinkle liberally with insect powder.

Scald the drinking vessels once a week.

Although the poultry year does not, practically, begin with January, yet it is a good time to start accounts so that facts and figures may be included in the year's diaries.

Just at this time of the year, those who had fowls to cater to the holiday trade, find plenty of spare room in their houses. It would now be a very good idea to spread out the flocks, dividing them into smaller families. Overcrowding, especially when fowls must spend much of their time indoors, does not produce any good results. Nothing will tend to promote egg production, and prevent such vices as feather pulling and egg eating, so much as giving the fowls plenty of room ; with sufficient "elbow room" comes the disposition to work, and if the material is given them in which to scratch, they will keep busy almost the entire day. It is natural for hens to scratch, but they will not do so when crowded. In keeping fowls indoors, care must be taken that there are no irritable birds in the flock, they must all be at peace with each other. A savage, irritable hen in a flock will soon make cowards of the more quiet ones, and will throw the latter back considerably. In one of our flocks was a cranky hen that never seemed happy unless she could fight, or pick at, other members of the pen. For want of space she was put (she was a two year old) in with a small flock of pullets that seemed to be about coming into the laying condition ; but she so annoyed those pullets, especially during feeding time, and ate so greedily what was given her, that she became very fat while the pullets were gradually losing weight ; so she was changed to a pen of older birds, and the change which took place in those pullets when alone again was almost magical.

If the houses are warm and the birds are kept busy, there should be a good supply of eggs this month. Incubator men prize the January eggs for broiler raising, while many of the general poultry farmers find it more profitable to sell their eggs this month, as the prices are usually the highest.

Keep the fowls indoors while there is yet snow on the ground.

It has been proved by experience that hens compelled to run about on the snow, slack up in egg production. It is also advisable to keep them indoors during high winds or cold rain storms. No fowl can be comfortable during such weather, and when a hen is not comfortable she certainly is not profitable.

Beware of draughts in the hen house at night. That is an old time advice, but at this time of the year it is well to remind you of it. Swelled head is about the first of negligence in this matter, and roup ends the career of the patient.

Go among the fowls at night and treat every case of scaly leg to be found. Wash the legs well with Castile soap and warm water, after which anoint with an ointment made with equal parts of coal oil and melted lard. Repeat daily until the legs are clean.

A little rusty iron in the drinking vessels is good to make iron water for a tonic, and is especially valuable at this time of the year. If at each window in the hen house a heavy curtain is hung at night, it will keep out a lot of cold air, and make it very acceptable to the fowls.

We have tried it, and would not think of having a window encovered at night. If the curtains are on a roller they can be readily pulled up or lowered.

So, the important lesson for this month is to keep the birds warm, comfortable, happy and busy. The reward will be hardy and profitable fowls.

J. ANDRES.

GET RID OF DRONES.

Culling the flock improves it every year, as a higher standard will result. By an observation of the individual members of a flock, much can be learned. The good hens become pets, and pride in their individual excellence is entertained on the part of the owner. The young stock will be hatched only from the best producers, instead of from eggs taken indiscriminately from the egg basket. No farmer, who will carefully cull out the drones, need depend on breeders to produce breeds for him. Pure breeds should be used in every case ; especially pure bred males. Even with the choicest stock, the matter of selection should not be overlooked. There are drones and idlers in aristocratic flocks as well as in the flocks of low degree. There is room for improvement in every direction. My object is to impress upon every one who raises poultry ; farmer, or amateur ; the importance of a close scrutiny of their stock, and to teach the fact that a profitable flock can be

made up of what may look at first like unpromising material.

The work in the poultry yard in January needs constant attention. The poultry house should be warm and dry; cracks and crevices should be covered and there should be no draughts on the birds. The fowls should be fed a warm mash in the morning of cut clover hay, scalded and mixed with bran or middlings. Steep the clover at night in a tub or bucket with a cover, and in the morning it will be soft and mushy, with an odor that reminds one of new mown hay. Feed this mash each morning. For the noonday meal, feed wheat, oats or barley, and at night feed liberally of whole corn. The grain food must be scattered in the litter on the floor of the scratching shed or house. Two or three times a week, feed green cut bones and vary the diet with green foods, as cabbage, lettuce, etc. Cull your birds closely, and all not intended for breeders should be sent to market. During the latter part of the month, begin to study your matings, so that no time will be lost when you are ready for breeding.

ONTARIO EXPERIMENTAL-UNION.

