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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

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Journal of Agriculture and Horticulture

THE JOURNAL OF AGRICULTURE AND HORTICULTURE is the official organ of the Council of Agriculture of the Province of Quebec. It is issued Bi-monthly and is designed to include not only in name, but in fact, anything concerned with Agriculture and Stock-Raising, Horticulture &c. All matters relating to the reading columns of the Journal must be addressed to Arthur R. Jenner Fust, Editor of the JOURNAL OF AGRICULTURE AND HORTICULTURE, 4 Lincoln Avenue, Montreal. For RATES of advertisements, etc., address the Publishers

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The Farm.

NOTES BY THE WAY.

Sheep on rape.—Professor Shaw, of the Minnesota Experiment Station, says that an average crop of rape will sustain from ten to fifteen sheep an acre for sixty days, and that, at the expiration of that period, they ought to be fit for market.

Well, that depends upon the way in which the sheep are treated. If the Lincolnshire (Eng.) plan is followed of turning the flock loose into a field of rape, the crop will not keep so many sheep by a "long chalk," as it would if the plan followed is that pursued in the East and South-East of England, namely, hurdling off a fresh piece for the flock every day.

Again, if the rape is begun to be fed off when—as we saw recommended in an exchange the other day—it is no more than six or eight inches high, it will not keep half as much stock as it would if allowed to come to pretty near its full growth.

In Cornwall, where owing to the dampness of the climate, rape grows with marvellous rapidity and succulence, we know of a piece of three acres that fattened thirty heavy tegs in ten weeks, without any additional food.

At Sorel, we had three acres of rape, on very poor, worn-out land, manured with 200 lbs. of inferior superphosphate to the acre, on which we fattened—really fattened—27 tegs of the French-Canadian breed, to each of whom were given a

pint daily of *gabourage*, i. e., oats with a few pease mixed with them. Mr. Wolferstan Thomas, of the Merchants' Bank, had one of them, and praised it highly. We give an engraving of the flock and fold, with, be it observed, the land already gone over by the sheep ploughed-up close to the fold. (1)

As for sowing rape thinly in rows, to be horse- and hand-hoed, we cannot recommend it. One of the beauties of the plant is that, if sown thickly broadcast, no weed has a chance to grow, and no hand-hoeing is needed.

Rape, or, what is pretty nearly the same thing, *colza* or coleseed, may be sown at any time from May to the end of August. Its cultivation is simple enough: deepish ploughing before winter; grubbing and harrowing till the land is fine in spring; sowing 6 lbs. of seed to the acre—5 lbs. to the arpent; covering the seed with the chain or bush harrow, and a rolling to finish off with.

The hurdles, as will be seen in the cut, are simple enough in construction. About twelve feet long, and four feet high, they can be easily rolled from place to place by a boy, so that there is no reason why the fold should not be moved forward daily.

Observe, that if the sheep are turned loose into the whole field at once, some parts of the piece will get more manure on them than others; for, if there is a gravelly spot, a shady place, or a hillock of any kind in the field, the sheep will be sure to seek them: a good thing for the sheep but a bad thing as far as the manuring of the land is concerned.

During the summer or early autumn, the flock will do very well on the rape alone; but as soon as the early frosts begin, do not grudge the darlings (we love them) a little extra food in troughs. Any rough chaff will help them; a few oats and pease, with a trifle of clover-chaff or well-harvested pease-haulm, which is nearly as good as most of the over ripened clover-hay we see here. The sweepings of the bottoms of the bays of the barn are better than nothing, for it is an old observation of ours in England that, whereas it is very difficult in warm weather to get sheep to eat dry food, like chaffed straw, the moment coldish weather comes on, they are ravemons for it.

(1) The figure standing, uncovered, at the head of the fold is supposed to be *we*; but we trust it is not the least like us. (*Next number*). Ed.

How we should like to import and sow broadcast all over this province a lot of young English shepherds—among the most valuable of our farm-servants, trusty, and enthusiastic in their business. Why will none of our leading *agronomes* spend a few months in the Southern and South-Eastern counties of England, and see for themselves how wonderfully perfect the whole system of sheep-farming carried on there is? There is not the slightest reason why the same system should not be pursued here. The ten acres, then, furthest from the buildings would stand a chance of growing something, instead of being, as they generally are, on the long farms in the French country, allowed to stand uncultivated to produce nothing but weeds and rubbish to infect the neighbouring land with the most undesirable of tenants.

Seeding.—We see, in an exchange, a recommendation, from a man who ought to know what he is talking about, to sow five pecks of wheat and five pecks of oats to the acre. Now, as to wheat, if it were to be fall sown, when it would have plenty of time to tiller in the spring, provided the land were in good heart we have nothing to say against the quantity prescribed; for we ourselves grew, in 1853, 60 bushels of Chidham (white) wheat over a large extent of land, from one bushel of seed to the acre. But, then, the land was of first-rate quality, on the chalk, and as full of dung as it could stick. But five pecks of oats to the acre, in a climate like this, where as soon as the spring begins the soil warms up, the growth of the plant is rapid, and there is no time for tillering, seems to us, who have seen the great oat crops of Scotland and the enormous yields of the South and East of England, running from 80 to 140 bushels to the acre, from a seeding of from 4 to 5 bushels an acre; 5 pecks to the acre of oats seems to us to be a strange seeding to recommend.

Rape for ewes.—An interesting case is reported from a Minnesota Farmers' Institute meeting. A sheep raiser wanted to know how to prevent ewes having too many lambs. Nearly all his ewes had triplets this spring and the rest had twins. He didn't object to twins, but he drew the line at

triplets. His sheep were grade Cotswolds and Oxford Downs, and ran on grape and turnips at breeding time last fall. The thriving condition of his ewes at breeding time no doubt explains the prolificacy of his flock.

The writer in *Farming*, who observes in the above paragraph, that the thriving condition of the ewes in question when put to the ram was the cause of their prolificacy, is indubitably right. We do not know that we ever saw many triplets in a flock of ewes, but in our part of England, we used to contrive to have as many twins as we could manage, and the plan followed was to do exactly what *the farmer* ought not to have done, if he wanted to reduce the number of lambs yeaned, namely, to put the ewes into *rape* about three weeks before the ram was introduced to them. Not that any particularly amatory proclivity was attributed to the rape (or coleseed), but because it was the handiest and healthiest food to be had at that season.

By the bye, if any one wants to reduce the size of the individual members of his flock, the best way to set about it is to put the *ewe-tegs* to the ram, as we regret to say we observed to be done, some eight or ten years ago, with the tegs of a very neat little flock of Southdowns, not very far from Lachine. *Teg*, *hog*, *hogget*, are all local names for the same things, i.e., a weaned lamb (1)

From this evil practice, no doubt, springs the small size of many of the sheep in the country round Three Rivers, and St Hyacinthe. In too many cases, the ram is allowed to run about loose all through the summer, and the poor little tegs get impregnated, to the utter arrest of all growth after they drop their lambs. How many young things have we seen at Sorel; where a great many head of stock used to be slaughtered for the supply of the steamers; not going over 20 lbs. to the carcase in November! And the early spring-lambs sent to Montreal, too, some of which are no bigger than a large English hare!

This is a good deal yet to be learnt about sheep-breeding in this country.

Clipping.—"Clipping horses in the spring is a most beneficial operation to horses that carry a heavy coat and are slow in shedding it. The only drawbacks are the liability of horses to take cold during the first few days following the clipping, and the effect that clipping has in causing the coat subsequently to be rather harsh and staring. In fact, it is well known to horsemen that once a horse has been clipped a few times it is almost impossible to keep him looking decent unless he is clipped."—*Ex*

We cannot say we approve of clipping horses in the spring. If clipping is done at all—a very useful thing it is when proper care is taken of the horses afterwards,—it should be done, in this country, early in October, and the horse *singed* once a month till the old coat is shed in the spring.

Cattle feeding for profit.—John McMillan, M. P., is well known as one of the very live practical cattle feeders of Ontario. At a recent institute meeting in East Essex he gave his views on "Feeding for Profit" as follows: It is in entire accord with the practice of L. H. Kendrick, as given on page 82 of this year's Farmer. Mr. McMillan said: "Beginning with the calf, neither calves nor older cattle should be let go back. They should be kept growing all the time. I feed ensilage regularly, and have a good deal to say on the value of this as a food." In answer to a question as to how often cattle should be salted, he said he fed salt with every feed. When asked if one could raise a two-year-old and sell at a profit, he answered: "Yes, at any time." The calf must be taken away as soon as dropped, and be kept growing. He had raised them at a cost of $47 and sold them for $60.

Mr. McMillan, very sensibly, recommends that the calf should be *removed from its dam as soon as it is dropped*, and never allowed to fall back in condition from that time until it is fit for the butcher.

Stacks.—The proper way to build hay-stacks is very little understood in this province. They are put up just as it happens; the hay, generally far too ripe when cut, and made far too much, is thrown together anyhow; no bottom is prepared to keep it off the ground; the fact that compressed hay keeps better than loosely packed hay is utterly lost sight of, and no careful thatching is ever attempted.

The more workers there are on the stack while it is a-building the better. If the middle is kept full, and the sides upright, the whole, after sub-

(1) Until shorn. ED.

sidence, will bulge out towards the eaves without any additional width being given to that part. When the body has attained the height of 15 feet, or thereabouts, the drawing in for the roof is begun by gradually taking in the breadth on each side to the ridge, and the ends are of course built up perpendicular. The hay ought to heat considerably a couple of days after it has been stacked, or else it was made too much, and until this heat has subsided, there is no use trying to thatch the stack, as the subsidence may be unequal, and the thatch be drawn open in places.

Frying.—"The usual method of frying adopted in the Royal kitchens, however, is not that of the pan, but rather the Continental style of boiling in liquid fat which has been raised exactly to the boiling point before the food is put in. For this purpose an enormous number of wide, deep copper vessels are provided, fitted with an open frying-basket tray of tinned wire."—*Star.*

The cooking in a shallow pan, smeared with a little lard, etc. (often not heated until the thing to be cooked is put into the pan), is not frying at all. It is called, in French, "sauter," to jump. As for the two inches of fat *boiling*, that is absurd, as fats do not boil at so low a temperature as 212°, except under pressure. The test is: throw a crumb, or two, of bread in to the hot fat, and if it browns quickly, the cooking can proceed. The *spitting*, supposed to be from the fat, is really from the water therein contained.—*Ex.*

Roads.—Years ago, we remember seeing on the the great placards at every turnpike-gate near London—England—a list of charges, in which a considerable difference was made between broad and narrow waggon wheels. We take the following sensible remarks from "An address by A. Harkness, Iroquois, Ont.

