Marion L Costin

VOL. 3 FEBRUARY 1911 No. 4

The Maritime Students' Agriculturist

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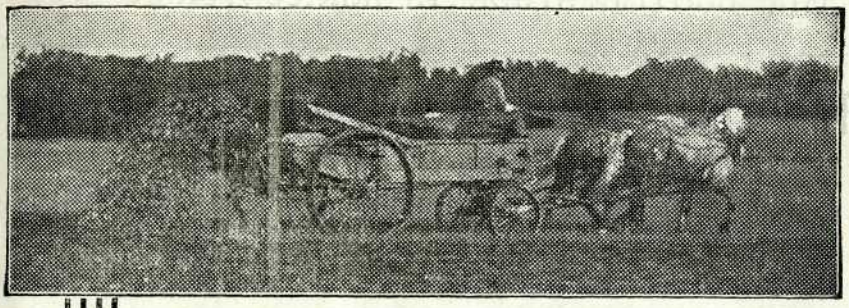

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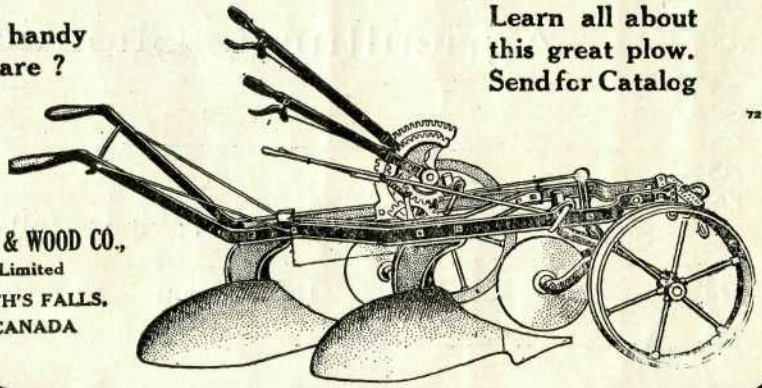

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The Maritime Students' Agriculturist

VOL. 3 FEBRUARY, 1911 No. 4

Editorials

THE tariff wall between Canada and the United States has at last been partially broken down, with what result time alone can tell. There are some who declare that the United States will get all the "plums," while Canada will receive nothing but "stones." This may be true to a certain extent, but it is equally true that Canada should benefit much from the reciprocity. Of course, American manufacturers will try to crowd out Canadian ones; but when the latter find that their customers can get what they want at a much lower price elsewhere, they will waken up and do all in their power to outrival the Americans. The great Canadian forests, say some, will now be the prey of the rapacious American lumbermen, and Canada will be denuded of her vast wealth. Why this should be so remains to be proven, for what the Americans take they will have to pay for and, besides, they will be bringing into Canada large lumbering concerns, which cannot help but leave money where they have found wood.

Again, as to the cry of "Annexation" that has been shown to be of little moment for there is small danger of Canada being annexed while her citizens continue as loyal as they are at present. Most farmers are in favor of this trade agreement, for prices of grain and cattle will be raised thereby, and in most points its advantages overrule its disadvantages.

THE question of cow testing is one that has been much talked about, but it is of such importance and so few, comparatively speaking, are taking it up, that it merits a short discussion.

A record of performance enhances the value of an animal or

its progeny to a considerable extent, for a dairyman is willing to pay more for a cow of such a record than he is for one of inferior stock. A knowledge of the performance of each cow in the herd is of the utmost importance, for if the farmer does not know what his cows are doing, he cannot tell the good from the bad, and consequently continues to keep cows that do not pay for themselves. Many farmers have increased the yield of their herds from 10 to 20 p. c. and what they have done, could be accomplished by everyone. Keep records of your cows, for it is well worth while, and will pay you many times over.

