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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

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- THE -

Journal of Agriculture and Horticulture

THE JOURNAL OF AGRICULTURE AND HORTICULTURE is the officia 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.

Swedes.—Does any body know why the growth of the leaves of the swede this year is so much out of proportion to the growth of the root? At Ste. Anne's we inspected four crops of swedes, our own five rows included, and in every case the growth of the foliage was abnormal.

Mr. Boden's *root-crop*, or rather Mr. Reford's, at the farm near the Ste. Anne's station is very fine. The mangels are as large as we ever saw that plant, perfectly healthy, and, as they had two months more to grow when we saw them—Sept. 13th—there should be hard upon 30 tons to the imperial acre. The crop of the two roots lie neatly on a slight slope, so that one gets a bird's eye view of the whole. The swedes have the same abundant growth of leaf that we mentioned above, and we are not likely to turn out more than two-thirds of the weight of the mangels.

But why on earth does Mr. Boden keep his drills intact? In a damp climate like that of Dumbartonshire, whence Mr. Boden comes, earthing up the drills of the root-crop may be useful, but in our dry climate it is far better to pull the drills down at the singling, leaving the whole field level from side to side, and giving the roots of the plants unlimited scope for extension on their search after food. The more the drills are pulled down, the less the danger of forked roots at harvest time.

Draining.—It is curious enough, but a well ascertained fact, that deep-laid drains run soonest after a fall of rain. We tried this in England, fifty years ago, and thoroughly, by placing alter-

nate drains of 30 inches deep and 40 inches deep in a heavy clog soil, and the practical result was highly satisfactory. It may be worth while mentioning that when the government loans for drainage were granted, in or about 1850, under the supervision of Mr. Parkes, the well-known civil-engineer, of Birmingham, the rule was laid down, and strictly adhered to, that no grant was to be paid over until the superintendent had certified that every rod of drains completed had been laid at a depth of not less than four feet all over.

By the bye it may be well to repeat what we have often written in this paper: water gets into the chains from the bottom; it does not wriggle its way into the pipes through cracks and worm-holes. Until a man gets it into his head that the force of gravity presses upon the water already in the soil, and splits the lower sheet of water, so to speak, each way into the drains, he can never be a successful drainer. Frequent drainage, when the pipes are laid at regular distances from each other through a whole field, is one thing; drainage for springs is quite another.

Fall-wheat.—If fall wheat can be grown; and has been grown at St. Hilaire; why should it not be grown in other parts of the province of Quebec? We remember very well, somewhere about 1882, measuring-up a lot of fall-wheat for Major Campbell's sons, the yield of which was highly satisfactory. The straw measured 6 ft. 1 inch in length, almost as much as it ever measures in our best English soils, and the grain from an acre weighed 2,040, equal to 34 imperial bushels! This would be a good average crop in any part of the old country; quite as much as the average of Scotland, where wheat is only sown on land thoroughly prepared for it; and at least 4 bushels more than the average of England, where wheat is more generally sown than north of Tweed.

If any one tries fall-wheat next season, we would advise him to bury the seed *at least three inches deep*, either with a drill, or by ploughing it in, in which case it would take a 4 inch furrow to cover the seed, and the width of the furrow should not be more than 8 inches at most.

The land should be untouched after ploughing in the seed, except so far as necessary to water-furrow it, which should be very carefully done; and, in the spring, the first operation should be the passing of the harrows over it, to be followed by a heavy roller, unless the soil be very light and loose, in which case the roller may precede the harrows. It will be easily perceived that either roller or harrows will crush down the crests of the furrows, and, so to speak, earth up the young blade of the wheat; after which, the plants will begin to *tiller* at a rate that will surprise any one who has never seen fall-wheat at work.

After what crop should fall-wheat be sown? After early potatoes, or after a bastard fallow, as we suppose no one makes summer-fallows nowadays. Naturally, a clover-ley would be the best place for wheat, but then the second-cut would have to be sacrificed, and that does not pay. Theoretically, wheat should follow pease, vetches, or other leguminous plants; but the land is, even on the heavier soils, so shattered by the roots of pease and vetches, that the wheat, if at all a heavy crop, is almost sure to go down. The best of all seed-beds for wheat is a good crop of rape fed off by sheep. Would there were more of them.

VARIETY OF FARM PRODUCE.

In one of the earlier of his books,—I am nearly ashamed not to be able to name it—Mr. Ruskin, insists how very much more the ordinary stone-mason — of the period when the great cathedrals were built, viz.: about six or seven hundred years ago — must have known about his craft, above what the average man of the same class knows on the same subject, in 1850, and which is true of to-day. So much of the stone-mason's work is now forwarded, and partly executed by machinery, that the skill of the ordinary workman has becomes cramped by the comparative narrow range within which he is called upon to exercise it. What was noticed of the artisan class is equally true of the agricultural labourer; and to a certain extent it is so of the modern occupiers of farms. Their field of activity of late years has been greatly narrowed. They may, and possibly do, know very much about many things of which their predecessors were entirely ignorant, yet about the capabilities of the farm itself, the men of to-day are not called upon to know so much as were their forefathers. The farms produce a smaller variety of crops, and many processes which were once part of the work in every farm household, have been removed altogether from the ken of the agricultural classes. There can be no doubt but that just about the time, when talk of "go-head

farming" was commenced, the standard of knowledge of animal and vegetable life was as low perhaps as it ever had been.

There is no doubt that the terrible strain of what is known the world over as the "Agricultural depression," was greatly intensified by the cramping through which whole generations of each section of the landed industry has passed. This cramping is still carried on by the markets, at least these act in the same direction, viz: to restrict the lives within which the farmer finds his profit, and the men of the farm their occupation. The influence of the markets is good in so far perhaps as they make one holder of land aim at producing some one thing better than any neighbour, subordinating all farm products to that one; but he thereby becomes a specialist; and the popularity of the caution—about putting all one's eggs into one basket—shows that men are alive to one very real dangar in becoming a specialist viz:—as I pointed out in a former article on "fancy breeding"—that if the favour of the public for his spécialité be capriciously withdrawn (and the consuming public are very capricious) then the man who has devoted all his farm, all his capital, and his mental powers to producing one thing, will be left either without a market, or with a market which will only take off his wares at less than the cost of producing them. It is to be imagined that it is now proved that a certain amount of variety of cropping is essential to the secure position of any farmer, with the power to divert into fresh channels part of their energies and products, as the variation of demand may require.

When in the past anyone has suggested supplemental pursuits to the orninary return of the farm, to an agricultural audience, the comments on the suggestion have almost invariably take the the form of "What! give up growing wheat and barley to grow jam?" "What! give up haymaking to fill a silo?" "What! give up bullocks to keep old hens?" The assumption invariably being that, there being an opening (as proved by the markets) for some new production, there is no intermediate course between throwing up every other consideration besides this new demand; and remaining doggedly *in statu quo*, although this be notoriously unremunerative. This assumption is not justifiable. There is a third course open, and that is to be always trying—of course on a small scale,— new experiments and combinations, viz: growing a new crop, or "converting" some part of an old one in a new way, and, by so doing, feeling one's way into a better business. If the business be already good, it is certainly "good business" to leave well alone.

I fancy that an intelligent observer of any market might discover some direction in which there is a demand which he has the power to supply. The exact articles will of course, be different in different localities, just as the exact crop which each farm will produce to the greatest advantage can never be discovered except on the farm itself.

The idea that once prevailed—surely it is dead now—that all land must be farmed on exactly the same number of courses, and the few crops permitted only be grown in one rotation, was worthy of that robber chieftain of olden times, who made all comers fit his bedstead, lengthening out by the rack those who did not touch both top and bottom, and chopping off a bit of those whose inches were in excess of what was required for this purpose.

To sum up. To determine which variety to grow, and how to grow it, requires no small intelligence, and no small amount of traditional skill. Mere quick-wittedness, without any practical knowledge, is about the most dangerous quality an agricultural assistant can have, as anyone may find out for himself who will take a sharp town-boy and put him to some country-task.

The man who should set out, or chop out, one variety of roots at the distances which suit another will half spoil a costly crop. The man who expects one variety of herbage, to "make," exactly as another would, will be rewarded with a "rick a-fire." Success in farming depends in recognizing a thousand little differences and distinctions between plants and animals which have a general outward resemblance to each other; and to do this requires a sympathetic insight. Now, this sympathy with beast or bird, or plant is not a product of modern education.

W. R. GILBERT.

THE MAINTENANCE OF SOIL FERTILITY THROUGH THE GROWING 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 his 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 informations 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 talbe, prepared from these results :

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

TABLE No. 1.