DAMAGE DONE BY NARROW TIRES.

One of the most active enemies of good roads is the narrow waggon tire. This was made strikingly manifest when barley was our staple crop, and was marketed during the rainy season in the fall. The "metalled" part of our country roads is seldom more than eight feet wide—it would in most cases be too expensive to make it much wider.

This leaves but a single track for vehicles, and those of you, who like myself, have during a few hours or a wet morning in the late fall, seen fifty or sixty wagons each bearing a load of from one and a half to two tons, pass down one of these roads, will readily understand that it requires good material, well put down, to withstand the wear and pressure there is on tires originally an inch and three quarters wide, and sometimes worn so that their faces are little wider than the edge of a man's hand, and round at that. The result is,—small ruts that hold water soon form; and the wear is assisted by the moisture; or, if the road slopes, these ruts soon become the beds of tiny rivulets that still further accelerate the process of destruction. Whereas, if tires wide in proportion to the load they bear were used, the pressure would be on a considerable surface and would tend to smooth and solidify the read rather than cut it up. The difference between the narrow and the broad tire is the difference between the disc harrow and the land roller.

It is an encouraging sign of the present times that the wide tires are coming into more general use; the farmers are beginning to understand that they can move a heavy load over the roads or over the fields with greater ease on wide, than on narrow tires. The same rule holds good with sleigh shoes; our winter roads would be leveller for the horses' feet and contain fewer and less dangerous holes, if the width of sleigh shoes were doubled. The width of both tire and shoe, as well as that of the sleigh should be regulated by general statute. We are all partners in the public roads, and no member of the firm should be allowed to improperly use or injure the property of the other members.

ROAD MAKING.

I need not dwell at any length on how the roads should be made, further than to indicate a few principles that should always guide. The ditches should not be deeper than is requisite for the proper grading of the road—unless when it is necessary to cut through slight elevations when the surplus material should be removed to depressions; for slight, elevations mean slight depressions, and it is desirable to have the road-bed as level as possible. When the elevation is more than slight,—that is, when there is a hollow between two hills,—drainage should be sought through the adjoining land. The roads should be graded so that the water will flow readily into the ditches, and the ditches should be laid out

and constructed so that no water will lie in them. This latter rule is very important and is, we fear, about as much honored in the breach as in the observance.

THE MAINTENANCE OF SOIL FERTILITY THROUGH THE GROWTH OF LEGUMES.

By Frank T. Shutt, M.A., Chemist, Experimental Farms, Ottawa.

Among the many agricultural problems now receiving attention from practical farmers and scientific investigators none occupies today such an important and prominent position as the improvement of soils through the legumes. We therefore feel our readers will be interested in the following extracts from a lecture delivered before the Montreal Natural History Society last week by the Chemist of the Experimental Farms.

For many years Mr. Shutt, chemist of the Farms, has paid special attention to this subject and done a large amount of experimental work in relation thereto. He consequently is in a position to present data and information both interesting and reliable. The whole lecture was replete with information and will we understand be published, in full, at an early date.

After bringing forward the chemical data obtained in the Farm Laboratories during the past four years and showing the amounts of plant food contained in clover under different systems of experiment. Mr. Shutt presented the following table prepared from these results:

Average estimated amounts, per acre, of nitrogen, phosphoric acid, and potash in clover-crop, including roots to a depth of 9 inches:

	Nitrogen			Phosphoric acid			Potash		
	Foliage	Root	Total	Foliage	Roots	Total	Foliage	Roots	Total
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
First year crop	90	48	138	30	16	46	75	40	115
Second year crop	50	60	111	17	20	37	45	51	96

The fertilizer universally used in this country is barnyard manure or stable manure. Such contains, if of good average quality, about 10 lbs. nitrogen per ton. It is evident, therefore, that by this clover method we can furnish the soil with more nitrogen than would be supplied by a dressing of 10 tons of manure per acre. And in addition to this nitrogen—the greater part of which is obtained from an otherwise unavailable source—there are, as we have already pointed out, considerable amounts of potash, phosphoric acid and lime, liberated in the decay of the clover, in forms much more valuable as plant food than they were originally, and therefore in a very true sense to be considered as a distinct addition to the soil's store of available mineral plant-food.

It might be urged that the burying of such a large amount of rich food-material as is contained in a crop of clover is wasteful and bad farming-practice. This, in a certain measure, is true, if the farmer has the stock to consume it; for by feeding it there is the opportunity of converting a part into high priced animal products and returning to the soil by far the larger portion (practically 75%) of the fertilizing elements of the crop in the waste product of animal economy. (1) On too many farms, however, there is not sufficient stock for this purpose. We have in this fact indeed the reason for much of our exhausted soil in the older provinces, where farming in many districts has consisted in growing grain, oats, or hay, year after year. For such districts, where stock is not kept in greater numbers, we strongly advocate the growing of clover for recovering fertility, for we know of no fertilizer or manure of equal value that can be so cheaply purchased. The benefits that I have enumerated are derived from 8 lbs. to 10 lbs. of clover seed per acre, costing $1.00 to $1.25. The lowest price for nitrogen in fertilizers is 10c. per lb., and, as we have seen, practically 100 lbs. or $10.00 worth can be obtained by this method of green manuring, not to mention the other benefits.

But nearly one-half of the fertilizing value of clover is in the roots, so that if the crop is harvest-

(1) This is exactly what we have always contended for. ED. J. OF A.

ed and sold off the farm, there is still a large addition to the soil's store of available plant food, and the land is considerably enriched.

It only remains for me to say in this connection that the clover requires, comparatively speaking, large amounts of the mineral constituents, potash, phosphoric acid, and lime. These being present in sufficient quantities, the clover plant with the aid of the germs I have referred to will obtain its own nitrogen. This points to the economy, where the soil is poor in these elements, of supplying a certain amount of them, either as wood-ashes—our own special product and one that we are parting with to farmers in the United States at a price much below their true value—or some form of German potash-salts supplemented by superphosphate or basic-slag, to encourage the growth of clover.

In conclusion, I propose to present some of our field results, showing the beneficial effects upon grain and other crops by this system of manuring by clover. They are of an exceedingly striking character and furnish ample corroboration of the claims I have made for the clover crop as a means for increasing the soil's productiveness These field experiments, I should add, were conducted by Dr. Saunders, Director of the Experimental Farms.

Grain after clover.

In 1897, 8 plots were sown with grain, 4 with the addition of clover seed at the rate of 10 lbs. to the acre, 4 without the addition of clover. In October of the same year the crop of clover was turned under, the adjoining "no clover" plots being ploughed at the same time. The grains sown on these plots were: Preston wheat, Banner oats, Bolton barley, and Odessa barley. This land without any application of manure was sown in 1898 with Banner oats. Regarding the appearance of the growing crops on these plots, Dr. Saunders speaks as follows: "The difference in the growth of the grain on these plots was very noticeable, and as the season advanced, especially just before the heads appeared, the difference in height and vigour of growth in favour of the plots where the clover had been grown was very remarkable. So clearly was this manifest, that the difference could be distinctly seen at a considerable distance, and the outline of those plots on which no clover had been sown could be readily traced by the manifestly shorter and less vigorous growth. After the grain was fully headed, the difference in appearance was not so clearly seen at a distance, but by careful examination it could be easily traced." The plots were cut and threshed separately, and weighings made of the grain and straw from each plot obtained. The results showed an average increase in the yield of grain from the four clover plots of more than 11 bushels per acre over that on the plots on which there had been no clover sown.

To ascertain what manurial value there might be from the clover the second year after ploughing under, these same plots, without the addition of any manure or fertilizer, were sown, in 1899, with Mensury barley. Again a great difference on the plots that had been sown with clover in 1897 was noticed, and the harvesting results showed that the average yield on the four clover plots over that of the four "no clover" plots amounted to almost 9 bushels p r acre.

The weight of grain and straw harvested from these plots in 1898 and 1899 are given in the subjoined table:

Grain after clover: Results showing fertilising effect of clover (a) first year, and (b) second year after being ploughed under.

Another experiment in which equally striking and important results were obtained may be described as follows: In 1897 two plots adjoining each other and uniform as regards size and character of soil, were selected: No. 1 was sown with barley and a grass mixture containing clover seed; No. 2 was similarly sown, with the exception that there was no clover seed in the grass mixture. In the spring of 1899 they were ploughed under and sown with Bavarian oats. The yield per acre on No. 1 was 46 bushels 4 lbs.; that on No. 2, 36 bushels 6 lbs., on increase of 9 bushels 22 lbs. of grain to the acre on the plot which had grown clover over that on the plot sown with grass seed only. This increase was practically due to the fertilizing constituents set free by the decay of the clover roots only, for in 1898 two crops of hay had been taken off. (1)

(1) Very striking. In England, the yield of wheat was always greater after two crops of clover-hay, in the same season, than where the clover had been fed off by sheep. The reason given for this is that the higher the clover grows *upwards*, the more plentiful are the roots, and the deeper do they plunge into the ground. Ed.

Plot	Nature of crops sown in 1897.	1898. 1st year Banner oats		1899. 2nd year Mensury barley	
		Straw per acre Lbs.	Grain per acre Bush. Lbs.	Straw per acre Lbs.	Grain per acre Bush. Lbs.
Plot 1	Preston wheat and clover	3770	56. 6	3120	40. 20
" 2	" " no "	2160	37. 2	1740	25. 20
	Increase due to manurial effect of clover	1610	19 4	1380	15. 0
" 3	Odessa barley and clover	2180	37. 12	2620	32. 29
" 4	" " no "	1450	30 10	2440	27. 44
	Increase due to manurial effect of clover	730	7. 2	180	4. 33
" 5	Bolton barley and clover	3180	51. 26	2470	33. 26
" 6	" " no "	2090	44. 24	2000	29. 28
	Increase due to manurial effect of clover	1090	7. 2	470	3. 46
" 7	Banner oats and clover	5110	55. 0	3270	44 38
" 8	" " no "	2260	44 4	2320	33. 36
	Increase due to manurial effect of clover	2850	10. 30	950	11. 2
	Average increase on four clover plots	1570	11. 1	745	8. 32

Indian corn after clover.