Summer Fallow in Conserving Soil Moisture

By F. T. Shutt, M. A., F. I. C., Dominion Agricultural Chemist

The essentials of "dry farming" are, as we have seen, practically identical with those of summer-fallowing— the making of a receptive soil reservoir and subsequent cultivation to preserve a dry earth mulch. Long before the term dry farming was coined, the practice of fallowing to conserve moisture and suppress weeds was introduced by Mr. Angus Mackay, Superintendent of the Experimental Farm at Indian Head, Sask., and it has been widely adopted for the past twenty years in the wheat growing areas of the Canadian North-west. The immense value of this practice, as a means of storing up moisture for the crop of the succeeding season, was shown by determinations of the soil moisture in fallowed and stubble lands on the Experimental Farm at Indian Head and Brandon in 1900, and it may be well in bringing to a close this brief account of the principles involved in this method of moisture conservation to present some of the more important data then obtained. The details may be found in the report of the chemist for 1900.

Two areas were selected in the early spring on each of these farms for this work—the one "A," had been cropped the year previous, and the other "B," had been fallowed the previous season. During the season of experimentation the area "A" was to be fallowed; "B" was to be sown with grain. Samples of soil, to a depth of 16 inches, were taken from May to November, monthly, for moisture determinations.

The season of 1899 was characterized by what might be considered a normal precipitation; wet and cloudy in May with low temperatures, abundant rains in June, a fair supply of rain in July and August. The fall months were unusually dry.

The season of 1900 was exceptional and abnormal; practically no rain till

the middle of June, the crops suffering severely for lack of moisture. This condition continued till almost the middle of July, when between 3 and 4 inches of rain fell and the soil was saturated; in August and September, the rains were heavier than for that season of the year.

Amount of moisture per acre to a depth of 16 inches:

Date	"A" In Fallow Cropped 1899		"B" In Crop (Fallowed 1899)	
1900	tons	lbs.	tons	lbs.
May 11	427	657	626	1,686
June 11	418	353	749	805
July 11	607	1,263	673	1,740
Aug 11	644	604	440	565
Sept. 11	621	984	639	1,008
Oct. 11	571	1,017	607	1,951
Nov. 11	655	1,916	606	1,781

It will be noticed that during May, June and July, the months of growth, the soil fallowed the year previous contained much more moisture than that which had been in crop, and this in spite that it was carrying a crop of grain. This may perhaps be more apparent by tabulating the differences as follows:—

	tons	lbs.
May 11th, 1900	199	1,029
June 11th, 1900	331	452
July 11th, 1900	66	478

Excess of moisture in soil "B" fallowed the year previous, per acre.

Between June 11th and July 11th, the large excess of moisture previously present in soil "B" fell off rapidly and was reduced to between 60 and 70 tons per acre. This, in all probability, was due to two causes: the first, the greater absorptive and retentive power of soil "A"—in fallow 1900—to hold the rainfall of the month, 4.46 inches, and secondly, the large moisture requirement of the growing crop on soil "B." These factors continued evidently in a more marked manner from July 11th and August 11th, so that at the latter date a reversal of the previous conditions had taken place and the soil in plot "A" (in fallow) now contained 204 tons moisture more than in plot "B." The draft by the growing grain on the moisture on this plot would be at its maximum this month—a fact that well explains our results.

The records from the Indian Head Farm show that in 1899 the rainfall was fairly normal, with precipitations of 1.35 inches and 5.34 inches in May and June, respectively.

In 1900, the weather conditions were similar to those at Brandon. The spring was dry and warm with high winds - until the middle of June little or no rain of any use to crops—and in this respect exceptional. July, August and September were unusually wet, causing the soil on "B" (with the growing crop) to become much more moist than would ordinarily be the case.

Amount of moisture per acre to a depth of 16 inches:

Date	"A" In fallow Cropped 1899		"B" In crop (Fallowed 1899).	
1900	tons	lbs.	tons	lbs.
May 8	540	1,887	700	691
June 8	507	888	685	550
July 8	594	354	501	498
Aug. 8	550	776	534	516
Sept. 8	568	533	496	360
Oct. 8	608	1,641	623	1,491
Nov. 8	625	306	618	789

During May and June the moisture in "B," the land fallowed in 1899 (the year previous), contained, over and above that in the land cropped in that season, 150 tons, 804 lbs., and 177 tons and 662 lbs. respectively. And this in spite of carrying a grain crop. We notice that this same area "B" in crop, contained in July less moisture than "A," due to the draft on the soil moisture by the growing crop and no doubt especially emphasized by the light rainfall. After this date the land in fallow continued with the higher moisture content, as might have been expected, until October and November, when the moisture in both areas tend to approximate owing to heavy autumnal rains.