	Nitrogen			Phosphoric acid			Potash		
	Foliage	Root	Total	Foliage	Root	Total	Foliage	Root	Total
	Lbs.	Lbs.	Lbs	Lbs.	Lbs.	Lbs.	Lbs	Lbs.	Lbs.
First year crop.....	90	48	139	30	16	46	75	40	115
Second " "	50	60	111	17	20	47	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 bab 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 now 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 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 harvested 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,

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

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 grown 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 per acre.

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

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 bush. 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)

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.

(1) Very striking. Ed.

TABLE No. 2

Grain after Clover: Results showing Fertilizing Effect of Clover (*a*) first year, and (*b*) second year after being ploughed under.

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 clover	2160	37.2	1740	25 20
	Increase due to manurial effect of clover	1610	19.4	1330	15.0
" 3	Odessa barley and clover	2180	37.12	2620	32.29
" 4	" " no clover	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 clover	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 clover	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

Potatoes after Clover.

The following experiments 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 bush. 27 lbs. per acre, on No. 2. 104 bush. 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 Western Canada, have already commenced 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 the North-West? In my opinion the average yield in all our Eastern provinces would be materially raised by the more extensive 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 land is 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 dissemination of information arising there from. 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 growing of legumes.

COMMERCIAL FERTILIZERS.

Though commercial fertilizers are applied in large quantities by our neighbours of the States on lands which have not been cropped longer than ours, they are yet little used by Canadian farmers in general, and least of all by the farmers of our own province. A strong effort is now being made to persuade the latter to resort to the same means in order to restore the fertility of their soils. On the other hand, we see the leading agriculturists of the States alarmed at the enormous and ever increasing consumption of fertilizers and endeavoring to reduce it by advocating a more rational system of cultivation. Evidently, it is possible to make an abuse of fertilizers, and the

question arises : To what extent and under what circumstance can they be employed ?

To answer this, we must first consider the condition of our lands. Many of then, formerly very productive, have become unable to give remune rative crops of grain, on account of long years of continuous and unsystematic cropping. These lands are said to be *worn out*, or in other words, that the plant-food which they contained in such abundance not many years ago has all been removed. Therefore it it claimed that, as farm-yard manure is too slow in its action, artificial fertilizers should be used to restore the fertility.

But is it possible that our land should have been robbed of all its original fertility by the relatively short period during which it has been cultivated ? This may be doubted, often, during a very favorable season, we see these worn out lands give a much larger crop than usual. This is clearly a sign that they still contain some plant food, but this plant food has become sluggish, unavailable to the plants. Why has it become sluggish and how can it be brought into use again ? There is one element missing, the presence of which is indispensable to the fertility of the soil. The *humus*, or black earth, result of the decaying of vegetable matter one so plentiful in the land has gone. When the plough brought it in contact with the air, it decomposed slowly, giving to the plant the nitrogen which it kept in store and liberating also acids which attacked the sluggish plant food of the soil and made it available. Furthermore, humus so improves the physical texture of the soil as to permit, in the same degree as lime, the access of air, warmth and moisture, which all three work together in liberating plant food. Like lime then, humus helps in rendering the mineral matter of the soil available, but it goes further, it fixes it and prevents it being washed out of the soil.

To return this vegetable matter which furnishes to our plants the more costly of all fertilisers : *nitrogen*, should certainly be thought of before resorting to chemicals. This can be done by the use of farm-yard manure and by practising green-manuring. Lime can also be used as a more energetic means of unlocking the mineral wealth of the soil, but humus alone will furnish the nitrogen.

On the other hand, the land may have been for many years cultivated only to a shallow depth. In this case, beneath the exhausted surface layer, there is still an other layer of greater depth rich in mineral matter, and which, owing to its compactness has so far been untouched by the plant roots. Again it will be far cheaper to bring this sub-soil into use by tilling it, or bringing it to the surface slowly and gradually with the plough, than to use commercial fertilizers. (Good. Ed.)

Fertilisers may however be used in a judicious manner so as to hasten this restoration, like kindling wood in starting a blaze. It is important that a young growing plant should have within immediate reach of its rootlets plenty of available nitrogen, the first element which it needs in the course of its growth. This will give it an early and vigorous start, and, hence, more power to draw from the soil the food which it needs later on. A light spreading of nitrates early in the sprfng will supply this need.

Fertilizers may also be employed to remedy the defects of incomplete soils. There are some soils originally poor in one or more of the elements of plant food, especially phosphoric acid, and sometimes, but rarely, potash. Farm yard manure used alone on such lands is not sufficient. In this case, the use of the fertiliser needed will give wonderful results. The only way to recognize which is needed is to question the land. Let the farmer test the different fertilisers on small plots of land and use on his fields the one which has given the best results. (Good. Ed.).

But it must be well understood in all cases that the use of fertilizers can be profitable only on a well cultivated farm. They may give appreciable results on a farm poorly tilled, but the same might have been obtained at less cost by better tillage. As says Roberts, commercial fertilizers must be use to supplement tillage and not to take its place. It is only on a farm well drained, well tilled, well supplied with organic matter, or humus, that their use may prove advantageous.—C. M.

AGRICULTURAL SCHOOLS.

To the Gazette—At the annual meeting of the Scottish Chamber of Agriculture held in Edinburgh, a resolution was passed unanimously affirming "That the subject of agricultural education is one of the first importance to agriculture." and, besides, strongly recommending the establishment of agricultural schools, "where theory and practice could be taught and experiments conducted."

In regard to experimental work the mover of the resolution is reported to have said :

"I think it is an essential part of agricultural education. There is no farmer of fifty years standing who has not been an experimenter. His daily practice is ruled by the results of prolonged observation. He pursues certain methods and avoid others, because he has observed and noted certain results. He cannot perhaps give you a reason, but he is satisfied in his own mind. The defect of such experiment is that it is long and laborious, that the results are not placed on record and the young farmer has in many cases to begin and gain experience in the same way. An important part of all experiments is to define cause and effect and experiments in agriculture are so much affected by side influences that they need to be carried out with the utmost care and to be repeated before reliable results are attained. You cannot get the best conditions in ordinary farming practice. You require trained experimenters with ample time and means to attend to every detail and even then they must beagain and again repeated before you can rely on your results."

The resolution in question was moved by Mr. Jas. Biggar, of Dalbeattie, and seconded by Rev. Dr. Gillespie, of Mouswald, both prominent agriculturists, and in speaking to the resolution both gentlemen referred in the most eulogistic terms to the Ontario Agricultural College, the seconder referring to it as "the beau ideal of an agricultural college." It must indeed be gratifying to Ontario to have her agricultural college so highly thought of by such eminent agriculturists and held up as a model for old Scotland to copy. It will have been noticed by the annually increasing attendance that this college is steadily advancing in popularity and usefulness at home.

The maritime Provinces—Nova Scotia, New Brunswick and Prince Edward Island—are just now considering the advisability of establishing a first agricultural college at some central point within those confines. The governments of each province recently met and formulated plans for the establishment of this school forthwith. This is a good augury of the spirit of the times in the Provinces by the sea. At all the meetings of farmers and breeders which the writer attend last winter agricultural education came in for by far the greatest amount of interest and discussion. In the present status of agriculture and stock breeding, old farmers, where education along the lines of agricultural science has been neglected, are feeling the dire effects of that neglect and find it difficult, in many cases impossible, to keep up with the procession. They are therefore determined that their sons shall not suffer from like causes and to this end are making every effort not only to establish and equip a central up-to-date agricultural college, but to have at least the elements of the sciences relating to agriculture taught in the public schools.

J. A. MACDONALD.

Kings Co., P. E. I., Can. *Breeder's Gazette.*

A RETROSPECTION

To the Editor of JOURNAL OF AGRICULTURE.

Dear Sir,

I think it is a good idea, once in a while, to look back and see the way we have come, although the Good Book says : "when a man puts his hands to the plough he must not look back." I suppose it means that when in the act of ploughing, we must keep our eyes to the front, to keep clear of the stones in the way. A ploughman when he gets to the end of a furrow looks back to see if there are any crooks in the furrow ; and if so, to make them less, gradually, so that at the finish, all is straight and even.

It is something of that sort I would be at in this article. We have got to the end of the furrow, to the end of the harvest, although the root-crop is still to be saved, we do not include that in the meaning of the term *harvest.* We have had a peculiar season. I should not like to say we have had none just like it, for the season of 1897 was very much like it, as far as regards a wet July and August is concerned, and the spoiling of a rather poor hay crop.