In 1897 a number of plots were sown with grain and clover, check plots being left throughout the series upon which grain only was grown. The clover was allowed to remain through the winter, and on May 23rd., 1898, (at which date there was a heavy mat of growth) ploughed under. It was planted with Indian corn. The yields in detail are to be found in the report of the Experimental Farms for 1898. I will now merely state that the average yield from three plots that had previously grown clover was 16 tons 240 lbs. of fodder corn, while that from the plots on which there had been no clover was 13 tons 380 lbs.

Potatoes after clover.

The following experiment shows that, as with grain and fodder corn, an increased yield of potatoes was obtained by previously preparing the land with clover.

Plots Nos. 1 and 2, of similar size and character of soil, and adjoining each other were selected. No. 1 was sown with grain and clover; No. 2 with grain only. In May 1899 (there being an excellent growth of clover on No. 1), the plots were ploughed and planted with potatoes. The yield of potatoes was, on No. 1, at the rate of 146 bushels 27 lbs. per acre, on No. 2, 104 bushels 57 lbs. per acre.

The data which I have just cited, obtained by careful experiment over a number of years, employing the cereals, Indian corn, and potatoes as test crops, are, in my opinion, of such a striking character as to leave no doubt as to the conclusions to be drawn therefrom. They unmistakably assure us that the clover crop has a most marked effect in increasing a soil's productiveness, and confirm in the most emphatic manner the chemical results.

We have referred to the fact that in certain provinces of the Dominion we find extending over very large areas some of the richest wheat soils in the world. To support this statement we have not only our own analyses, but those of European

chemists. Where these soils are being cultivated, the system of continuous cropping with wheat is in vogue and practically nothing is being put back into the soil. From what we have said to-night you will be aware that not only are such soils becoming poorer in available food constituents by the amounts removed yearly in the crops, but that much organic matter and nitrogen is necessarily oxidized and lost by the indispensable cultural operations. When a short time ago, in Portage la Prairie, one of our very best wheat areas, I was told by several careful and observant farmers that already a diminution in the yield, other than that which could be ascribed to climatic influences (for it was a more or less steady decrease), was to be observed on the older lands, that is, on those that had been consecutively cropped with wheat for 20 or 25 years. Thus it comes about that the farmers in many districts of the North-West are now recognizing the necessity of adopting some plan for the maintenance of soil fertility, and interested and encouraged by the results obtained through the use of clover in Eastern Canada, have already commonced a trial of this method.

If it behoves the Western farmer, who has tilled but for a quarter of a century one of the most fertile soils of the world, to pay attention to this matter of the restoration of the nitrogen, humus, and available mineral food, how much more important is this subject for the farmers of Eastern Canada, where for the most part the soil has been much longer tilled, and where originally it was not of that extreme richness as in Northwest? In my opinion the average yield in all our Eastern provinces would be materially raised by the more extension and regular growth of one of the legumes.

You must not imagine, from what I have said in this address, that there are any grounds for considering our cultivated soils and their productiveness as seriously impaired; such is not the case, save in a few localities in restricted areas. I do, however, say that in many parts of Canada we have, either through ignorance or carelessness, or both, practised a very foolish and irrational system of farming, one in which much has been taken out of the soil and little or nothing returned, a system which has necessarily resulted in diminished yields—the first and most serious step towards unprofitable farming. Since it is almost impossible to materially lower within a few years what I have termed the "total" stores of mineral plant food in the soil, it is evident that our one-sided system of farming has exhausted the land of those very small, but nevertheless most valuable supplies of soluble available constituents which go to nourish crops. It is to restore these economically, to add humus and nitrogen, that this method of manuring by the clover is so strongly advocated. I trust sufficient evidence has been brought forward to show that theory and practice alike justify us in recommending this system as one of the most effective, and certainly the cheapest, for soil restoration.

We have referred to our soils as a natural resource of great and permanent value. They are a resource which should increase rather than deteriorate in value as time goes on, and I have no doubt that such will be the case. Of the capabilities and possibilities in Canada we cannot form any adequate conception, for little more than one-tenth of our agricultural lands are as yet tilled. Thousands upon thousands of acres of fertile soil yet await the husbandman to yield their quota of wealth. We may be said to be only beginning farming, but nevertheless we have sufficient evidence to show that Canada is pre-eminently a food-producing country. It is all important, therefore, that no pains should be spared in the scientific investigation of agricultural problems and in the determination of information arising therefrom. Every year marks an advance, and the most encouraging sign of all is that our agricultural work is being more and more prosecuted on rational lines, a result no doubt of the fact that the scientific principles underlying the practice of agriculture are becoming more widely known. Of improved methods based on scientific truths that the Experimental Farm system has been instrumental in introducing, none give more promise of fruitful results than the one which I have brought before your attention this evening: The maintenance and increase of soil fertility through the growth of legumes.

LECTURES ON AGRICULTURE.

Some very striking object lessons as to the value of lectures have just been furnished by this neighborhood. During the past week or so, three of these lectures have been delivered at Stoneham, Laval and Valcartier respectively and on each

occasion, notwithstanding the horrible condition of the roads, the Government lecturer, Mr. George Moore, was greeted with large and attentive audiences composed chiefly of the English speaking farmers of those several localities, many of whom came from long distances to hear him and who evinced their appreciation of his efforts to interest and instruct them, not only by their hearty votes of thanks, but by what was still more gratifying—by taking immediate action on many of his recommendations. A representative of the *Daily Telegraph* had the pleasure of assisting at the Valcartier lecture and we append his description of it:

"The meeting took place at the residence of the postmaster, Mr. John McBain, in Valcartier village and by half-past six the house was filled to its utmost capacity with as fine a collection of sturdy, hard-fisted manhood as you could wish for. They came from near and far and crowded every room on the ground floor of the building, with the exception of o-e which was set apart for the fair sex, a number of whom also showed their intelligent interest in the lecture and its objects by giving it the benefit of their presence. Taking his stand at a point where his voice could be heard in all apartments, the lecturer launched out into a discourse which might not be inaptly termed a familiar talk on agriculture and the duties of the farmer, and which was listened to with the utmost attention by all present. Mr. Moore unquestionably possesses in a high degree the gift of ability to interest an audience. Endowed with a ready eloquence and an apparently inexhaustible fund of agricultural information and experience, he at once reveted the attention of his hearers, while he amused them by the introduction of amusing anecdotes calculated to illustrate the more important points in practical agriculture. He spoke to them of the advantages of intelligent farming, good ploughing and good dairying, the proper selection and care of live stock, the benefits of cooperation and combination, &c., and he showed them by various examples within his own knowledge that it was a mistake to suppose that success in farming depended upon capital in money. There was another kind of capital, he said, which was far more essential to that success. That was the capital involved in industry, honesty, energy and perseverance, without which no farmer could hope to succeed. He also pointed out that no farmer should ever consider himself so far advanced that he had nothing more to learn—in other words that there was no business in which a man required to keep his eyes and his ears more open, and his intelligence more on the alert all the time than in farming if he desired to get on. But his advice to the young of both sexes as to the advantages possessed by those who gain their living by the cultivation of the soil and the care of all sorts of live stock was particularly timely and excellent, while the encouragements which he showed to exist for young people to remain at home and faithfully and intelligently do their duty should have a good impression upon the rising generation. Indeed, it can hardly be doubted that such talks to our farmers are well calculated to educate them up to a sense of their own importance and that they are about the only means by which many of them can be reached in this respect.

"At the close of the lecture, which occupied nearly an hour and a half, a hearty and unanimous vote of thanks was given to the lecturer, after which the local farmers' club at once met and spent nearly another hour in a very intelligent discussion of their local interests and in making arrangements for procuring the best

PRIZES FOR SEED GRAIN COMPETITION

Mr. G. H. Clark, B. S. A., has been appointed to take direct charge of the work in connection with the sum of ten thousand dollars donated by Sir William C. Macdonald to promote "progressive agriculture" by encouraging boys and girls to select seed grain on the farms on which they live.

Mr. Clark has been for three years assistant to Mr. C. A. Zavitz, Experimentalist and Agriculturist at the Ontario Agricultural College. His training there in that capacity has given him particular fitness for carrying on the work, and the boys and girls will find him a most helpful and sympathetic co-worker.

Sir William C. Macdonald has continued to take a deep personal interest in this movement, as he is desirous of forwarding any movement which makes for the improvement of the conditions under which people in the rural districts carry on their work. He has desired the words "Progressive Agriculture" to be put on every cheque to be paid to the boys and girls who are successful in the competition.

As has already been said, the sum of ten thousand dollars in cash is to be paid in prizes during the three years. One set of prizes is to be awarded for the largest yield per acre of oats, counting also the quality of the grain. The basis for awarding the prizes, is one mark for every pound in weight of grain of good quality per acre in the first year; two marks for every pound in weight of grain of good quality in the second year; and three marks for every pound in weight of grain of good quality in the third year. Other sets of prizes are to be awarded for wheat. Any acre of oats or wheat on the farm on which the competitor lives may be selected for 1900, and the particular acre need not be chosen until just before the grain is ready to harvest.

I. (a) The competitor who obtains the largest number of marks in the total of the three years will receive the first prize in the province; the competitor who obtains the second largest number of marks, the second prize; and so on for ten prizes in every province.

(b) There will be also prizes for wheat on the same plan.

(c) The following show the prizes for one province:

	Oats.	Wheat.
1st. Prize	$100	$100
2nd. "	75	75
3rd. "	50	50
4th. "	25	25
5th. "	15	15
6th. "	10	10
7th. "	5	5
8th. "	5	5
9th. "	5	5
10th. "	5	5
	295	295

(d) There will be sets of prizes as above for Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edouard Island, Manitoba, the North West Territories and British Columbia, respectively.