The foregoing are valuable and instructive data, emphaszing in a most marked manner the beneficial effect of the previous year's fallowing. At both Farms there was a much larger amount of moisture in such land for the crop to draw upon just at that season when it was most required. In years when this period of active growth is one of low rainfall, fallowing may mean all the difference between success and failure. The soil at Indian Head is considerably heavier—contains more clay—than that at Brandon, and both are well supplied with vegetable matter. These results may therefore be considered to cover a fairly wide area of soils and no doubt are in the main representative of what may be obtained by thorough fallowing in the graingrowing districts of the Canadian Northwest where the averagg precipitation is from 15 to 20 inches or less.

A Feeder's Views on Cattle Feeding

By Geo. Rice, Tillsonburg, Ont.

BREAD has been called the "Staff of Life." But if one's diet were confined to bread alone, he would learn that it is possible to have too much of a good thing, and might even swap the "staff" for a "crutch." Bread and milk make a more succulent ration. Scientists might say that it contains the elements of life, and to live on this food one runs no risk from dyspepsia. Still, most people will prefer to "take a chance," and crave a ration of variety, and on such, there is no doubt, more energy and vim are generated, enabling one to "do things," and more feel the joy of living.

In feeding stock, also, much better results are obtained by feeding a variety of foods. Silage is indeed a very good food for cattle, butdoes not in itself furnish the variety necessary to the best results. But when we add to it, say for milk cows, some mangels, a little clover hay, and bran and meal, this latter depending largely upon the quantity of milk being given we have a ration that is at once the cheapest we can

furnish and the best to stimulate and sustain production. From this we obtain the maximum of production at the minimum of cost.

Whilst the bovine animal craves variety as well as the human, making sudden or extreme changes in the ration is bad. The feeder must distinguish between the meaning here of variety and change. Animals are creatures of habit and, as regards feeding, need to be fed, regularly at the same time each day, on about the same food every day. If a change is made in the food to something the animal never had before, it may act suspicious of this food, and not eat it readily, or not enough of it to furnish the necessary nutriment. We often have cattle that have never been fed on such choice food as mangels, refuse to eat them at the start, or nibble at them very delicately, but after a time that same animal acquires a great liking for the mangels.

On the other hand if we change to a food that the animal has had before and was very keen for, but had not had any of that food of late it would, if given a chance, gorge itself on it, and produce serious results. But sometimes fed on less than a repletion, the animal would have its digestive organs disarranged simply because they were not used to that particular food.

In good feeding the thing desired for best results is to have the animal eat its food every day with a decided relish, and when fed a variety of food this condition is obtained. It is poor policy to tempt an animal to eat more than is good for it by making a sudden change to something tempting. This will surely cause an "upset" to the stomach, or disturb the digestive organs. It is something like this in which the novice in cow testing makes his mistake. Because a cow is doing so much on its present feed he sometimes reasons that more food will mean more milk, and the first thing he knows the cow is "stuck," refuses her food altogether very likely. She is "off her feed" because she has been tempted too much and her stomach and bowels are out of order. When a cow is getting a fairly good ration any increase must be made very gradually. And it is better to increase the foods already being fed than to add something quite new.

A great mistake many dairymen make is to keep their cows on certain foods before calving, and then after calving change the ration almost entirely. Before calving the cow may be fed on straw, hay and some chop; a ration that lacks succulency and for that reason (not to mention others) is bad, as it does not put the cow's system in that thrifty condition so much to be desired. A cow should be fed the same foods, at least, a month before freshening, as it is intended to feed her afterwards in order that she may become accustomed to them. But that does not mean she should be fed so much food nor that these

foods need to be in the same proportion in the ration.

To make this more plain, we will suppose the dairyman has silage, roots, hay, chop, bran, and oil-cake, which he expects to feed when the cow is milking. Silage is generally the most plentiful. Roots, on account of trouble of storing large quantities, are generally not so pletiful. Before freshening I would feed about 35 lbs. silage, 10 to 15 lbs. roots, some hay, say 5 to 10 lbs. a day, straw "ad lib."