Those who did not wait until the hay had all done growing, before they began to cut their first field, had reason to congratulate themselves before the end of August. Some even of my own neighbors had to leave their hay cutting and finish their harvest, and then went back to the hay cutting in September. When will such people learn that dried grass for feeding cows is worth 2 or 3 times the feeding value of the same quantity of over ripe hay. (Good. ED.) no matter how well it may be saved. I am sorry to say it, but there were tons and tons of just such hay cut in the

province of Quebec this year, as there were also tons of it cut in the September of 1597.

I am pleased to note on the other hand that there are some up to date farmers who cut their clover in due time, early in the month of July, who were able to cut a second crop about the same time that the first mentioned were finishing their first crop of hay.

This much I will say, that the removal of the one crop of over-ripe hay took a great deal more fertility out of the soil than the removal of the two crops of grass, and the difference in feeding value certainly must have been increased at least 3 times. If the first farmer could live and make both ends meet, the last ought to be able to lay by several pennies for a rainy day.

It is always the same old story: the weather was so bad; when asked why they did not commence sooner, oh! it was only growing then, they wanted to wait until there was something to cut. Another fact worth noting is this, when grass or hay is cut green, bad weather does not spoil it so much, as when it gets rain when over-ripe; in fact, when over-ripe, wet weather almost ruins it altogether.

But perhaps, Mr. Editor, I have said enough on this question, for the present, those who are in the habit of haying in September will not care to read this article, while he who was cutting his second crop will not need to read it! (a sharp cut of the whip! ED.)

Grain.—Now that the farmers are getting their thrashing done, some fields are turning out well, others only fair. Usually, early sown grain is turning out well, while late field are not much. Corn has done well lately, and those who were fortunate enough to have silage-corn will not be disappointed with it.

Root-Crops, with the exception of potatoes, are doing fine. In some sections the rot has made its appearance, but still, there will be no scarcity of potatoes. The wet weather has made pastures greener than usual, and the prices of both cheese and butter have kept up well, the whole season.

This has been a remarkably good season for cheese, the shipments to date have been over 150,000 boxes more than last year, the price, the earlier part of the season, a great deal better than last year. I will make this prediction now; that the price from now to the close of navigation, say 2 months, will not be so good as last year, for the reason there was an excessive drought in Great Britain last season, and there is not any likelihood of its taking place this year. Nevertheless, the increase in our shipments, with the increased price earlier in the season over last year, means something over $2,000,000 more for the cheese product than last year, and last year was considered very fair; in fact, it was the greatest on record, in total value.

The butter market has been, until lately, fully as good as last year, though the shipments have been far short of last season. I should say that possibly there is a considerable quantity in cold storage, in Montreal, while last year, at this date, there was verylittle. I would say this, that if there is not a great deal in cold storage, the milk output is less than last year. I can hardly believe that, just at present at all events, taking the shipments as they are, the total cash cheese and butter product is about half a million dollars in excess of last year. Had the prices not been in advance of last year, this result would not have been attained. The farmers who are in the dairy-business have no reason to feel sorry, as the results hav ebeen good. Long may they continue so, is my earnest wish.

Your truly,

PETER MACFARLANE.

September, 28th 1900.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

HATS.

Speaking of hats, their shapes vary so much that it is almost impossible to say what is just the one. It is quite certain, though, that the young people like the hat bent or tilted on the left side; reason why, the little tilt is most becoming and the bend makes a place to set the hat firmly on the head, otherwise, how would the wearer ever keep it on her head? certainly not with the crown, which is much to small for use in that way. It seems to act as a make-believe or standard-bearer for the trimming.

So the little tilt is given and in the bend is inserted an ornamental hat-pin. These hat-pins are sold in so many and in such pretty devices that any person can be suited. Some are made with a military button for the head, may be a

token of remembrance from a friend passed on to the battle-field; others are made of beaten silver, which often forms a flower or insect; others have a ball of silver for the head; any one of these pins acts as an ornament and necessary use for keeping the hat on the head.

The sketch given shows a hat made on a wire shape, which can be bent to suit the wearer, it is also shows how to convert a summer hat into a seasonable one, which can easily be done by covering it with some of the pretty autumnal tinted goods sold for the purpose, sometimes the crown only is covered with this and the brim of some plain colour to suit it.

In fact, a handy girl can easily find, by looking in the piece bag, that which will help to convert any good hat-shape into one suitable to the season of the year.

A very pretty and fashionable trimming is made from silk, the sketch shows a piece wired at the edge with very fine wire which can easily be done by the sewing machine, two ruchings of which look well and makes a most inexpensive trimming, a fluffy roll on the other side of the silk, ending with a flower at the back, not forgetting a bunch of something underneath the curve at the back to keep the hat firmly on the head.

The happy knack of being able to do a thing of this kind will give exercise to an ingenious mind and will give a girl at the cost of a couple of dollars, that for which an expert miliner would charge a good stiff price, let alone the pleasure of doing the thing one-self.

Dishes to tempt the appetite.

Minced beef is a tasty and easily digested dish. Chop finely a pound of steak, mix in pepper, salt and cayenne to taste; a few spoonfuls of gravy, two spoonfuls each of walnut catsup, lemon pickle, minced, and port wine, and a small lump of butter rolled in flour. Turn all this into a jugging jar, cover closely, and set the jar in a saucepan of boiling water, and keep the water boiling until the mince is cooked, which will be in about half to three-quarter of an hour. When the meat is tender and brown turn the mince into a warm dish, garnished with sippets of bread, and set some nicely-poached eggs on the top. Mince also looks well in a wall of mashed potatoes on the outeide.

PICKLED MACKEREL.

Pickled, or potted, as they are sometimes called, mackerel or herrings make a tasty dish to be served cold with salad and mayonnaise sauce. Procure some mackerel about the same size, clean, and take out the backbone. Place the fish on a board; split it open. On each fillet place half the roe, season with salt and pepper, and a dash of lemon juice. Roll up each fillet tightly, pack the rools into a dish, cover with three-parts vinegar and one of water, and add three bay leaves. Cover with a well-greased paper, and tie securely. Bake for 1½ to two hours, in a slow oven, and set aside to get cold.

LOBSTER BISQUE.

Take the meat from a tin of lobster, cut it small, put it into a quart of boiling water or fish stock, add a teaspoonful of salt and a little cayenne, and let it stew gently for half an hour. In another saucepan scald a quart of milk, stir a teacupful of bread crumbs into it, closely cover for 10 minutes, add the lobster and the liquor, with two ounces of fresh butter cut in small pieces; season to taste, and serve in a tureen with freshly-chopped parsley scattered over the surface.

ONION TOAST.

Chop six onions finely, boil for twenty minutes in a pint of salted water; drain, season with pepper and an ounce of dissolved butter, mix well together; lay on rounds of hot buttered toast and garnish with chopped white of hard boiled eggs and the yolk of the same pressed through a wire sieve; serve very hot.

Savory rice may be recommended. Boil a teacupful of rice, then put it in a frying pan with two ounces of butter, and fry to a delicate brown. Then stir in two tablespoonfuls of grated cheese and three large tomatoes, skinned and cup up small. Cook for five or six minutes, pile on a hot dish, and serve.

Corns are things, from which it is usual to suffer and be silent; but there are really methods by which these tantalizing little worries can be cured. When they are too long neglected a cure is difficult, but happily, with patience there are remedies in most cases. Hard corns are usually due to friction of the skin against the leather of the boot or shoe. A cure for them is to touch the centre spot with a caustic pencil every day, carefully paring off the "crust" of the corn once or twice a week. The cure will take two or three months to complete. A young corn usually gives way to the influence of pumice stone if rubbed on the spot every day. Acetic acid is also recommanded as a corn cure. It should be applied with the point of a match stick, the surrounding flesh being thoroughly protected from contact with the acid. Be careful in paring a corn not to penetrate into the sensitive flesh It is advisable to soften the corn by bathing the foot in warm water before paring.

To wash chintz boil two pounds of rice in two gallons of water, and divide it into equal quantities. Put the first part into a washing tub, rice and water together. Wash the chintz in this, using handfuls of rice instead of soap. Strain the second quantity of rice, and in this rince and finish the chintz. It will not require to be starched.

Grease spots on carpets may be removed by covering with a paste made of fuller's earth and spirits of turpentine. Let the paste remain on till thoroughly dry, and then brush it off. If the spots are very bad they may need to be slightly rubbed with the paste—not too hard or the fuller's earth will be difficult to get out.

When putting away silverware that is not in ordinary use do not fail to sprinkle a few tiny bits of camphor gum in each case before rolling it up; then, if the silver is put away in a close box, it will not become discoloured.