II. (a) There will be also sets of prizes annually for the hundred heads of grains which contain the largest number of seeds of the best quality picked out of those selected from the acre each year.

(b) Any hundred heads from the acre entered for competition may be picked; one mark will be awarded for every seed on the one hundred heads, and *two marks for every grain* (in weight) which those seeds weigh.

(c) The competitor who receives the largest number of marks will receive the first prize in the province; the competitor who obtains the second largest number of marks, the second prize; and so on for the ten prizes in every province.

(d) The following show the prizes for one province for 1900:

	Oats.	Wheat.
1st. Prize	$25	$25
2nd. "	20	20
3rd. "	15	15
4th. "	12	12
5th. "	10	10
6th. "	8	8
7th. "	5	5
8th. "	5	5
9th. "	5	5
10th. "	5	5
	$110	$110

There will be sets of prizes as above, for Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, North West Territories, and British Columbia respectively, in 1900 and also in 1901 and 1902.

Summary:	100 large heads.		
1900:	Oats	$110	
	Wheat	110	
		$220 x 8 eq.	$1,760
1901:	do		1,760
1902:	do		1,760
			$5,280

Three year lb. grain per acre competition:

Oats	$295	
Wheat	295	
	$590 x 8 eq.	$4,720
		$10,000

The seed grain for this competition is not supplied by Prof. Robertson; and it is not necessary to choose any particular variety of seed for sowing this year, but whatever variety of seed is sown this year will be continued during the three years of the competition on each farm.

Teachers in rural districts are invited to join in helping to forward this educational movement. Any teacher may send in a list of not more than six pupils in the school district for competition.

Professor Robertson, through whom this donation was made by Sir William C. Macdonald, says:

'All those who desire to enter the competition should send their names and addresses to Professor Robertson, Ottawa, before the 1st. June, 1900. These communications should contains only the words "Entry for seed grain competition," and the full name and address. They will be carried by mail free of postage.

'I particularly request that no question be asked on these entry applications. Full particulars will be mailed in good time to everyone whose entry is received; and I am sure the newspapers will accord their much prized courtesy, and help in giving publicity to any further announcements. The competitors will doubtless number many thousands, and it will not be practicable to write letters to them individually. The plan provides for 640 prizes, of which 16 are $100 each; 16 are $75 each; 16 are $50 each; and 64 are $25 each.'

It will not be necessary for any of the boys or girls entering this competition to receive any further directions concerning this movement until some time in June, when full particulars will be sent to each competitor intimating how to choose the particular acre and how to set about selecting the large heads from it for seed grain for sowing next year.

As mentioned before; entries should be addressed to Professor Robertson, Department of Agriculture, Ottawa, and should contain only the words "Entry for Seed Grain Competition" and the full name and address of the competitor. These applications will be carried by mail free of postage. They will be received until the first day of June, 1900. Already there are many hundreds of entries from every province in the Dominion.

GOOD ROADS.

To the Editor of THE JOURNAL OF AGRICULTURE:

Dear Sir,—The subject of good roads should be a live one during the next few years. What are we to do about it? It is quite easy to criticise and find fault, but quite another thing to suggest a remedy. At the present time, old time methods will not do. Some people say the roads are better now than they were 25 or 40 years ago, and our forefathers got along well and made money; why do not we try and follow their example? My contention is that the circumstances are quite different. Forty years ago, our forefathers were not on the road even once a week, and sometimes for a longer period; while, now, with cheese factories and creameries at almost every corner, farmers are drawing their milk to these every day; dry or wet weather is all the same, you must go. During the wet weather in the fall, and in the spring, when the frost is going out of the ground (1) our roads are in a wretched state, and at times are almost impassable. During times like these last I have just described, our forefathers would stay at home unless in cases of emergency; now, the creameries run at least 8 or 9 months in the year, and, in fact, some of them the year round. The patrons have no choice, but must go through, breaking vehicles, and abusing cans, spilling milk, etc. A change is needed, and that too immediately. In those parts of the country where statute labor is in vogue, I can easily see a way to remedy matters; but when every one makes their own front road, the difficulty will be much greater. For this reason, those that make their own front road, some may have gone to considerable expense in making their road, and during the muddy season such piece of road is like an oasis in the desert, or perhaps the simile would be better if we used the word: island in an ocean instead of an oasis. While others object, they cannot say for what reason, they think they might be called on to pay more than their proper share. I should think it would be only fair to compensate those who may have done such a thing as permanent work, and it would take away their objections to make a change from statute labor.

When we have reached that stage, I should say that the taxes levied for the repair of roads, by commuting it in money; the township or parish could be bonded for 30 or 40 years, and the amount capitalised, would in most cases put the roads in good shape by macadamising them. The reason why we call broken stone macadam, is that a man (2) by that name was the first to use broken stone. The Government, at Quebec, in order to encourage the building of good roads, offers liberal bonuses to those who purchase road-machineries, or stone-crushers. In most of the

(1) Don't we remember the spring roads, from Chambly to St. John's, in 1860, when we had the Chambly Brewery! ED.

(2) A Scotchman; but he did more than that; he regulated the size of the broken stones. ED.

parishes and townships, there is an abundance of stone; and good stone, too; generally, not very far away. I hardly think it would be an average of a half mile to draw them where needed, in a great many cases close at hand, and they are an intolerable nuisance where they are in the fields. I can easily see that some divisions of certain countries this plan would not be feasible, as the country is low and flat, and then no stones for a long distance. But I can assure you, Mr. Editor, if all the localities that have the raw materials quite convenient would adopt it, a marvellous change would take place in a very short time. It takes time to work reforms. How long it took in your own country to abolish the corn-laws over half a century ago. But we must advocate it; talk it up; write about it, and agitate for it, and perhaps our efforts will be rewarded by and by.

We can only expect to arrive at something definite when our people get educated up to a point where they see the error of their ways. In Ontario, the most of the leading roads are macadamised. If some of our farmers could take a trip out when our roads are in their worst state, perhaps in the spring—and see a bit of well drained, well rounded macadam, it would give them an idea at once of the benefits of good roads.

I have not mentioned anything about drainage—as I was afraid some would say I was a little cranky on that question. But nevertheless if we are to have good roads, they must be well drained, and if so their permanency will be ensured fourfold.

I hope, Mr. Editor, you will keep the agitation going, as agriculture will get a set back if our roads are not attended to very soon.

Yours truly,

PETER MACFARLANE.

April 2nd, 1900.

GROWING ALFALFA OR LUCERNE.

To the Editor of FARMING:

As it is now time to begin farming operations for the season of 1900 and one of our first and most important tasks is to arrange for our meadows and fodder crops. It is necessary that we apply our clover seed to our fall seeding of timothy with fall wheat or rye. As I have been experimenting with alfalfa for a few years my testimony on behalf of this plant may be of some encouragement to brother farmers. My first experience was with about two acres of young orchard which I wished to seed with clover. When at the seed store the dealer showed me a bag of alfalfa. I had read of its good growing qualities and concluded to give it a trial. I procured half a bushel of seed and applied it with Advancer Teas to my young orchard. I got a good stand which gave me a grand calf pasture in the fall. The next spring the alfalfa shot up very quickly, I think it must have grown three inches some days. It was the admiration of passers-by and it was not an uncommon thing to see people get over the fence to examine it. Making such a good growth so early in the season it began to blossom by the 24th of May, and I cut it on the 28th of May, getting about three tons of fine alfalfa hay. I pastured it the rest of the season with much satisfaction instead of harvesting another crop. The coming winter was a very cold and barren one and alfalfa as well as all other meadows had a hard call. I may say here that I think our cold, barren winters are our only drawback to successfully growing this plant and yet it lives as well as our red clovers. Alfalfa is noted for its enormously long roots which are bound to find moisture and it will be found always green in our severest droughts when other plants are apparently dead.

I have made a practice of mixing alfalfa, alsike and red clover in equal parts with timothy seed and am well pleased with the results. When sowing alfalfa with other seed it will not mature as early as when grown by itself and will mature with timothy. It requires high, dry land and does well on our light clay gravel soils where it is hard to get timothy to grow tall and rank. A year ago I sowed the above mixture of clovers on fall wheat when the snow and ice were leaving in the spring, having put the timothy on with the wheat in the fall. The alfalfa took a hold as well as the other seeds and looked well in the fall. It makes a fine hay (1) and all stock seem to like it and it makes a good pasture for hogs, sheep, cattle and horses. I would advise all farmers to give alfalfa a trial. It is a new plant to our soils and gives a change which I think is a profitable one.

BRUCE E. JOHNSON

Picton, Ont.

(1) True, if you can keep the leaf on! ED.

At a meeting of the Farmers' Club held at Percé on Monday, the twenty-sixth day of the month of March, A.D. 1900, were present :

L. C. Lavoie, Priest, President ; John Gorman, Charles Lamb, John Proulx and John LeBreton, Directors. The proceedings of the former meeting were read over, adopted and signed.

Moved by Mr. Gorman, seconded by M. Proulx, and carried :

That this club desires to show its appreciation and express its sincere thanks to Sir William G. MacDonald, of Montreal, for his large and generous gift towards encouraging the youth of this Dominion in the selecting of good seed grain. Adopted.

Moved by M. Lamb, seconded by M. LeBreton,

That the Secretary-treasurer, of this club transmit a copy of this resolution to Sir William A. MacDonald through the kindness of M. Jas. Robertson, Esq., commissioner of agriculture at Ottawa.

Attested, Signed,
W. FLYNN, REV. L. C. LAVOIE,
Secretary. President.

True copy,
W. FLYNN,
Sec.-Treasurer.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

ILLUSTRATION. (1)

I have just received this, showing the very latest fashion on the otherside. It embraces the very latest style of Eton jacket, with the very pretty new collar and *revers*. The coat will be the same colour as the skirt of the dress. Blue, with *revers* of cream silk, blend, and look well ; as do fawn and cream ; also, violet, another fashionable colour, looks well and is quiet and ladylike.