The regular meal ration would not need to be very large if the cow was in good condition, but I would feed some of all kinds, say, 3 lbs. oat chop, 2 lbs. bran, ½ lb. oil-cake daily. This would do very well for the cow a week after freshening (less the day after freshening.) Then this could be changed in proportion until two weeks after freshening. She would be getting 25 to 30 lbs. silage, 30 to 50 lbs. mangles, 2 lbs. oil-cake, and half and half chop and bran, the amount would depend upon the cow.

If the cow was good for 50 lbs of milk per day, two weeks after faeshening, she would require about 10 to 12 lbs. chop and bran, with the 2 lbs. oil-cake, and silage 30 lbs., and roots, 30 lbs., hay, 5 to 10 lbs. Now, if this cow was thought capable of greater work than 50 lbs. a day, I would decrease the silage to 25 lbs. and gradually increase the roots to 40 lbs., and the meal ration by ½ lb. a day for two or three days. If she continued to improve the food could be still further increased, but very slowly.

It must be remembered that a cow can stand an increase for two or three days, but cannot continue this increase unless there is an increase in production. Or, in other words, this increase in feed is not benefitting her, but just putting excessive tax upon her digestive organs, which are already pretty well taxed, so that it frequently happens that production is decreased by increasing the feed, that is coming to a danger point. To over-tax the system is a little worse than not giving quite enough. The animal will show the observant feeder by her actions, when fed enough food, and in variety; she will look and feel as fit as a fiddle, and act as if life were joyous even when working like all sin at production.

POOR OLD BAYNES! - Gone, but not forgotten. His memory will ever remain with us; and as we think of his winning ways and saintly disposition, his angelic smile and his sweet regard for the feeling of others, let us shed a tear and rejoice that, in the words of the illustrious Pemberton, we will not see him again "for months and months and months." SIC TRANSIT GLORIA BAYNSI!

A Change in Programme.

The Literary and Debating Society met as usual, on February 6, with the President in the chair.

As the Normal students were not present we had a change of programme.

Mr. F. Campbell gave us an address which was thought by all to be very interesting. A hearty vote of thanks was then extended to Mr. Campbell. There being nothing further, the meeting was brought to a close.

The Rhetorics met again on February 13.

One of the most pleasant features of the evening was the large number of Normal Students present.

After a promenade the audience listened to an interesting debate, of which the subject was, Resolved, that corporal punishment should be abolished in public schools.

The speakers were :

AFFIRMATIVE	NEGATIVE
B. Johnson	W. E. Dickson
H. Johnson	C. Chapelle
M. Churchill	C. Shipton

Good arguments were advanced on both sides, and ably upheld by different speakers.

While the judges were considering the verdict, Mr. F. Campbell gave a fair and just criticism of the speakers, which was well received. The judges not being ready with the decision, the time was taken up by a song from Mr. Baynes. The judges then rendered a decision in favor of the Negative.

The evening of February 27 saw a goodly number of Normal College Students present, to whom we are indebted for furnishing us with music for the Promenades. The following programme was rendered.

PROMENADE.
SONG—By Mr. Baynes.
INSTRUMENTAL MUSIC—By Messrs. O'Brien and Schafheitlin (Violins) and Faulkner (Mandolin).
PROMENADE.
SONG—By Mr. F. Campbell.
PROMENADE.
SONG—By Mr. F. Campbell.
SONG—By Mr. A. Pemberton.
PROMENADE.
INSTRUMENTAL MUSIC.

The different performers exhibited great talent. They were all heartily encored, showing their efforts were highly appreciated by the audience.

On the evening of February 20th, the Canadian Club of Truro kindly extended an invitation to a lecture to be delivered by Mr. Frederick Campbell. A considerable portion of our stalwart "Farmers" availed themselves of this opportunity, and Monday evening saw them seated

in a body in the Academy Hall, listening with open ears and mouths to the scholarly and talented speaker. This address was on the "Awakening of Asia;" and he depicted in a masterly manner the customs and manners of the Oriental races, showing how their natures differed from ours, how they thought and worked, and of what great import to the Western world was the question of their awakening and development. It is indeed a treat to hear such lectures as these, which are at once educational and interesting. The students of the N. S. A. C. are deeply indebted to the Canadian Club for giving them the opportunity of listening to their lecturers.