The juice of two or three lemons added to a bath is a great beautifier and acts as a tonic. Lemon is also one of the best manicure acids. A teasponful should be added to a cupful of warm water and the fingers soaked in this for ten minutes. It cleans the nails and loosens the cuticle better than anything else. Slimy sponges may be effectively cleaned by soaking them in water to which the juice of a lemon has been added. The rind of lemons should never be thrown away. If carefully peeled and put in a bottle with a little spirit it will be found most useful for flavouring.

The Garden and Orchard.

(CONDUCTED BY MR. GEO. MOORE).

PAST AND PRESENT.

It is interesting and instructive to note the derivation of many English words; for instance, the word "pecuniary" is derived from the Roman, *pecus*, cattle, *pecunia* meant money, and a man's wealth was estimated by the number of cattle he possessed. To destroy pecus, cattle, wantonly was considered by the Romans a public offence of such magnitude as to be punishable with exile.

The Romans knew that wealth consisted in the abundance of cattle, not only with regard to their actual value for beef or milk but as a means of keeping up the fertility of the soil, upon which the increase and prosperity of their population depended, and the natural sequence was, that until their rulers sank into effeminacy and self aggrandisement, they were the most prosperous and powerful nation.

If we contrast the old Roman regulation as to

cattle with what we do, we ought to learn a most useful lesson. Wanton waste is always attended by disastrous results, and even if there is no legislation to prevent it, it carries its own punishment and inflicts it upon the trangressor, sooner or later.

It is an appalling fact that, here there are destroyed nearly half a milion of young cattle annually, and although there is no law to exile the perpetrators of this national crime, it is a remarkable coincidence that retribution follows them, and they either have to leave or drag out a miserable existence, akin to pauperism, on the land which they have exhausted by not raising and keeping cattle enough upon it to maintain its fertility by the manure they left, to say nothing of the value of the milk products or carcases.

If there was no demand for the materials of food and manufacture that cattle produce, the case would be different, but in the years 1898 and 1899 there were imported into the Dominion of Canada, horns, hoofs and hides, in the two years, to the value of $7,480,211. With the millions of acres of fine land, and pastoral advantages we *possess, there is no reason why agriculture* should not keep pace with domestic manufactures, or why these articles should not have been developed here.

The boom in the dairy industry has doubtless been of the greatest importance to the Province of Quebec, but the desire to conserve the milk for butter and cheese has led to the wasteful destruction of calves, especially males. This might be avoided if another boom could be made in meat export, and it would appear that any reliable scheme that would further that object, should have the consideration of all who have the power and the will to advance the increasing prosperity of this vigorous branch of our great country, whose sons lately distinguished themselves in Peace and in War at Paris and at Pretoria.

GEO. MOORE.

ANNUAL FAIR AT UPTON, MASS, U. S. A.

The pretty little town of Upton, Mass., about ten miles from Worcester, was *en fête* on Thursday the 27th of September, being the thirty third anniversary of the Town fair and Industrial show.

The farmers' club under whose auspices the exhibition is held, has continued its good work without let or hinderance for a period of thirty-three years, without being absorbed by, or amalgamated with, any other large county association, as have so many others, but has kept an independant course, overcoming all obstacles and growing from year to year in usefulness and popularity. There are certain features in the meeting worthy of attention. First, its social character. The Exhibition was held in the town square and hall, and the live stock were placed in the sheds adjoining the church, which are used for sheltering the horses during Divine service. All the exhibition was free to visitors, except that a small fee was charged for admission to the Horticultural and Industrial departments, for which the Town-hall was set apart.

A dinner was provided by the club for which the tickets were 50c each, but the boned-turkey and delicious home cookery of which it was composed made it so popular a part of the entertainment that upwards of 800 persons partook of it.

The church was also opened for the use of the club in which short addresses for the encouragement of agriculture were delivered, one by the Hon. John R. Thayer, member of Congress for Worcester, Mass., and one by Mr. Geo. Moore of this JOURNAL

The practical, useful, and social elements were happily combined ; the proceedings commenced with a ploughing match in the morning and terminated in the evening with a ball and supper: all under the control and management of the club. Another noticeable feature was the absence of all vitiating exhibitions or sports, none being allowed. No gambling tables, no wheels of fortunes, no cheap Johns, bawling out invitations to purchase their trashy wares ; no whiskey, no rowdyism, and nothing to mar the respectability of perhaps 3000 or more of all ages and conditions which filled the town and seemed like a vast family gathering. It was delightful to see the crowds in their holiday attire, and to hear the greetings that fell from the lips of friends when they recognised each other ; friends who had come from distant localities to join in the merry-making.

The Exhibition as a whole, was, of course, not so extensive as those of more pretentious societies, but the specimens of all sorts exhibited were highly creditable and the neatness and order with which they were arranged and displayed increased the pleasure of inspecting them. For instance, the fruit, flowers, and vegetables were all grouped

artistically, and a method of exhibiting celery, although perhaps of trifling importance, was worth a passing remark; instead of being cast upon the table carelessly in a half withered stale, it was first cleanly washed, and then, without being denuded of any of its outside leaves, it was planted separately in boxes of earth, and appeared as if it was grown in them, and was quite fresh-looking and ornamental.

In the fruit display, were some very fine outdoor grapes, peaches and apples. Among the latter, a variety called "Wood's Favorite," was remarkable for its rich, bright, scarlet, crimson color. Another very large, solid apple, "Cloth of gold," attracted much attention. Potatoes were very good, particularly "New Queen," of the Early-rose type; "Uncle Sam," a flat roundish clear white-skinned variety, sound and pure; "Rural New-Yorker"; "Bovine," and "Sir Walter Raleigh," were all large smooth eyeless tubers. Tomato "Enormous" was well named for it really was so, nevertheless the fruit was perfectly round, smooth, fleshy, and without crack or blemish.

The prizes were awarded by committees of three, a committee chiefly chosen from the members of the club, for each class, and the plan rendering the work of judging easy and expeditious, so that it was all done and the public admitted punctually at the time stated.

The Revd George S. Ball was absent, in consequence of indisposition, but vice-president Geo. Stoddard occupied his place, and he and the other officers of the club, did all they could to contribute to the comfort and enjoyment of the numerous guests.

It was easy to see that the paramount motive of all concerned was to forward the good cause of agricultural progress and friendly intercourse and the gathering was a model for all such societies.

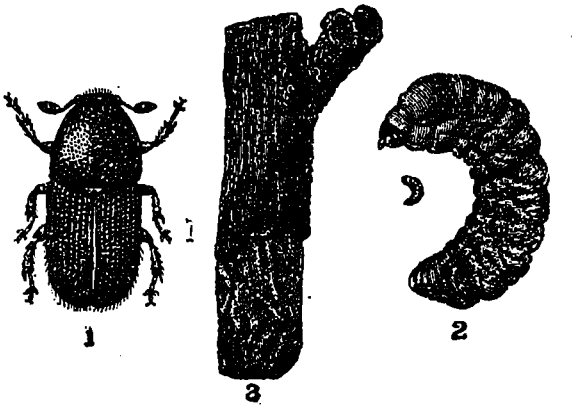
INSECTS INJURIOUS TO VEGETATION.

(*Continued*).

This beetle has a decided preference for sickly trees, and branches where there is the least flow of of sap. The larvæ have been frequently found in shoots injured by frost as well as near scars, canker, cuts, and knots. The fruit tree beetle attacks all kind of fruits.

The drying away of the ends of the small branches, and the shrivelling up of leaves are sure signs of infestation. On close inspection, many round holes not larger than the head of a pin will be discovered on the bark of infested trees. These holes lead to the surface of the woody parts, and upon this little channels will be found made lengthways between the bark and the wood on either side of these are smaller channels in which the larvæ are concealed.

THE FRUIT TREE BEETLE (*Scolytus regulosus*).



1. Beetle magnified; line showing natural length.
2. Larva, natural size, and much magnified.
3. Piece of apple branch, showing holes in bark made by the beetle, and channels made in the wood.

The female beetle flies about in April and early in May. It bores holes in the twigs of the trees, and forms the channels, above described, about half an inch long and places its white eggs regularly upon either side of these. The eggs hatch in a few days and the larvæ feed upon the bark, making branch channels at right angles with the main channels, and at the end of these the larvæ make holes which are nests for the pupæ; the beetle then bores fresh holes through the bark and escapes. It has been well demonstrated that there are at least two generations of this destructive insect during the year and active injury is continued at all seasons.

By comparing the magnified with the natural size given in the diagram it will be noticed how insignificant the insect is as to size, while its colour, russet and black, would cause it easily to escape notice.

Keeping all trees in a healthy and growing state is all important as far as this beetle is concerned.

Methods of prevention and remedies.