It is now sixteen years since Mr. Zavitz, then a student of the O. A. C., conceived the idea of connecting the graduates leaving the College by a Union, each member of which agreeing to undertake certain agricultural experiments on a practical basis. The beginning was modest: twelve letters were first sent—twelve willing men answered. The result of the first experiments was such as to encourage their continuance and it was not long ere the usefulness of the growing Association proved itself in such a striking manner that the Government felt bound to give substantial aid. The Union, like all similar enterprises, had to contend at first with many difficulties; farmers were reluctant to undertake the tedious work of experimenting, little belief was expressed towards its success, but, through the persistent efforts of its director, it survived and steadily prospered from year to year. The membership, first confined to ex-students and students, soon extended to all farmers and has now reached the handsome number of 3,000. To-day, the Union stands as a most useful and practical organization, such as any country might justly be proud of.

In order to explain the rapid success of the Union we need only to point to the usefulness of its work, and the benefits which the farming community has not ceased to derive from it, benefits still increased by the recent extension of experimental work to several branches related to agriculture.

It has justly been said that agriculture is the oldest of all arts but the most recent of sciences; for it is only of late years that science has thrown light upon its operations. Still, many questions are yet discussed, many problems are still involved, and in the struggle against the ever growing competition of our times, the farmer, forced to modify his system of culture on a more economical plan, is often at a loss to determine what he should adopt. The same may be said of the numerous varieties of grains among which he must choose the most profitable. New theories and new varieties arise every day. In their choice the farmer must be guided. The Union aims to determine the true value of these. But the conditions under which farming is done are so numerous and variable—so many influences have to be contended with—that no rules can be fixed, no method can be adopted with security, unless repeated investigations, carried out over a wide area, have definitively proved their excellence.

These experiments, so necessary, are, by means of the Union, performed in co-operation throughout the province. All varieties of grain, all new methods of culture are submited to a thorough test for several years. Those which give the most satisfactory results are then adopted. Thus, the average production of the land, owned by the members of the Union, has been raised to a better standard. Thus, the attention of farmers is awakened and kept directed towards the all important questions of the selection of grains, the proper way of preserving the fertility and moisture of the soil, to check the progress of weeds and to destroy injurious insects.

Besides material advantages, these experiments create in the farmer who undertakes them a greater interest in his work, thus breaking the dull monotony of farm life, a greater accuracy, a desire of knowledge, and a stronger interest in the reading of bulletins and of reports formerly disdained.

The rapid growth of an organization which thus joins material and moral advantages is not to be wondered at, and the unprecedented success of the

meeting this year is convincing evidence of its increasing popularity among farmers. Speakers of note from American colleges and distinguished visitors among, whom the Hon. S. A. Fisher, MM. Dechêne and Duffy from Quebec, created special ir terest. A great number of ex-students of the College, from all parts of the province, had gathered as usual. Many of them through lack of time had not been present to the College for years past. To such the view of the improvments effected was no little cause of wonder and interest.

The most interesting and practical feature of the Union was the report given by Mr. Zavitz on the results of the experiments conducted throughout the province in testing farm-crops. The following is a list of the varieties which stood this year at the head of the list :

Leguminous crops f. green fodder	Grass-Peas.
Mixed grains	Oats 1½ bu., peas 1 bu.
Millets	Japanese Panicle.
Grasses	Fall Oat Grass.
Clovers	Mammoth Red.
Buckwheat	Silver Hull.
Spring Wheat	Rio Grande.
Barley	Mondschensi.
Oats	Siberian.
Peas	Early Britain.
Beans	White Wonder.
Carrots	Pearse's Half-long white.
Swede Turnips	Hartley Bronze Top.
Fall Turnips	Purple-top Mammoth.
Corns	Mastadon Dent.
Potatoes	American Wonder.
Winter Wheat	Dawson's Golden Chaff.

Of the fertilizers tested, the following have given the best results :

Fertilizers with Corn	Nitrate of Potash
" " Mangels.	Nitrate of Soda

Many important facts obtained from investigations carried on in the different branches of agriculture were stated successively by the professors of Dairying, Horticulture, Biology, and Physics, of the O. A. C. Each statement, though brief, represented many hours of hard and careful work, and to all those who took part in it the country is deeply indebted. Special mention shall be made in another article of the results obtained from the work accomplished in soil physics. The conservation of soil moisture is a question of as great an importance to the farmers of Quebec as to those of Ontario, and the results of this year's experiments were so conclusive in favor of better systems of culture, that many will certainly follow in this new path.