A silk waist or blouse, fitting well to the figure, seems to be the most sensible garment to wear under the jacket, as in taking it off it still leaves the wearer in visiting costume. For those who like it, the new collar with the points is very pretty ; these are seen in velvet decorated with many devices in beads, but for the spring must be rather too warm. The waist must be a little full in the front ; pink or blue will go well with any of the colours mentioned. The belt must be carefully made, so that there shall be no gap between waist and skirt ; it can be either the same colour as the waist or to match the *revers*, as a slight part of it always shows between the coat and skirt. A piece of silk on the cross is all that is needed, and this soon works into the natural folds of the figure.

As can easily be seen, the sleeves are quite tight fitting. Needless to say, this skirt need not be followed minutely as there are many others that might be more suitable, but taken in part, or as whole it is a very pretty costume.

SPRING GREENS.

At this time of the year the growth of everything is so rapid that the trouble is to catch a plant when it is young and tender.

(1) The original is drawn by Miss Winfred Grier, now in London. ED.

Almost with the first blade of grass shoots comes also the dandelion, which makes a most welcome dish boiled, and, eaten when very young, makes a very nice salad. For the latter purpose it is just as well to blanch them, which can easily be done by covering the young plants with empty tomato tins and leaves them covered for about 10 days, taking care to put a stone on each tin to prevent the wind from blowing the covering off. It will be found a most appetising dish, but growing as it does so close to the ground it must be thoroughly washed in many waters to get rid of the sand which clings to it. It is eaten with the usual salad sauce; some people make a sauce which after boiling is bottled and is always handy on an emergency, as it keeps well in a cool place for a fortnight or more.

For people who have a prejudice against salad oil, cream can always be subsituted.

LAMBS' QUARTERS. (1)

This plant is found, one might say, everywhere in the spring, its growth is very rapid and abundent, and is found where there is or has been a manure-heap, round the edge of which it grows to a good size. If picked young and treated like spinach, it will be found excellent eating. It has a rather long pointed leaf; it needs very careful washing. The leaves and about 3 inches of the tip only are used, as the stem is often tough when the leaves are quite tender; Needless to say, this plant is only fit for boiling. Drained well and served with poached eggs dotted over the top, it makes a dish by no means to be despised in the country, where it can be got for the picking.

BONUS HENRICUS, OR GOOD KING HENRY.

Is another plant of the same species, it grows in about the same places as the former, but is a larger plant and has a rough leaf. Treated like boiled greens, it will be found a very nice change in the spring time; but it also must be caught when young and tender and the leaves and tips only used.

TURNIP-TOPS.

In looking over the vegetables in the root-house or cellar, if the turnips have sprouted, try a dish of them; they are by no means to be despised but on the contrary are very good eating indeed. (Particularly swede-tops. Ed).

HOTCH POTCH OF MUTTON.

This is a capital dish for a family dinner. It is very frequently met with in the north of England, where it is a general favourite, especially in winter time. Hotch-potch can also be made from cold meat, but, nice as it is, it does not equal that made from uncooked meat. The best end of a neck of mutton is a good joint to choose. Cut the meat into cutlets, trim off most of the fat neatly. Have ready a casserole or earthenware dish which can go on the table, as the hotch potch is served in the dish it is baked in. Put the cutlets in the dish with a very little stock or water, some par-boiled and finely-shred onion, a little chopped parsley, peppercorns, and a little salt; add some sliced potatoes, and on the top put a good layer of sliced potatoes. Do not cover the dish, but put it in the oven to stew gently until meat and potatoes are tender, and the top nicely browned.

SMALL PORK PIES.

Let us say we begin with 3½ lb. flour; to this quantity allow a pint and a-half of water, 1 lb. lard, six teaspoonfuls of pepper, and 5 lb. pork. To make the crust, boil the lard and water together, have the flour in a heap, and make a hollow in the centre of it. Into the hollow pour the boiling liquid, and mix, and let it stand by the fire; it should not be either too hot or too cold, or it will not rise well, as a little practice will soon teach you. Then mould the crust like an ordinary raised pie, whatever size you please; cut the meat in small square pieces, season it according to taste, and fill the pies with it. Then pour in a little water, and put on the lid; prick the edges together, and trim with scissors, form a few leaves with the paste-cutter, and put them on for ornamentation. Let the pies stand quite four hours before baking, and bake them in a rather slow oven for an hour and a-half to two hours. When you remove them from the oven have ready some gravy that will jelly, made previously from the bones and trimmings of the pork, and, using a funnel for the purpose, pour through a hole in the lid of the pies as much of the gravy as each pie will take.

(1) On April 16th three people were gathering dandelion in a patch opposite 1136 Sherbrooke St. Montreal. Ed.

(2) *Chenepodium*, or goosefoot. Ed.

FISH BALLS

Mix 1 lb. cold cooked fish (freed from skin and bones) with 1 cup bread crumbs, 1 well-beaten egg, and seasoning to taste. Form into small balls, place in a buttered baking dish and bake in a moderate oven to a delicate brown. While they are baking, make a sauce with 1 cup milk, a small lump of butter, a table-spoon flour, ½ tea-spoon minced parsley.

VEGETARIAN LUXURIES.

Stewed potatoes :—About six medium-sized cold boiled potatoes, two ounces butter, half a pint white sauce, two teaspoonfuls chopped parsley, half a teaspoonful each of chopped eschallot, salt, pepper. Cut the potatoes into half-inch squares, put in a saucepan with enough boiling water to cover them, heat thoroughly, then pour off the water. Put the white sauce into the pan with salt, pepper simmer very slowly about eight minutes. Melt the butter in another pan, put in the parsley and eschalot, fry for a few minutes, but do not let these brown, stir gently into the potatoes. Serve piled up on a hot dish with prettily-cut pieces of fried bread round the edge. About two table-spoonfuls of cream would greatly improve the dish, stirred in just before serving. Take great care not to break up the potatoes while heating. (1)

INEXPENSIVE LEMON PUDDING.

Take ¾ lb. bread crumbs, ½ lb. chopped suet, two small lemons, 1 oz. moist sugar, ¼ lb. flour, and two eggs and a little milk. You first mix ogether the flour and bread crumbs, suet, and sugar, as well as the lemon peel, which should be finely pared from the fruit and chopped up very small, and the juice of the two lemons, which should be strained. As soon as all these are well mixed moisten the whole with the beaten-up eggs and enough milk to make the pudding into a thick batter. It should then he put into a well-buttered mould, a white sheet of paper placed on the top, and over that a well-floured pudding cloth securely tied. Let it boil for three hours and a half. When you turn it out on the dish strew sifted sugar well over it. You may serve a sweet sauce with it, or no sauce, as you please.

When hard water is kept in a glass jug there is often a brown deposit, sometimes rather difficult to remove by the ordinary methods. If, however, the jug be nearly filled with equal parts of vinegar and water, into which a potato cut in small pieces has been dropped, and shaken well for a few minutes, it will be found that the cleaning process is both affective and easy.

In cookery, a bisque usually means a puree of cray-fish, but excellent bisques can be made from lobsters, prawns, and crabs. Brioche is a cake similar to Bath buns. Croûtons are sippets of bread fried and used for garnish. Déjeuner à la Fourchette is a breakfast with meat, wines, &c. Hors d'œuvres are small dishes of sardines, anchovies, and other relishes. Feuilletage is puff paste.

(*Cray* fish, are usually found in streams running out of a *chalk* stream. Chalk is *craie*, in French. Or it may come from the French, *écrevisse*. Ed).

CHEDDAR CHEESE.

(Continued)

Casein in Milk.—There is one point about the composition of this milk which is of importance. While in April the milk contained no less than 3.70 per cent. of fat (see Table I)., due, I believe to the high feed, (1) yet this food appears to have had no effect upon the percentage of casein, which was almost exactly the same as had been found in previous years during April, when the percentage of fat was low. Each month, however, the percentage of casein rose as in former years. But the percentage of casein in the milk at Haselbury was as low as, and in most instances lower than, the percentage found in the milk at any of the Cheese Schools held during the preceding four years. As a rule the casein increases with an increase of the fat. But at Haselbury the percentage of casein had no definite relation to the amount of fat, for while in April the percentage of casein was only 2·43, in July it had risen to 2·67, although the milk contained less fat. In 1892, at the Axbridge School, the percentage of casein was also low. I then came to the conclusion that this deficiency of casein would appear to be due to locality or season, or to some especial peculiarity of the stock, rather than to any fixed relation between the constituents of the milk, and subsequent investigation proved this to be the case.

(1) *Eschalot* is from the Philistine city *Askalon*. Ed.

(1) Then fat *can* be fed into milk! Ed.

The stock and yield of milk at Cossington in 1896.

On the 1st of April there were fifty-one cows in-milk.

These were already out on the pastures, thirty in Newlands, receiving hay in addition, and twenty-one on Stubclose receiving, owing to the shortness of keep there, not only hay, but also cotton-cake (about 6 lbs. each per day).

The number of cows were increased by 14th of May to fifty-eight, and in the meantime had been changed into other fields. On the 9th of June there were sixty-two cows in milk. This number continued in-milk up to 21st of September, when ten of the cows were milked only once a day; and on October 4th the number in-milk dropped to forty-nine.

On 27th of August there were ten feeding on "aftergrass" and receiving cake; and on 12th of September there were twenty cows cake-fed. Thus, owing to the drought, some of the cows had to be fed on cake during the greater portion of the season.

Milk yield. — The greatest amount of milk yielded was on the 4th of May, when fifty-five cows gave 175 gallons, or an average of 3·18 gallons (31¾ lbs.) per cow. Even when the number of cows had risen to sixty-two on the 9th of June, the maximum volume of milk obtained was only 163 gallons. Comparing these figures with the 1895 results, it is interesting to note that in that year the maximum yield was given twelve days later, on 16th of May, and only reached 3 gallons per cow. We thus see how early was the season of 1896.

Quality of milk. — Table I. appended hereto shows the average composition of the milk which was yielded at Cossington, from which it will be seen that the milk at Cossington was exceptionnally rich in fat during the whole season.

Effect of drought on casein and solids other than fat.—The casein in the milk, while normal during April, May, and June, fell during the months of July, August, and September below the normal. A careful study of these results will show that the solids-other-than-fat in the milk also fell during these later months below the normal I have found this to be a somewhat characteristic result of an exceptional drought and scarcity of food, especially with individual cows, some appearing to be affected far more than others.