Not much can be done against this insect in the way of prevention or remedy. All the branches

and limbs that are infested should be cut off and burned during June, before the beetles have escaped. Where a tree is badly infested in various places it should be cut down and burned during June, so that larvæ, pupæ, and beetles all may be destroyed.

In orchards, fruit plantations, and gardens where there is considerable infestation, it would answer to adopt the American recommandation to ring, or girdle, worthless trees that are either unfruitful, or already decaying. This is done by cutting strips of bark round the trunks in the spring, and letting them remain until the following June, to serve as traps for the beetles, which will be attracted and lay eggs in them. The trees should then be cut down and burned during the ensuing June, before any of the beetles escape from the colonies within.

It is feared that the application of noxious compositions would be quite useless as a means of preventing the beetles from boring into trees, unless all the trees in a orchard or fruit plantation were similarly treated, which would be a difficult and costly process. When the beetles have once got into the bark no amount of syringing would affect them. In the case of gardens with two or three trees only, these might be syringed, or daubed over, with a very thick wash of an offensive nature, such as thick paraffin emulsion, before the leaves and buds showed, so as to prevent egg-laying where an attack is feared. When there is a decided infestation in the case of a few trees in a garden, it would pay to examine every branch carefully, and cut away and burn all those which have the typical holes.

The Dairy.

Erratum.—Page 163, 1st line (Oct. 16 No.) for "970 or 980," read 97° or 98°.

CHEDDAR CHEESE.

(*Continued.*)

My first attempt to determine the acidity of curd was made in 1891. Considerable difficulty was experienced, and after frequent attempts, the only plan found practicable was to cut the curd into very fine pieces, to weigh out 1 gramme, place it in a glass tube, and boil with 25 c. c. of standard soda solution, until the whole of the curd was entirely dissolved. The solution was then washed into a glass vessel, and the quantity of free soda present estimated by standard sulphuric acid. This being deducted from the quantity originally taken, showed the amount of alkali neutralised by the curd.

Thus :—

	c. c.
Quantity of alkali taken	25.0
Quantity present after boiling with curd	21.3
Neutralized by curd	3.7

which would represent 3.7 per cent, of lactic acid, only 1 gramme of curd having been taken.

Finding such a difficulty in the estimation of the acidity of the curd, I confined my estimations in 1891 to this one stage of the curd only. The results obtained were so high that they could not be due to lactic acid, and could only be accounted for by the fact that casein is itself an acid substance and evidently neutralized the soda.

In 1892 the estimations were continued, and again the fluctuations in the acidity of the curd when milled were very great, yet I was totally at a loss to explain the cause. On several occasions, in order to confirm the results, two tests were made in the curd of the same day ; and the results obtained were so close as to preclude the supposition that the method was faulty ; moreover many tests were made which gave absolutely concordant results. Why the curd should on some days show an acidity of 7.2 per cent, and on others only 3.6 I was utterly unable to discover in spite of many experiments.

The subject was left in abeyance until 1896, when the question once more arose in my mind—is there an acidity or acid condition of the curd, independent of and different to the acidity of the liquid by which that curd is impregnated ? And, if so, is it of importance ?

Experiments were made to determine the acidity of the curd by the following four methods :—

(*a*) Two grammes of curd were cut up into fine pieces, placed in a flask with distilled water, and allowed to stand in a warm place, or gently heated, and after standing for twelve hours the acidity of the liquid was determined.

(*b*) Thinking that the warmth employed in method "*a*" might cause the production of lactic acid, two grammes were treated similarly to the above, but the solution was immediately boiled so as to destroy the bacillus acidi lactici.

(*c*) Two grammes of curd were rubbed up in a mortar with distilled water into fine particles, and the acidity thereof immediately determined.

(*d*) Two grammes of curd were cut into fine pieces, placed in a flask with water, and an excess of caustic potash solution, and the liquid boiled. Subsequently the free potash was determined so that the amount of potash consumed showed the acidity of the curd, soluble in alkali.

The following table gives a few examples of the results obtained, and also the acidity of the liquid from press on the same dates.

Date.	Acidity by "*a*"	Acidity by "*b*"	Acidity by "*c*"	Acidity of liquid from Press.	Acidity by "*d*"	Acidity due to Curd.
1896.						
June 6.....	·85	·87	·89	·88	6·05	5·16
" 24.....	...	·90	·97	·95	5·37	4·40
" 26.....	94	·95	·99	·99	5·37	4·38
July 1.....	104	1·04	1.05	1.04	5·30	4.25

From these results, which have been confirmed by numerous other experiments, we learn that method "*a*" does not succeed in obtaining all the acid liquid out of the curd. That method "b," while it improves the results, owing probably to the contraction of the curd by heat expelling its acid contents more thoroughly, still fails to give quite so high results as method "*c*," which was consequently adopted in subsequent work. It is, fortunately a more simple and more rapid method than either "*a*" or "*b*."

Comparing the results obtained by method "*c*" with the acidity of the liquid from the press, it will be seen that they are practically identical, so that this method of analysis appears to give us merely the same acidity as that of the liquid which is in the curd. As the curd contains only 50 per cent, of liquid at most, we might expect the figures to be one-half those of the liquid from the press. Why they are identical with the liquid from the press, I am unable to explain. It has been noticed that after estimating the acidity by method '*c*' there is a secondary reaction, which takes place slowly, and is more difficult to determine, but which gives almost constant results. So far as I am able to judge at present, this is due to the acid salts present in the curd.

Casein Acidity.—The result obtained by method "*d*" is very different. Here, in addition to the acidity soluble in water, we have an acidity which we must assume to be due to the solid substance of the curd insoluble in water, subsequently termed the "casein acidity." By deducting from this total acidity the acidity due to the soluble portion, we obtain the true acidity of the insoluble portion or casein.

The acidity of the casein, as determined by method "*d*," fluctuated from day to day in a most remarkable manner as in previous years.

The determinations with which the results obtained seemed mostly to accord, were those of the acidity of the liquid from the press. But, though, up to 1896 very numerous experiments had been made to try and discover if there were any relation between these two determinations, no constant relation could be discovered.

Tabulating the figures obtained in 1896, and comparing them with results obtained in 1892—the only year for which the necessary date existed—the following results were obtained.

Table showing average "casein acidity" during the first 10 days of each month.

——	1892.	1896.
June.....	4·27	4·39
July.....	3 77	4 06
August....	3 33	3·39
September....	3 62	3·43
October.....	3 16	3 47

These figures seem to prove beyond doubt that curd when vatted is an acid solid, surrounded by an acid pickle. Also, that the acidity of this solid varies not only from day to day, but in different months, decreasing during July and August, but increasing subsequently.

WANTED: GOOD MILK.

If a perfectly sweet, aromatic clean-flavored butter is called for, then a perfectly sweet, clean-flavored milk supply must be available. I have proved conclusively to my own satisfaction, that it is absolutely impossible to mix a batch of milk of 100 lbs. weight, which is off flavored, with the day's full supply of 8,000 lbs., and still retain that perfectly sweet, aromatic, and clean-flavor so prized in gilt edge butter. More than this, after two months diligent correspondence with the proprietors and makers of twenty-five of the leading

creameries of the Dominion, as well as with the best authorities on butter-making that Canada knows, I am in a position to positively assert, that the widespread indifference which even the most intelligent of our so called dairy farmers exhibit in the proper care of their milk and management of their dairy herds, forms, first, the constant prevention of our butter ever attaining that enviable reputation for uniformity acquired by the Danes, and being acquired by Ireland and New-Zealand, and secondly, the neglect of intelligent herd management, is a sure means of failure in the dairy business, and will eventually say the very life out of the industry, which alone can be a success where intelligence is brought to bear on the economical aspect of the question, and the application of new and scientific methods to the production of milk and care of the herd. However, I mean to confine myself in this article, to the question of keeping milk, either for delivery in the city, at the creamery or the cheesery.

To myself, the record of sixty-five patrons hauling milk to our own creamery, is almost identical with the record of any number of patrons hauling to any other creamery, with the exception perhaps that the percentage of patrons who have learned that milk must have just one sort of care, may be found amongst our own patrons in possibly greater proportion than amongst the patrons of the average factory. This condition, imaginary as I admit it may be, is the result of five years strict discrimination between good and bad milk. And what happens, in the sixth year, when, as I have already stated, it has become possible to imagine that a rather larger proportion of our patrons have learned (by experience) to take proper care of their milk, than may be found amongst the patrons of the average creamery? Why, some of our most intelligent, and cleanly (supposed) patrons bring milk day after day which cannot fail to contaminate the whole days' supply were it to be accepted and mixed in with the rest. This state of affairs, at once invited the hearty co-operation of the buttermaker and the patrons whose milk was causing trouble, with the result that the several farms were visited, different troubles, mostly of neglect, located, remedies suggested, and further developments awaited.