CHAS. MORTUREUX.

Swine.

EXPERIMENTS ON FEEDING HOGS AT THE ONTARIO AGRICULTURAL COLLEGE.

Thirty-six pure-bred hogs were purchased when from 7 to 9 weeks old. They were divided into three groups, each group containing two hogs of each of six different breeds. One group was fed in pens with small outside yards. From July 4th to August 19th the ration was wheat middlings ; from August 19th to Sept. 12th it was equal parts by weight of peas, barley and shorts. When the carcases came out of the salt the condition of four was positively firm ; one was slightly tender and the remaining seven ranged from decidedly tender to soft. Another group was kept in the same building in exactly similar pens and fed exactly the same ration ; but about two pounds of whey were fed with each pound of meal. When these carcases came out of the salt only one showed any sign of tenderness and the remaining eleven were first-class as regards firmness. Such a striking difference cannot be accounted for on any other basis that the whey was responsible for the superiority of the second group. The third group was allowed to run of a half-acre lot and fed exactly the same ration as the first group. This group came out of the salt in decidely better condition than the first group, but not equal to the group which received whey. By far the greater amount of tenderness was found among the lighter and leaner hogs, and since several unthrifty hogs had been purposely put into the third group, the group was placed at a disadvantage. The hogs in the third group, which were heavy and fat enough for Wiltshire bacon, were all firm but one.

Twelve strong, fleshy, store grade hogs, fresh from the stubble, and averaging about 109 pounds each live weight, were also purchased. These were put on full feed in pens for six weeks before slaughtering. Part were fed cornmeal alone, part were fed a two-thirds ration of cornmeal with all

the rape they would eat, and part were fed equal parts by weight of peas, barley and shorts. All these hogs produced firm bacon except one in the peas, barley and shorts group, which was somewhat tender. There seems to be little danger, therefore, of spoiling hogs of this class with either corn or rape.

Twelve more grades were confined in pens from time of weaning to slaughtering. They were fed skim-milk and wheat middlings (except during about three weeks, when they were fed skim-milk with barley and shorts), until they reached an average live weight of about 100 pounds. The skim-milk was then discontinued, and during the next six weeks some of them were fed cornmeal, others were fed equal parts by weight of peas, barley and shorts and the remainder was fed a two-thirds ration of the peas, barley and shorts mixture, together with all the rape they would eat. All of these hogs produced firm bacon, excepting one in the group receiving peas, barley and shorts with rape. The only practical difference between the feeding and treatment of these hogs until they reached 100 pounds and the group of pure breds, which gave such very bad results, consisted in feeding the grades skim-milk with their meal ration. From this it would appear that skim-milk has a very beneficial influence on the firmess of the bacon.

FEEDING OF PIGS

Some experiments in the feeding of pigs have been carried out by the Agricultural Department of the University College, Nottingham, during the past season. The first was undertaken to ascertain the relative feeding value of separated milk and whey respectively, when used with maize meal. Three lots of pigs, six months old, and six in each, were fed for sixty days, the first lot getting 32 lbs lb. of maize meal to the six pigs per day, the second lot 20 lb. of meal and 6 gallons of separated milk, and the third 24 lb. of meal and 12 gallons of whey. The maize meal cost ½d. a pound, the separated milk being reckoned at 1d. a gallon, and the whey at one-third of a penny a gallon. The maize meal was scalded and allowed to soak for a few hours before being given to the pigs. The three rations all cost the same, 1s. 4d. a day for six pigs. At the end of twenty days each lot had 6 lb. (1 lb. per pig) more meal daily; but this did not interfere with the equality in the cost of the three rations. At the end of sixty days the six pigs which had meal alone showed an increase of 3 cwt. 2 qrs. 21 lb, in live weight for the whole lot; those which had separated milk also had gained 4 cwt. 1 qr. 8 lb., and those which had whey had increased by 4 cwt. 2 qrs. 22 lb. It will be seen that the last lot paid best, taking the valuation of the food as given, and they also proved to have made the firmest pork. The prices charged for the separated milk and whey were those at which they were sold at the Midland Dairy Institute (connected with the college) when not wanted. The pigs were sold well, and they showed a profit of 12s. 9d. per pig for the first lot, 15s. 3d. for the second, and 19s. 9d. for the third. The cost of putting on 1 lb. of carcase weight per day was 3·12d. for the first lot, 2·84d. for the second, and 2·48d. for the third. If the separated milk had been charged at 1½d. per gallon, and the whey at ¾d., these foods would have paid as well as the maize meal alone. The other pig feeding experiment was carried out for the purpose of comparing the relative advantages of feeding on maize and barley meal respectively. The maize-fed pigs made a greater gain than the animals which had an equal quantity of barley meal, and as the former was the cheaper, it was the more remunerative, though the meat was less firm.