NOTE.—Mr. A. W. Stokes has recently investigated the result of the dry season, 1898, and confirms these results. (Society of Public Analysts.)

The stock and yield of milk at Long Ashton in 1897-98.

The cattle were shorthorns, mostly bred on the farm, and were by a bull which was considered to have come from a good milking strain.

The yield of milk.—No record of the milk yield had been kept before the Cheese School commenced, but it was roughly estimated at about 2 gallons per head per day. Judging from the results obtained in 1897, this estimate is probably not far from correct; but I do not consider it very satisfactory for a well-bred and well-fed herd. Taking the average of the seven months it is only 2·21 gallons per day, while at Mark the yield was 2 39 gallons per day, and at Haselbury and Cossington 2·18 and 2·16 gallons respectively. On all dairy farms a record of the milk yield of each cow should be kept, and the poor milkers gradually weeded out. This would probably greatly augment the average yield and well repay the little trouble involved.

The quality of the milk.—This, throughout the season, was inferior from a cheese-maker's point of view, owing to the deficiency of casein and consequent small return of curd. Only in the months of September and October was as much as 1 lb. of curd obtained from a gallon of milk. The average composition of the milk is shown in Table I. on p. 80. It is not possible to compare these figures quite closely with those of former years, because newly calved cows were brought into the herd from time to time, while in former years all the cows had calved in the spring of the year. So poor in solids other than fat was the milk found to be on the days on which the usual observations were made in April, 1897, that during the months of May, June, July, and August it was deemed necessary to analyse the milk daily. It is the average results of these daily tests which are recorded in the table showing the average composititon of the milk.

In 1898 the stock at Long Ashton was practically the same as in 1897. Hence, any variation in the yield of milk must be attributed mainly to the season. In April the milk was exceptionally poor in casein, and contained much less fat than in 1897. In May there was a slight increase, which was partly lost in June, and not quite regained in July. But during August, September, and October, there was a slight improvement over the results obtained in 1897, both as regards fat and casein.

In spite, however, of this improvement, the milk yielded at Long Ashton is still conspicuous as having contained less casein during each of the seven months than has been present in the milk yielded at any previous Cheese School.

Hence the small return of curd per gallon of milk.

(To be continued).

DAIRYMEN AND GOOD ROADS

It is often a surprise to us that patrons of cheese factories and creameries do not rise up in their might and demand good roads at any cost. In sections where co-operating dairying has been carried on for years we often find our very worst roads, which during the spring and fall months must be almost impassable. To haul milk five or six miles over such roads would to many seem almost an impossibility, but still it is done and the same thing continues year after year.

If the bad roads in such sections were replaced by roads that would remain good at all seasons of the year the patrons of the factories in these localities would be able to get their milk hauled very much cheaper and would get a better quality of product out of the milk when delivered. We speak advisedly in regard to this latter contention. There is no doubt that milk is often materially injured for either butter or cheese making by being churned and agitated as it is when hauled half a dozen miles on some of those almost bottomless or rough rocky roads.

In this goodly city of Toronto there are block-paved streets so bad that to ride on them gives one a sensation not unlike a quick tumble down stairway. A year or two ago, before the block pavement was replaced by asphalt, on one of the streets the city milkmen could not drive because the milk would be churned into such a state that their customers would not take it. In order to retain his trade one milkman was compelled to leave his wagon at the end of the street and to carry the milk by hand for a couple of blocks. If hauling milk a block or two even on this rough pavement would have such an injurious effect on milk for family use only what must be the effect when milk is subjected to similar treatment for an hour or two when on the road to some creamery or cheese factory? Is it not reasonable to suppose that its quality will be very much injured for either butter or cheese-making?—*Farming.*

A WONDERFUL MILKING RECORD.

A noteworthy milking record has been established by the red poll cow Crocus, which belonged to the famous Norfolk dairy herd at Whitlingham. She gave birth to her third calf on the 11th May, 1890, since which date she continued uninterruptedly in milk till 28th September, 1899, a period of over nine years, her milk yield in the last week of her life being at the daily rate of 43¾ lbs., or nearly 4½ gallons. During the nine years four months that she was continuously in milk she yielded altogether 50,428 lbs., or nearly 23 tons of milk. Over the last five years the average quantity of butter-fat in her milk was as high as 4.3 per cent. Her live weight when sent to market, after being on grass feed for the last six months of her life, was 10 cwt. 1 qr. 11 lbs. (1) In the nine years since her last calving she gave something like forty-five times her own weight in milk, and her average production during that period was 5,403 lbs. of milk, or considerably over 500 gallons per annum. —*North British Agriculturist.*

The Garden and Orchard.

(Conducted by Mr. Geo. Moore).

INJURIOUS INSECTS.

(Continued).

The Pear Midge.

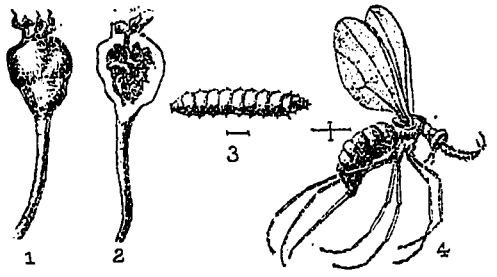
It will be noticed by the lines which show the natural length of this fly and its larva that it might easily escape notice, and so when it has attacked pear trees and the fruit falls off, when about as large as marbles, the evil is attributed to the wrong cause, such as an unhealthy condition of the tree, or unfavourable state of the weather.

The midge is most prevalent and destructive on the early varieties of pears.

(1) 1159 lbs. Ed.

THE PEAR MIDGE.

(*Diplosis pyrivora*, Riley. *Cecidomyia*, Meigen).



1. Pear stunted and malformed by the larvæ within in. 2. Section of pear with larvæ. 3. Larva much magnified. 4. Female fly, much magnified. Lines showing natural length of fly and larva.

THE LIFE HISTORY

of the pear midge is curious and interesting, because it is wonderful that an insect of such small proportions and delicacy of organism should be capable of so much havock. The fly is about one-tenth of an inch long with an expanse of wings of close upon one-fifth of an inch. Its slender body is dark grey, approaching black, in colour; its antennæ, with twenty-six joints, in the male are brown and very long; its legs are very long and yellowish brown.

The female is slightly longer than the male, having *antennæ (a)* with fourteen joints, and an exceeding long *ovipositor (b)* for the purpose of depositing her eggs in the calyces of the blossoms of the pears. Schmidberger witnessed the process of egg-laying, and describes it as follows: "I found the first gall-midge in the act of laying its eggs in the blossom; this was on the 12th of April. It has fixed itself almost perpendiculary in the middle of a single blossom, and having pierced the petals with its long ovipositor, it laid its eggs on the anther of the still closed blossom. This female was about seven and a-half minutes laying her eggs. When she had flown away, I cut the pierced bud in two, and found the eggs lying in a heap one upon another on the anthers. They were white, longish, pointed on one side, and transparent, and from ten to twelve in number. I afterwards found several midges engaged in laying their eggs as late as the 18th of April, from which day they ceased to appear in the garden. I also saw a midge on the side of the blossom with its ovipositor inserted in it, so that they do not merely pierce the petals but the calyx also."

The number of eggs varies from a very few to more than 20. They are hatched in a very short time if the weather is warm The small insects begin to bore into the blossom near its centre as early as the fourth day after the eggs have been laid. Before the blossom is expanded they descend to the core so that they may not be exposed to the sun's rays which would endanger their existence. They separate at the core and begin to devour it on all sides. When they have consumed the pulp of small fruit they have attained their full size, and are waiting a favourable opportunity to leave their, hitherto, safe dwelling; sometimes they fall from the pears to the ground; and sometimes they fall with the infested fruit, from which they emerge and bury themselves about an inch deep in the earth. The grub can jump and crawl, but it has no legs.

METHODS OF PREVENTION AND REMEDIES.

It is well proved that the midge is lying under the trees from June until March at only about an inch below the surface; therefore thoroughly digging the ground to bury the grubs so deeply that the flies cannot get out will be found one excellent means of prevention. Ploughing an orchard after the middle of June, turning the soil four inches at least would have the same effect. A top dressing of 1 ton per acre of kainit has effectually destroyed the insect. The kainit should be applied between the middle and the end of June, before or immediately after rain.

In grass orchards the kainit will be the most useful and it should be put on after the grass has been cut quite short.

When the atmosphere is moist the kainit disolves slowly and the caustic solution thus produced scalds the tender bodies of the insects which come within its influence.

NOTE (*a*). *Antennæ* are moveable-jointed, horn-like members placed on the heads of insects and crustacea, such as crabs and lobsters; they are not connected with mouth, are tubular and hollow throughout their whole length, and the cavity contains a soft membranous substance in which is received the last branches of the nervous system. The use of these organs has been a subject of much discussion by naturalists, some affirming that they are the organs of touch, while others assert that they are the organs of smell.

NOTE (*b*). *Ovipositor*, from Latin *ovum*, an egg, and, *pono, positus*, to place, thus named because it is an instrument by means of which an insect deposits its eggs in the nest or place to receive them; it is sometimes used to bore a way to it, and in some genera it is also used as a weapon of offence.

Actual remedies are few and unsatisfactory. Spraying with insecticides is of no avail.

Picking off, and burning the infested fruit can be done in case of small dwarf trees, but could not be practised to any extent in large orchards, hence it will be more necessary to adopt the means of prevention of the hatching of the brood by burying the larvæ.

(*To be continued*)

(An unfortunate error occurs on page 446, fourth line, first column, which as it renders the sentence meaningless, we hasten to correct. The misspelt world should have been *embedded*).

POISONOUS PLANTS.

The United States Department of Agriculture is doing work which must result in great practical value to the cause.

The Division of Botany is publishing a list of all the poisonous plants with a view to enable people to avoid accidents. A committee has been also appointed to test the quality of seeds sold by the seedsmen who sell poor ones and the delinquents are written to and cautioned.

Explorers have been sent to Russia, Japan, South America, and other points to report upon and secure specimens of plants which are likely to prove of economic value.

The interest in these matters in the United States is deep-rooted and wide spread.

PACKING APPLES.