Results were not long in becoming apparent. Four out of seven patrons adopted the suggestions offered to them, one of them going to the expense of several dollars in material, not counting time occupied in putting up a shed and sinking the water-pipe beneath the reach of the sun's rays, and not one of these four has had a drop of milk returned since. The other three, well perhaps the less said about them the better, suffice it to say, they did not follow the suggestions offered, they were unwilling to accept advice, what had satisfied their predecessors was good enough for them, and they got tired of having their milk returned, and finally went off in a huff to swell the ranks of the patrons of neighbouring factories which are in the habit of taking any old thing in the form of milk.

Now, the loss of these patrons, I consider in the light of a blessing, as their bad milk was not wanted. But that they should be able to dispose of their bad milk to the unscrupulous proprietors of neighbouring factories, I consider to be a very great grievance. The above is not written at all in order to aid our own petty troubles, but is quoted merely as an example of what is happening all over this Dominion, wherever any attempt is being made to educate the patrons and make butter on a perfectly sweet milk basis. This is not our little trouble alone, as I have said, this is the evidence I have gathered from all over the Dominion.

One large proprietor writes, "it isn't the loss of a few patrons' milk that one deplores so deeply, but is the inability to co operate where co-operation is so sorely needed." This, perhaps, is the key to the situation, co-operation. I do not advocate co-operation between the patrons alone, and again between the makers, but co-operation right through, between patrons and makers, and between makers and makers. It is not long since the Dominion Butter and Cheese Makers' Association was organized at Woodstock Ontario, the object of the Association being to promote the interests of the makers in every way. Several recommendations have been made from time to time, with a view to materially benefit the position of the maker. It was agreed, at one meeting, that all makers should stand shoulder to shoulder in rejecting milk not fit for making a good quality of cheese or butter, and that no maker should take in milk that had been rejected by a maker at a neighbouring factory. It is evident, that if this resolution were followed out by all the makers, it would do more than anything to improve the quality of milk supplied to many of our cheese and butter factories. It was stated at this meeting, that "in many of our dairy sec-

tions, there is strong competition between adjoining factories, milk supplied by patrons living on the border line between two factories, when rejected at one factory, is taken in at another. This creates difficulty, and makes it impossible to get that patron to take proper care of his milk." I have known of many instances of this kind, and if the makers only have backbone enough to stick to the regulation adopted at Woodstock, it will have a wholesome effect on some "straddle of the fence," patrons of cheese and butter factories. Cœrcion is not always the best method to adopt, but when other methods fail, it becomes a necessity. There is a fine field for a branch of this organization in the Eastern Townships, but I do not expect its principles to find much sympathy with the numerous proprietors of small factories, whose milk supply is so small, and the line between profit and loss drawn so close, that an extra patron or so may mean their financial salvation for that season. However, some plan should readily lend itself to the requirements of the situation in this Province. It is the patron who is not educated up to his part of the business at the present day. Even the patron whose milk is always a source of delight to the maker, is as a rule in the dark with regard to his own system of keeping his milk. He knows that he must have perfectly clean milk pails, cans, strainer, aerator, etc., he knows that his cows should be clean, but he also knows that his milk has not been found fault with when his cows may have been abominably dirty for some reason or other; he knows that his milk must be kept in cold water over night, in summer, to keep it sweet, but he hasn't the slightest idea the exact temperature which his milk should be cooled to, in order to be perfectly safe from fermentation. He places implicit confidence in that water supply of his, that it is cool enough to preserve his milk, and the use of a thermometer is the one thing farthest from his thoughts. Yet, investigation along this line has disclosed the fact that the temperature of some springs from one season to another is extremely variable. It has almost been proved conclusively that the greater the rain fall, the higher the temperature of the spring will be. One of our patrons, who left us this summer, was trying to keep his milk in water at 59° F., he did not know this of course until told, but even then, did not realize the necessity of covering his tank to keep the sun's rays from heating it up still more, nor did he consider it worth while to sink his pipe lower in the ground, or better still, move his milk tank right up to his spring, where the water was 53° F., but rather, he preferred to go on in his own way, and carry his milk three miles farther to a cheese factory.

The highest temperature at which milk may be kept with perfect safety is 58° F., but there are certain condition which are essential: the cans, pails, etc., etc., must be perfectly clean, there must be no lactic acid or other germs left in them with which to inoculate the fresh milk. Then again, this temperature of 58° F. must be reached within a a reasonable time, say one hour, and this can only be accomplished by thorough aeration in the first place, and judicious stirring at intervals of half an hour or so in the second place. It will never do to count on the milk cooling down to this temperature before morning, as very undesirable ferments will commence to work if milk remains at a favourable temperature for germ development (60°-90° F.) for a few hours, and this bacterial developments, which in its early stages, before the formation of lactic acid in any quantity occurs, is always noticable by particularly obnoxious and disagreeable odors and flavours, which are checked and fastened in the milk, when it does eventually cool down to 58°. So the one essential object is to get the milk cooled down to safety point, before any changes whatever take place in it, bacterial or otherwise. The more is this necessary, when such unfavourable conditions as thunder-storms and close hot weather, are in present.

The mistake of mixing the warm milk with the cold is not often made in ignorance now-a-day, but it is wilfully done frequently, nevertheless.

So few patrons have a conscientious sense of their obligation to furnish good milk. I fear the majority aim only to have their milk accepted, and are content as long as they have no milk returned, and so take no more care than they find absolutely necessary, instead of taking every care possible, that suggests itself to them.

This carelessness in keeping milk is only one of many things which is keeping the dairy industry from attaining its perfect development in every line. Farmers, as a rule, seem very reluctant to keep cows, which is a bad sign, as there is no doubt that as compared with most other methods of farming, dairying certainly demands more intelligence, greater perseverance and business abili-

ty, and should therefore more readily commend itself to the present generation.

H. WESTON PARRY.

Compton Model-farm.

The Poultry-Yard.

(CONDUCTED BY S. J. ANDRES).

INCUBATOR CHICKS.

It is less trouble to raise them than it is to run after a lot of setting hens.

Blessings on the man who first invented the incubator. It seems little short of marvellous how these wooden machines (when intelligently managed) will hatch chickens so perfectly. They really have a better start in life than the chicks the old hen hatches, for the very simple reason they have no lice. How many readers have tried hatching ducks in an incubator, I wonder.

There is no prettier sight than one of those wonderful machines full of little ducks when the last ones are out of the shell. The greedy little things begin to "nose around" (with their long yellow bills) for something to eat before they get dry. I hatched three little quails in my machine last summer. After they got dry I tried to put my hand on one of them and he hopped away to the darkest corner, the little fellow didn't want to be "cotched."

Some people condemn artificial incubation. For my part I would rather give the incubator the little care it requires than run after a lot of setting hens. It is so aggravating to have an old hen stay off her eggs till they are cold, or, may be, break half the eggs. Some old hens are like some people, there isn't much dependence to be put in them. And if you have a good incubator (I believe the most of them are all right) you can depend on them as money makers. Of course there is more work attached to raising the chickens. So much depends on the person, whether he makes a success of the chicken business. Then, I think one has to have a love for any work he is engaged in to be successful.

LEVEL ROOST THE BEST.

When the roosts are level, the fowls will have plenty of room, but if the roosts are slanting from the wall the hens will seek the highest ones, as instinct prompts them to get as far from danger as possible. In the wild state the greatest number of enemies of fowls is below them at night. They therefore seek elevated roosting places as the safest. The domestic fowls do the same. They will struggle to get to the top roost, and if there are 100 hens together they will endeaver to crowd until they are pushed off, falling and struggling until darkness compels them to become quiet. If one has a large poultry house and the roosts are slanting, there will be a waste of space and crowding will not be avoided; but place the roosts so that all will be of the same height, and more room will be afforded, the fowls will not crowd, and they will be more comfortable. Sometimes only a small matter may be in the way of egg production, and it has happened that the slanted roosts have caused the hens to nearly suffocate on a warm night, rendering them unable to give a profit.

CURRENT NOTES AND COMMENTS.

Old hens have been surpassing the young in egg production at the West Virginia station, which is disturbing to one of the popular traditions of poultrydom.

Be on the alert for every new idea in your business, but do not be greedy and attempt to swallow more than you can digest.

Always know your business. Keep strict accounts and records and study them. A good system of accounts is the surest guide you can have to success in any business, and you will find farming to be no exception, though comparatively few farmers keep them.