B.

A NOBLE PURPOSE AND PUBLICATION.

There is not a paper that comes to our exchange table that receives a more hearty welcome than that little harbinger of mercy, "*Our Dumb Animals*," edited by the eminent philanthropist, Geo. T. Angell, of Boston. For the sake of the gentle cow and her mission of prosperity and comfort to man, we wish a copy of this paper went to every farm home in America.

More than this, we wish every farm boy and girl had the opportunity of reading therein the beautiful little stories about our domestic animals and that kindness that is profitable to both heart, pocket and manhood.

"*Our Dumb Animals*" is published on the first Tuesday of every month at 50 cents a year, 19 Milk St., Boston, Mass.

We append below a few of the extracts found in the last number:

From the Lewiston, Illinois, *Democrat:* "If we should be asked to name the best paper in America, it would be *Our Dumb Animals*, of Boston, Mass. And if we should be asked to name the grandest man in America, he would be the president of "The American Humane Education Society," represented over 30,000 "Bands of Mercy."

From the eminent writer, Sarah K. Bolton:

"I have placed a watering trough in our village, by the roadside, and have had great pleasure in seeing horses drink from it, 500 to 1000 per day, besides dogs. It cost only twenty dollars, as much as a dress or a bonnet—and has given me much more satisfaction than either. A tin cup has also been used by bicycle riders and others.

"Try it, good women, in your town."

All honor to our good friend, Mrs. E. J. Thurston, of Canton, who one day last week prosecuted a brute who abused his horse, and had him sent to jail thirty days therefore.

In the Denver, Colorado *Times*, we find a most touching testimonial of the kindly relations which existed between the late Dr. Edward W. Bovett, of Denver, and his favorite St. Bernard dog "Duke," which died of grief at the loss of his master. At his funeral, close behind the hearse, walked the doctor's mare "Gypsy," and alongside the beautiful horse the huge St. Bernard.

Every day after Dr. Bovett was laid to rest "Duke" grew sadder and thinner, and steadfastly refused all offers of food until he died.

President Lincoln one morning found that a robin's nest containing three little robins, had been knocked off an evergreen tree near the White House by a careless cab-driver. Kneeling on the ground and putting the birds back in the nest he replaced it saying: "These birds are helpless, and I'll make them happy again."

A COW'S GRATITUDE.

When I lived on a ranch in Western Colorado I saw a remarkable thing done by a cow.

Each season our hay, on being mowed, was stacked in a field about 200 yards from the house.

We had a milch cow named Turvy. One winter Turvy's calf, which had not been weaned, was kept tied, a part of the time, to a post near the hay.

One morning my attention was attracted by the persistent cries of the cow. I looked out and saw Turvy standing at the bars. She was calling me and was almost frantic. I snatched up a shawl, threw it around me and ran to see what the matter was. Quick as she saw me coming she turned and ran back to the stack. When I reached the place I found her calf almost choked to death. He had wound the rope, with which he was tied, round and round the post, and twisted it so tight that his tongue was lolling out and bloody foam dripping from his mouth and nose. I quickly untied him and his mother, by her every action, showed her joy at his rescue.

C. MITCHELL.

The above extracts teach the great lesson of kindness to animals.

If this lesson were only well learned, it would make a great many dairy farmers rich in a few years.

One of the greatest hindrances to profit in dairy farming *is a lack of intelligent* kindness. We are unkind in the way we stable our cows, in the filth and foul air we compel them to live in all winter long; in the poor food, and too little of it, we give them; in the way we speak to them or strike them; in the way we allow ourselves to go along year after year, refusing to make an intelligent study of this animal we are vainly trying to win some profit out off.

If we were more intelligent we should see where and how kindness pays.

How can more of these men who really do not mean to be unkind be made to see how they stand in the way of their own enlightenment and their own best profit?

Nikoteen, the essential element of tobacco, is used in Australia for spraying. The preparation used is an intensely concentrated form of that substance. In one small bottle of Nikoteen is the narcotic from twelve pounds of tobacco stems, a ton of the stems making four pounds of the preparations. It is said to be very effective in destroying the codling moth or aphis.

Farming.