A recent article in the *Witness* calls attention to some remarks made at the Eastern New York Society by Mr. A. S. Baker, managing director of the International Cold Storage Company of Southampton, England. Mr. Baker, whose practical knowledge of the subject gives weight to his opinion, recommends the use of square boxes in preference to barrels, for the following reasons: First, the saving in freight by the square package taking up less cubic space, which, as the freight is paid for by measurement will be 20 per cent less;

Secondly, the apples arrive in a much more saleable condition;

Thirdly, boxes containing 50 lbs, or one bushel are much more easily handled, and there is no danger of heating, as when they are packed in a barrel, which, however honestly packed, will never open in the middle so bright as at the top or bottom;

Fourthly, It is advised to wrap the fruit separately in paper to avoid all danger of one bad one contaminating others, and reduce the danger of bruising.

And to show that even this extra trouble will pay, Mr. Baker gives the following figures: a box packed with the choicest fruit containing 1 bushel is worth, on the London market, $2.25, while a barrel which contains nearly three bushels brings only $3.75. This is a problem well deserving the study of our apple growers, because if we want to inspire confidence in the superior excellence of our productions we must spare no pains in getting them to market in the finest possible condition.

PROFITABLE POTATO CULTIVATION.

In the season which is at hand, it may be well to remind our readers of the advantages they may gain, or the loss they may sustain by the care or otherwise of the potato crop, a crop which will yield an adequate return of profit without drawing much upon the land if well cared for, and will be also an excellent cleaning crop, but which may be a prolific source of loss, vexation, and annoyance for years, if neglected or carelessly handled.

We will presume that due attention has been paid to the thorough, deep cultivation of the soil and its preparation to receive the crop which has been planted under the most favourable circumstances and has been well attended to as regards hoeing, and earthing up, (1) but alas! trouble comes upon it by the attack of a disease caused by a fungous growth which is now, after many years of experience, perfectly well understood by the scientific botanist and its remedy, as sure and certain when duly applied as any that medical practice has discovered and prescribed for the cure of the diseases of man or animals, namely Bordeaux mixture (*bouillie bordelaise*), a mixture which is composed of the cheapest ingredients and costs nothing in comparison to the saving it will, without any doubt, effect. And yet it is difficult to make the average farmer believe that it will answer his purpose to apply the remedy.

(1) The less the better, and the earthing up should be *flat*. Ed.

Dr. Munro, late of Downton Agricultural College, Salisbury, England, conducted a series of experiments to test the value of nitrate of soda as a manure, and at the same time he tried the efficacy of *bouillie bordelaise* by twice spraying the crop once on July 1st and again on August 12th, and reports that beside the tubers being free from disease the crop was increased by spraying over a ton per acre, in consequence af of the increased duration of growth. But in a season when the disease was unusually severe the use of the mixture showed a gain of 5 tons 3 cwt. per acre over unsprayed plots, and a most interesting proof that the most part of this gain was due to a second spraying on 26th of July. Dr. Munro says: Although we left no part of our acre unsprayed, there was a plot, running down the centre of the field, which was sprayed only once, and when I visited the field at the end of September, this plot was clearly and sharply marked out from the remainder of the acre by its partially withered foliage, which afforded a striking contrast to the still bright green of the rest. The yield of this *once* sprayed plot was at the rate of 12 tons, 19 cwt., 3 quarters sound tubers and 2 tons 12 cwt. diseased, total 15 tons, 12 cwt., 3 qrs. as against 18 tons, 1 cwt., 2 qr. of sound potatoes on the adjacent, similarly manured, plot which was twice sprayed. In another experiment the crops was sprayed twice and when dug, less than 1 cwt. of diseased tubers were found on the acre.

The addition of 2 lbs. of Paris green to the 100 gallons of Bordeaux mixture will, just as effectually, kill the Colorado beetle.

It is scarcely credible that any one, with these facts before him, would be so foolish as to neglect the precaution of spraying and yet there are many who do so under the pretext that it is too much trouble, and that they do not have time. They do not think that there is any time lost in the necessary operation of weeding and cultivating, but when an enemy, more destructive than weeds, attacks their crop they simply let it do its worst without any effort to check its ravages, although its destruction is simple and easy and within the reach of all.

GEO. MOORE.

The Poultry-Yard.

(CONDUCTED BY S. J. ANDRES).

CHICKEN COOPS.

By request, I present a few chickens coops that I think will be a great improvement over the old barrel coop (the first one I used myself forty years ago). It consisted of an empty barrel laid on its side with stakes driven down in front of the open end so spaced as to keep the hen confined, yet allowing the chicks to come and go at will, since then, I have used boxes and any convenient thing in the shape of small sheds of different sizes. I have often seen in some of our country places and farms the small shed roof box with the hen tied to a peg in the ground or a staple driven into the coop, and the coop often being changed to new ground along the garden fence in front of the house, so the good wife could have her eyes on the hen and her family, and have them in a convenient place for feeding and supplying water, and I confess I have seen some very good chicks raised in that way although I saw many chicks lost in the long grass and under old boards and the wood pile which is often very near to the house, and forming a good place for marauding rats, cats, dogs and other enemies of the hen and her chicks, but as experiences were gained by loss, I finally settled on the shed roof coop with both lath and wire runs of different dimensions. Having gained also much information from Farm Poultry and other Journals, I aim to give a few designs which I hope will give the readers of this JOURNAL considerable choice, and enable them to select one that will suit their needs.

Figure 1, I consider the best for all around purposes. It is scarcely possible to make a coop that will not have some disadvantages. The following size I think will be found the most satisfactory—the coop 18 x 24 on the bottom, 24 inches high in front, and 20 inches high at the back; the run 4 feet long, 2 feet wide and 22 in high. Both coop and run are roomy, the height and the perpendicular sides make every inch of the ground space available for the hen, giving her really much more room than in an A or tent-shaped coop of equal ground dimensions. The

box coop and the frame for the run are made of inch stuff, the slide for the door is 10 x 12 inches, and the standard attached to this slide door moves through a slot in the roof, which is nailed fast. Perhaps some may want the roof to be hinged or hooked on. When this is done, it will be necessary to change the slide arrangement. The width of the run should be 2 feet between the rails of the opposite sides and either the top rails or both top and bottom rails should overlap the sides of the coop when the two are placed together in position.

Figure 2 shows the same coop with a knock-down run of lighter construction and may be liked better by some than the run as shown in Figure 1. The sides and ends are made separate; then the end is nailed or secured to the sides. Cross-braces of lath nailed to the lower edges of the top side rails the laths put on the top, a single lath nailed to the lower edges of the bottom rails a few inches from the open end and the pen is complete. The spaces between the slats should be: on top, 3 inches; on the sides, 2½ inches for small hens; 3 inches for large.

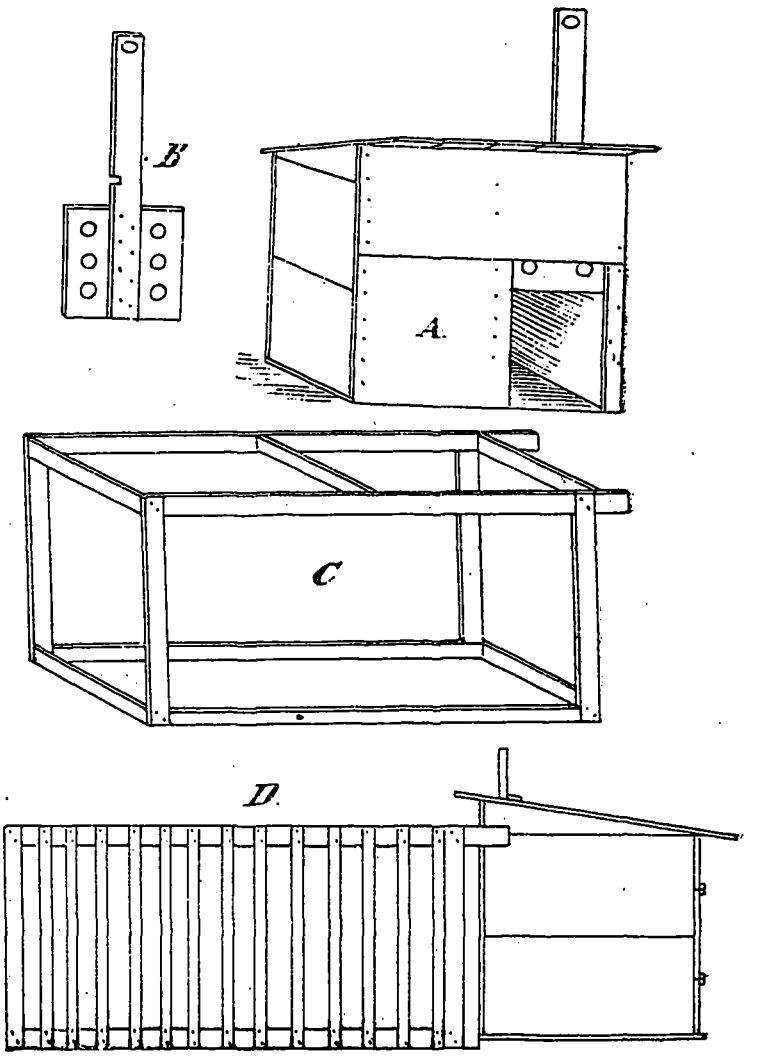


Fig. 1.—A Convenient Chicken Coop.

A—The Coop. B—Slide Door, Back View. C—Frame of Run. D—Profile of Coop and Run.

The material for both coop and hen if bought new cannot be very expensive.

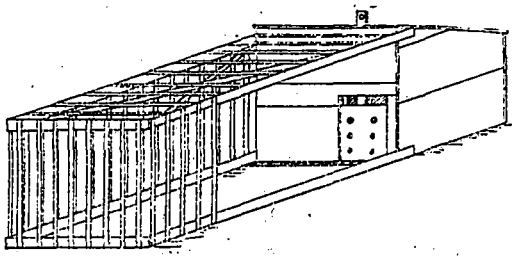


Fig. 2.—Coop with knock-down pen.