Study your markets, the particular likes and dislikes of your customers. Learn to fill every want, and just as they wish it, and never know more than your customers. If you wish to make changes in any way, do it in such a manner that they will think they are the ones making the change, rather than you.

Above all, look after the details, for no department of the farm needs such close attention to the many little details or will suffer so quickly for lack of attention as this. Careful attention to

these details, a love for the work, and a never failing will to succeed under any and every condition will bring you success. Never depend upon luck.

HOUSE FOR 100 FOWLS.

The following is a description of a fowl house sent me by a personal friend who says he has found it to give him very good results even in a poultry cold climate and it seems to me that it would be practicable as well as serviceable to the readers of this journal and could be built by any one knowing the use of the tools.

"A poultry house for 100 Wyandottes or Plymouth Rocks should be about 100 feet long divided into coops say 10 by 11 feet as follows: Width of house inside from wall to wall, 14 feet, coops about 11 feet with a 3 feet alley at rear. Height, 8 feet front by 6 feet 2 inches in rear. Frame of house should be placed on brick foundation, the depth of same depending on the nature of the soil, whether sandy, clay or gravel. This brick foundation costs more but is best on account of rats, if stone is plentiful and cheap use it instead, but make it solid. The frame itself may consist of 2 by 4 scantling placed 18 inches apart for lath and plaster. 12 feet scantling will cut in two pieces for rear, and 16 feet scantling will cut in two for front. Outside on these nail second quality but sound hemlock boards 10 inches wide and all of even lengths, say 12 by 13 or 14 feet but all the same, and not different lengths, this will save cutting. On these tack one or two thicknesses of good builder's papers; on the outside of all this, to finish, nail second quality novelty or other good siding. (Here I think a good quality of shingles would be equally as good and much warmer and drier).

The roof may consist of 16 feet rafters, 3 by 6 inches. This will give an overhang back and front of one foot. These rafters should also be spaced for lath and plaster. The roof should be covered with good roofing. The windows should be for each coop 10 x 12 feet one in number and about 5 feet hign by four feet wide. He prefers the window to open inside on side hinges like a door. He does not believe in sash windows that run up and down for a poultry house (nor do I those, opening toward the inside like French windows I have found best. S. J. A.).

On the outside of the windows have a poultry wire screen door to open out. This will prove of great benefit in keeping a flock in when the windows are opened. A small slide door near the floor is necesary to let the fowls in and out of the house.

For floor of house we prefer natural earth. If it is a clay soil, put a deep top-dressing of dry sand on it, and on top of this a deep litter of straw, leaves or other equally good litter. There is no floor so dry and warm as earth, in our opinion.

As to the furnishing of coops, suit your own taste. We prefer roosts about 3½ feet high, with drop-board sufficiently wide to catch all the dropping, and not lower than 8 or 10 inches from roosts. Under the drop-boards the space should be open, so as to give a full sized catching floor, 10 by 11, or 110 square feet. This is sufficient space for 10 or 12 Wyandottes or Plymouth Rocks. Door or coops from alley-way should be a frame 3 feet high of boards or nice matched lumber, and the upper part of one inch mesh poultry wire. They should be light but strong, and put on spring hinges, so as to insure their going shut automatically. Nest boxes and water pans or fountains may be placed where most convenient. The house inside, walls and ceiling, should be lath and plaster. The house outside should be painted with two coats of first-class paint.

ANOTHER OPPORTUNITY OF MAKING MONEY.

How our Farmers may comply with the conditions of the poultry market.

(By A. G. Gilbert, Poultry-manager, Experimental Farm Ottawa.

The recent formation of a large Produce Company in Toronto is calculated to be of immediate benefit td the farmers of the country, for the reason that the company is for the purchase of live chickens, at highest rates, during certain seasons of the year. For instance, from middle of July last to end of that month, 10½ cents per pound, live weight, were paid. The following card from the company, which was received bp the writer, will speak for itself:

Toronto, July 21, 1900.

Dear Sir,—We are ready to buy 5,000 live young chickens at 10½ cents per pound, delivered f. o. b. until July 28, 1900. Crates supplied.

What can you offer us?

Old hens thirty-five cents per pair.

On the 3rd of August following another card was received stating that 15,000 chicks were wanted and that the price from that date until the 11th of the month would be 10 cents per pound, but with the addition that:

Young chickens must not weigh under two pounds each. We will pay one cent per pound more for each young chicken weighing three pounds or more.

Crates hold forty to fifty birds each.

In ordering crates always name station to which they are to be sent.

And still later, on the 11th of August, a third card was received, which was as follows:

Toronto, Aug. 16, 1900.

Dear Sir,—We are ready to buy 15,000 live young chickens at 9 cents per pound, delivered f. o. b. at your station until September 1, 1900. Crates supplied. What can you offer us?

Old hens, 35 cents per pair. Young chickens must not weigh under two pounds each. We will pay ½ cent per pound for each young chicken weighing three pounds or more.

Crates hold forty to fifty birds each.

In ordering crates, always name station to which they are to be sent.

No doubt many farmers have received similar cards. The above is given to acquaint those who have not received the card notices with the *modus operandi* of the enterprise.

SOME FEATURES TO REMEMBER.

From the foregoing it will at once be seen that the larger the chickens the better will be the price, and the larger chickens can only be had by having them hatched out early. From the prospectus of the company it is also learned that freight on the chickens from point of shipment to Toronto is paid by the purchasers. More, the company will furnish the crates and pay freight thereon to point of shipment. The shipper is asked to ship the birds f. o. b. On arrival at the Company's depot in Toronto the live cickens will be paid for at the prevailing rate for that period. The condifions are surely not hard to comply with.

THE OBJECT OF THE COMPANY.

The aim of this company is to fatten the chickens by the forcing process. When in proper condition they are killed and sent to local or English markets.

Careful experiment has shown to the company that in the purchase, fattening and sale of chickens as described there is a satisfactory margin of profit. Experiment has also enabled the company to get the fattening rations down to the least possible cost.

POINTS INTERESTING TO FARMERS.

One of the rules of the company is that birds sent to fatten must not weigh less than 3½ lbs. per pair at the beginning or middle of July, so as to obtain the higher price. I mention this because all your numerous farmerr eaders should have, without difficulty, birds of the weight named, (hen or incubator hatched) by end of June, provided they comply with the following conditions, viz:

1. By keeping Plymouth Rocks, Wyandottes, or like heavy-weight birds, which make hardy and rapid flesh-forming chicks.

2. By careful feeding and care of the chicks from time of hatching, praticularly during the first five weeks of the chicken's life. Full instructions as to proper care and feeding of the young birds can be had, free of cost, by addressing me at the Experimental Farm, Ottawa.

3. By breeding from a good strain. This is a point of some moment. I have chickens which made a weight of 2 lbs. 10 ozs., in two months nd a half, as against others of a different straina which did not do nearly so well. Parent stock should be large, in robust health and full of vitality. It is best to begin on a good foundation.

AN OPPORTUNITY FOR THE FARMERS.

In the foregoing full particulars of the enterprise are given, because it is likely to be a source of revenue to the farmers while making money for the shareholders. I have no interest in the concern beyond wishing it all success. A day or two ago I learned that Mrs. Joseph Yuill, of Carleton Place, who will be remembered in connection with the successful fattening of the first experimental shipment of chickens to Liverpool by the Department of Agriculture, had sold a number of her early chickens to the Toronto establishment at good prices. When I visited Carleton Place about three weeks ago Mrs. Yuill had 350 fine chickens. Mr. Alex. McLean, a well known yeoman of that district, and the ex-president of the North Lanark Farmers' Institute, had 161

equally fine ones, which he is keeping to fatten for experimental shipment to England. In both cases the chicks were mostly incubator-hatched and brooder-raised. During March last, Mr. J. W. Newman, of Engleside Farm, near Brockville, notified me that he had fifty early chicks of large size and 700 to follow. He wished to know where to sell them in Montreal or Toronto to good advantage.

These instances show gratifying development in poultry raising. I ask your numerous family of farmer-readers how many of them are prepared to do likewise. With good management there is undoubtedly money in raising chickens and without proper management no department of the farm can be made to pay.

Ottawa, Aug. 17, 1900.

POULTRY NOTES.

A pound of cheap meat, such as the liver of sheep or the trimmings of beef should not cost over five cents per pound, and where a green bone with a large share of adhering meat is cut up with a green bone cutter the cost is not over a cent a pound. Wheat is at least a cent a pound and in some years corn in some sections is nearly as high. Now the cost of the foods is not of the kind but the results. If meat will make the hens lay two eggs in winter where the grain promotes the production of only one, then the meat is cheap and the grain is dear, because the increase derived by the use of the meat reduced this cost really to nothing.

If a large amount of grain is used it will be found that by using less of the grain and more of meat combination of the two foods in winter will be better than the use of either alone, but in summer lean meat and cut bone is the best ration that can be given, leaving the grain out entirely. No food is costly if it accomplishes the object that is sought but any kind of food is expensive if it does not induce the hens to lay eggs.

Some of the pullets may not begin to lay before spring unless hatched early in all flocks there some individuals that will be more advanced than others in the laying time but it is the pullets which grows to the largest size that are backward. The pullets that fail to in the winter will be the first to begin in the spring, and they often commence in February, keeping at their work well into summer.

Breeders who hatched early chicks from which they expect to procure their best show birds are of the opinion that when hens or pullets lay through the winter they are, to a certain extent, exhausted, and that eggs from the fowls that begin to lay early in the spring are the ones from which the chicks should be raised. Much depends on the food, however, if lean meat is made a portion of the ration and less grain given, the hens will lay a larger number of eggs and the eggs will nearly always hatch.

Never allow very young chicks on wet grass. Wait until the sun has remove the dew. When they come out of the shells give no food for twenty-four hours, and then pinhead oatmeal or stale bread dipped in milk three times a day, removing all food that is not eaten. It is also important to watch for the large head lice. The best preventive is to rub two or three heads, getting it well on the skin, but be careful to use but little as it may cause harm At this season the majority of the chicks die from the large lice on their heads.

Live-Stock.

CARE OF YOUNG LAMBS.

There is no animal kept on the farm whose young require more care and attention than the sheep. Especially is this true if the lambing season comes during the winter or early spring.

While old, careful ewes, that have the instincts of motherhood well developed and udders full of milk, cause comparatively little trouble if good, comfortable pens are provided, the yearlings or two years-old with their first young ones may cause a lot of trouble if not tame, and if they have been neglected. The income from the sheep depends largely upon the lambs she raises, and if she loses them the chances of securing a good income from her are past for a year at least. The carefull shepherd should therefore plan to have every sheep raise at least one lamb, and to accomplish this should be willing to sacrifice a little of his time and, if necessary, his sleep. The large Scotch and English sheep-raisers have their night shepherds, who stay with the flocks through the night to see to the lambing ewe. Some sheep farmers make a practice of visiting their stock a couple of times during the night in the lambing sea-

Royal 1st prize Hampshire-Down shearling ewes, Hillhurst-farm, Hillhurst, P. Q.

son. (1) This may be quite a task, but it will pay in the crop of good, strong, healthy lambs that will result from such care and attention.

Where a large number of sheep are kept, it is a good plan to have a number of little four-feet-square pens that open out for use and can be folded up when not needed. An examination of the udders when the ewes are at the troughs eating will generally show how near lambing they are, and those due within a day or two can be put into the small pens, where they do not need so much watching. The ewes can be kept in these enclosures until the lambs are several days old. Twins are much less liable to be disowned when the ewes are shut in by themselves and the lambs cannot get away from their dams. These pens are inexpensive; can be put away when not in use, and are always ready for use.

Very often, young lambs are lost by getting a chill when not looked after properly. A remedy recommended for this, and one that will warm up the lamb as quickly as by any other plan, is to submerge it in a pail of water at a temperature of 100° Fah., just keeping its nose and ears above water. Keep the lamb in the water for a few minutes, and, after rubbing it as dry as practicable without hunting it, get some milk into its stomach.

Care must be taken so as not to overdo the feeding if it is done by hand; there is no danger of it getting too much from its mother's udder. A little food, often and hot, is the rule in lamb feeding. Ewes in good condition, and which have udders full of milk, are usually able to feed their own young. and nothing will take the place of this condition, which is the result of the feed and treatment they have received the month previous.—*Farming.*

(1) We always did, and good fun it was. Ed.

DEVELOPING A PROFITABLE FLOCK.

James Wilson, New York.

In keeping any breed of sheep the first desirable feature is the selection of breeding stock. I would choose my ewes from my twin lambs (1) which have good faces, good square shoulders and backs, good loins and which stand well on their legs. Choose your ram with the same points and a twin, as that in my opinion will have a tendency to produce twin lambs. The next thing is to take good care of them. Give them a good, dry pasture and frequent change, look well to your water supply, and when your ewes are clipped and lambed and the days warm, give them a good dip to kill all vermin and to improve the quality and quantity of their wool. Visit them regularly during the time they are in the pasture and have a yard fenced in where you can always salt them, and when

(1) Doubtful. Ed.

you go always take something with you they like. By this method the sheep will know you and you can get them into the yard for any purpose.

Keep their feet in good order and before letting in your ram dip them again ready for their winter quarters. Have a *few acres of rape to put them in before breeding*, which will send them into winter quarters in good flesh and spirits. Have a good barn with low racks for hay and straw, and water them and feed at regular times every day. Change their feed often and give roots every day with about a quart of feed made of five parts ground oats, two of corn meal and three of bran. Keep up this feed until after they have dropped their lambs, when it is desirable to keep them separate with their own lambs and in a few days increase the feed of the ewe.—*Homestead.*

HIGH QUALITY HORSES IN SHARP DEMAND.

The scarcity of really good horses, and the high prices which buyers are paying, have been generally commented on by our correspondents everywhere. The influence of the bycicle or the automobile is not now seriously felt, nor is it likely to be. The bicycle fad has passed and the use of the wheel has settled down to its proper place. The automobile will follow in the same way. The horse will never be supplanted in popular favor for pleasure driving and riding. There is a greater demand for riding horses than before he bicycle was known. The prices obtained for driving horses have been higher this spring than ever before.

At a recent sale in New-York, a trotting bred gelding brought the enormous sum of $7,800, while one pair of harness horses brought $5,000 and another pair $4,800. This bay gelding could trot a little and was well bred, but his speed amounted to nothing, for there are at least 100 road horses in New York that could show him their heels. Breeding cuts no figure with a gelding. His sole value was in his "looks" when going, for at rest he was no handsomer than hundreds of others. But some man was willing to pay this price for the sake of appearing behind a handsome horse in Central Park. This incident shows two things: First, that there is a lot of money to spend in New York, and second, that a high quality horse will bring a big price. Could this horse have been mated, the pair might have brought $20,000, for two well-matched animals will bring more than double the price of one of them. There have not been enough high quality horses of any class, whether it be heavy harness, light driving, riding or draft, to supply the demand, which is likely to remain constant for a long while.

One of the attractions of the agricultural show at Aspatria, Cumberland, Eng., was a contest in guessing the weight of a bullock which was killed at the close and weighed in presence of the officials. There were 166 competitors. Two men guessed the exact weight and divided the 1st and 2nd prizes. The taker of 3rd prize guessed a quarter of a pound below the weight. The highest and lowest guesses were 180 lbs apart.

BEAT THE FLATT SALE.

Canadians were naturally proud of the enterprise shown by W. D. Flatt in the venture he made at Chicago a few weeks ago. But the best things going then were not in it with the results of the investments made thirty years ago by the Hon. M. H. Cochrane, of Hillhurst, Que. Fashionable Shorthorns were then sold at what we should now call very fancy prices, and Mr. Cochrane surprised the folks at home by the prices he was prepared to pay for really first-class stock. He paid Col Gunter $5250 (1,000 guineas) for 97th Duchess. To T C Booth, of Warlaby, he paid 1,500 guineas for Lady Grateful, full sister to Lady Fragrant, which beat all England for three years in succession, and for the heifer Bride of the Vale 1000 g For a heifer of the Vesper family he paid 500 g. On a subsequent trip he paid 1,000 g. each for two more Duchesses, selling their heifer calves to Lord Dunsmore at the same figures. Then he bought from Mr. Booth the bull, Commander-in-Chief, 1st prize at the Royal, and from Lady Pigot a magnificent heifer called Rosedale. In 1879 Mr. Cochrane fore-seeing a possible slackening in the price of fancy Shorthorns, decided to sell out while the boom lasted, and chartered a steamer to take back his herd to England, where a noted Cumberland herd belonging to Rev. Thos. Staniforth was to be sold at Lake Windermere. Thornton, the famous stock auctioneer, had charge of the sale, and the cream of the British Shorthorn fanciers were there. Ten yearling heifers of the Duchess tribe were sold, one going to R. Loder for 4 300 gs., another to Lord Bective at 4,000 gs. The bull Royal Commander was sold at private sale for 1,150 gs. The lot made a mint of money for Mr. Cochrane, and it would be interesting to know what their offspring are bringing to-day.