Figure 3 shows a good coop to use where cats and hawks are troublesome. The coop is one used by Mr. K. Boyer, editor of a "Few Hens," published by J. S. Johnson & Co., of Boston, Mass., from whom the electro was obtained. The coop differs from that shown in No. 1, in being a "knock-down." This is built of light ($\frac{3}{8}$ inch) lumber, and thus described below. The coops measure: floor space, 2 x 2 feet; front, 2 feet high; back, 1 foot; roof slanting, measuring 2 feet 6 inches square. The doors in the front are one foot square, and made of 1 inch wire netting. The roof and sides are covered with heavy roofing paper and painted. The frame is made of strips of $\frac{3}{8}$ inch thick boards, three inches wide. The floor, front, back, sides, and roof are complete by themselves, and fastened to each other by screws. This enables them to be taken apart when not needed and stored away. In that way they not occupy much room and also give a chance to easily wash and clean with lime-wash on the inside.

The runs are twelve feet long, 2 feet wide and 2 feet high. The frame work is made of strips and on this is tacked the wire netting. The top of the run is made into two pieces linked together which gives a chance to get into the runs when necessary. On the part nearest the house may be put $\frac{1}{2}$ inch boards to prevent the rain beating in in heavy storms. By changing these runs every week to new grass land, they will be found most excellent for the hens and her chicks. They are cat and hawk proof.

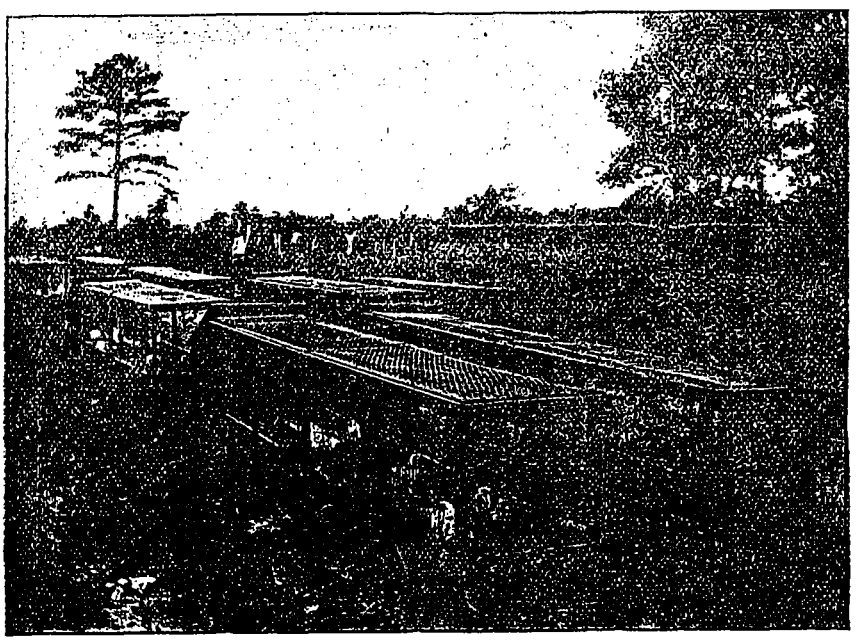
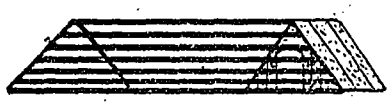


Fig. 3.—M. K. Boyer's Cat and Hawk proof coop.

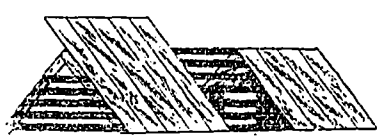
Figure 4 shows the style of coop preferred by Mr. A. F. Hunter, and a much cheaper one than either of the others, and some may object to the arrangement for closing the coop at night, and the necessity for frequently shifting the shelter board. Having no floor it is easily and quickly cleaned simply by moving to fresh ground, but on the other hand is not as comfortable in damp weather nor as safe.

Coming back to the matter of shelter from the sun for which this crop makes special provision, it may be said that with a flat topped coop pen

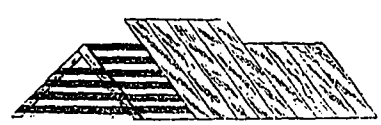
Fig. 4.—Mr. Hunter's coop.



Same with pen.



With shelter board—rain shelter.



With shelter board—sun shade.

as in Figs. 1 and 3, shelter from the sun and also from light showers may be obtained by covering a part of the coop with a piece of burlap or old carpet.

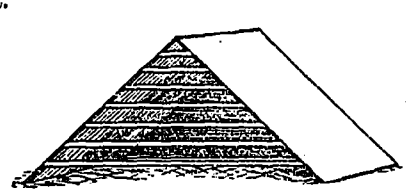


Fig. 5.—A coop.

Figure 5 shows the simplest form of a coop that can be made, though very generally used, it is not on the whole a satisfactory coop for the permanent home of a brood; but as it can be made in a few minutes, it is not a bad idea to be kept in the mind for use in emergencies.

Figure 6 shows the method of cooping young ducklings when reared with hens.

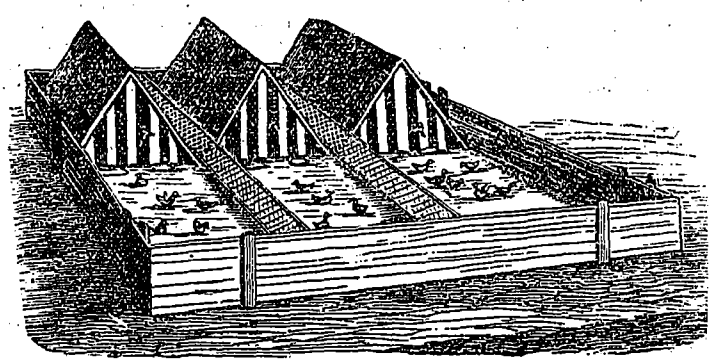


Fig. 6.— Coop for ducklings with hens.

The Horse.

SPRING TROUBLES.

The capricious weather of early spring often produces serious troubles in animals as well as man. Frequently horses at this season take severe colds which their owners fail to notice until it is too late to do anything for them. There are certain symptoms, however, which demand attention and prompt measures. As soon as a horse shows signs of dullness and distaste for food there is someting wrong, and the owner should keep the horse quiet in the stable and send for the doctor. Should there be no doctor near he should prepare some bran mash as follows: Half a stable bucket of coarse wheat oran, one pint of oats and half a pint of linseed, all boiled carefully together in half a gallon of water and covered up for an hour, so that the feed is well soaked. After giving the mash have a bucket filled with clean, lepid water, in which an ounce of nitrate of potash is dissolved, placed near the animal, so that he may quench his thirst when he likes. The horse should be kept in a box stall, if possible, free from exposures, should be hand rubbed all over and his legs bandaged, then bedded down nicely with straw and

kept quiet. Use the following prescription: Tincture cinchona, six ounces; spirits sweet nitre, four ounces; spirits of camphor, two drachms; thick barley water and honey sufficient to make 32 ounces. Give one-sixth to one-fourth part as a drench carefully three times a day and rub the throat with liniment of ammonia once. With kind attention, nursing and quiet for a week the cold will be relieved. When there has been neglect complications ensue which the doctor alone can properly diagnose and prescribe for correctly.

—*Exchange.*

Swine.

THE HOG INDUSTRY

To the Editor of FARMING :

I take the liberty of asking you to explain as best you can the reasons why live hogs sell about fifty cents per 100 lbs. higher in Buffalo than in Toronto.

Pork packers and other shining lights have for years been advising farmers to go more extensively into hog raising : to produce a good bacon hog, and good prices would be next to a certainty. It was pointed out—what is no doubt true—that Canadian pork and bacon sell at materially higher prices than does the American product in the English market. In fact, Canadian bacon is rapidly taking the very first place amongst its numerous competitors, and promises to find favor with the English consumer to a similar extent as does Canadian cheese. The Canadian farmer did listen, and acted upon the advice so freely given.

The typical bacon hog has to a large extent taken the place of the more thick and fat breeds which were in such favor with the farmers because of their easily fattening qualities. In short, the farmer sought to adapt himself to what seemed reasonable to expect would soon become the leading branch in his profession. And now what does he find? Instead of getting fifty cents or a dollar per hundred pounds more for his hogs than his American competitor, who can raise hogs considerably cheaper than he can possibly do, he must be satisfied with fifty cents less or go out of the business.

The hog business has certainly been a most disappointing one to the average farmer. What has been the cause of the failure is the question, and if FARMING can enlighten its readers on this matter I know its efforts will be greatly appreciated.

W. SCOTT.

Victoria Square, Feb. 8th, 1900.

NOTE—The question which our correspondent asks us to explain is one that is being asked by a good many farmers to-day. We have made some enquiries on this point of people interested in the bacon trade, and about the only explanation we could get as to the higher prices at Buffalo as compared with those at Toronto was that the American home market for hog products was specially good at the present time, and that in order to supply this demand American packers were able to pay higher prices for hogs than Canadian packers, who sell to the British trade, could afford to pay. It was further pointed out to us that times are particularly good in the United-States and that the working man is consuming more meat products, thus greatly increasing the demand for such foods, including pork and bacon. Whether this explanation is sufficient to account for the wide difference in prices referred to, we will leave our readers to judge. The question is an important one, and we would be glad to hear from those who have any other explanation to offer —EDITOR.

DISEASES OF WOOL.

Wool has its diseases as the sheep has. But the diseases of the fleece does not hurt the sheep as to its general health. Hair and wool are precisely the same in composition and general character except that hair is smooth and wool is rough to the touch. One of the diseases of wool causes the fibers to split and tangle together, forming matted patches all over the body. Another causes the wool to felt, forming patches of short, hairy-like balls, which loosen from the skin and leave bare spots, which are red and inflamed. All these are infectious and the disease will spread from one sheep to another, until, if neglected, the skin is bare over half the body of the sheep sometimes. A lookout should be kept for these diseases, and immediate treatment should be applied. The easiest remedy is to apply tincture of iodine to the skin, soaking the wool where it is still retained. The disease is really in the wool, and not in the skin, but yet the skin may be infected by the diseased wool. It is due to a minute fungus which grows in the fibers of the fleece, destroying the substance of the wool, and reducing it to short pieces, or even dust. These diseases are virulently infectious, and when they appear instant action should be taken.—*Farming.*