As the term of office of the President and his colleagues had expired, new officers were elected on the 27th. These were as follows:

MR. SCOVIL—President.
MR. SCALES—Vice-President.
MR. MCDONALD—Secretary.
MR. J. CAMPBELL—Executive.

A wish was expressed at this meeting that Mr. Scovil should endeavour to be present for at least one debate.

Underdrainage Operations

By E. S. Archibald, B. A., B. S. A.

THE most of our digging in Nova Scotia is now done by spade or shovel and pick, but under average conditions this is too expensive and the plow may be used to greatly cheapen the digging.

DIGGING DRAINS.

1. With an ordinary plow open the drain 18 inches wide, throwing furrows outward. Now throw two furrows together in the bottom of started ditch and shovel out. Continue this second operation as long as possible by widening the lines, using a long doubletree, one horse being on each side of the ditch, and a six foot chain extension to the beam. We may comfortably loosen the earth by this means to a depth of 18 inches. It is now necessary to have something which will dig a narrower trench. An ordinary subsoil plow is good for this purpose, plowing up and down in the centre of the trench. Lacking this instrument, we may readily remodel an ordinary plow, as follows: Remove the mould board and bolt a narrow block between the handles, running a brace from it to the back bolt in the beam, thus steadying the handle. Put on a new narrow point and narrow the handles by shortening the rod. This makes a very useful and serviceable instrument. On some of our sandy soils the use of the plow is unnecessary, but on average loan and clay soils a man can by using such means throw out fully one

half more per day and with greater ease.

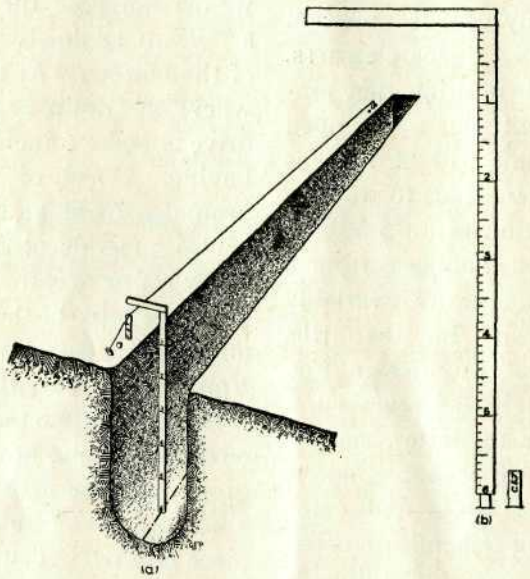
2. The drainage machine when obtainable is by far the cheapest and easiest method of digging.

GRADING THE DITCH.

The usual method of grading the ditch bottom with running water is very good, but even here there are objections. During the mid-summer months we are, as a rule, unable to obtain this supply. This method leaves many chances for carelessness. A great many ditchers think that providing the water will run in the open ditch the underdrain will be fully as efficient. This often leads to trouble. The grade of an underdrain must be uniform, as sudden changes from a steep to a slow grade means invariably sedimentary deposit in the tile. Hence, these greater or lesser uniformities must be either prevented or provided for. For the latter, such as a drain coming down a steep grade to a slow grade, silt boxes and catch basins (preferably of cement) are essential. For the former the following method might be recommended:

An old method of grading the ditch bottom with the board and carpenter's level is still much used. This was a decided step in advance of the use of the unaided eye or even of flowing water, but the board is a clumsy article, especially if so long as to permit imperfection. Even in the best of hands it is not perfect and allows many chances for errors and only this year I saw such an example. By levelling over the laid tiles in this ditch with the home-made drainage level, I found a marked lack of uniformity of grade, in some places the tile grading in opposite direction from natural flow. This ditch, I must confess, was a difficult proposition, but the drainer was both experienced and careful and had he used the following method the operation would have been more simple and efficient. By the use of the plow we may suppose the ditch of previous article to be dug within a few inches of the bottom. At the outlet, stake 1, where the drain is to be 3 feet deep drive a stake 6 inches from the edge, having 3 feet of the stake above ground. At stake 2, where the drain is also 3 feet deep, repeat this process. Draw a line or wire tight and straight over the tops of these two stakes and anchor the ends to pegs or weights. You will see that all points on this line must be exactly 6 feet above the finished drain bottom, however irregular the ground surface may be between stakes 1 and 2. As a guide in digging, cut a piece of 2 by 1 inch board 7 feet long. Toward the upper end of this nail at right angles and brace, a 2 foot cross piece at such a height that when the upright is stood on end the lower edge of cross piece is exactly 6 feet from the ditch bottom. In digging this answers splendidly as a guide, it just touching the upper edge of the cord when the proper depth is obtained, see cut. In driving these line stakes, say at stakes 3 and 4, we know at stake 3 the ditch is to be 3 feet 6

inches deep, consequently we will drive the stake so as to have 2½ feet above ground, thus making the top of stake 6 feet from ditch bottom. At stake 4 the ditch will be 4 feet 1 inch deep, hence we wish but 1 foot 11 inches of stake above ground, and all points on the cord will be exactly 6 feet above the finished ditch bottom and the uniform grade obtained, as charted in preceeding article.



LAYING TILE.

Through land of swampy or quick-sand character it is always necessary to lay the tiles on boards. The precaution, such as joining the tiles evenly and tightly and the filling of 6 inches of earth over the tile, as laid, to retain this eveness are self explanatory. Under average conditions nothing is needed over the joints of tiles, but in cases of of emergency tar paper, gravel, saw-dust, etc., may be profitably used.

It is unwise to allow the digging to get too far ahead of the laying and filling. A rain at this stage does serious damage in caving the sides or running sediment into the tile already laid. To prevent this the following precautions are useful: Place sods at the tile joints immediately after laying, followed by a few inches of earth. Tightly plug the upper end of the tile at the close of the days work, or before a heavy storm, complett the filling of drain as soon as possible. This latter operation may be greatly cheapened by the use of horse power. Plowing in the dirt is a very common practice, a V shaped wooden scraper is splendid on sod land and I have found the ordinary horse scoop or shovel as good

as any. With a steady team on one side of ditch and chain extension to the scoop on the opposite a man can fill over five times as fast as by hand. After completing the drain it is often wise to plow a high, narrow land with the drain top as the centre. This prevents surface water collecting over the top of drain, or from washing out the newly filled dirt. Remember that one tile filled with sediment or gullied out of true by above means will spoil the officiency of the whole system. If a relief surface drain is needed after the ditch has become thoroughly compacted, make this shallow, say a dead furrow about two feet, on one side of the tile drain. Occasionally we note the need of catch basins to prevent surface washing during heavy storms. These as silt boxes must be, at least, one foot deeper than either the incoming or out goihg tiles, so that sediment may have a chance to settle.

SIZE OF TILE.

The size of tile in the main drain depenus upon three factors namely, the quality of soil, number of acres to be drained by this main and the slope of both main drain and laterals. Below is a table worked out by McConnel and recopied from a report from Prof. W. H. Day's, which will act as a general guide. It must be remembered that our rain fall in the Maritime Provinces is much greater than in Ontario or Central States hence greater sized tile must be provided :

TABLE OF SIZE OF TILE PIPE OF MAIN (McCONNELL)

FALL.	ACRES DRAINED					
	3-inch tile	4-inch tile	6-inch tile	8-inch tile	10-inch tile	12-inch tile
1 foot in 20	18.6	26.8	74.4	150.0	270	426.0
1 " 30	15.1	21.8	60.4	128 0	220,8	346.0
1 " 40	12.9	18.6	51.6	108.8	189.6	298.4
1 " 50	11.9	17.0	47.7	98.0	170.4	269.0
1 " 60	10.9	15.6	43.4	90.0	156.0	246.0
1 " 70	10.0	14.5	39.9	83.0	144.4	228.1
1 " 80	9.3	13.4	37.2	77.0	135.0	213.0
1 " 90	8.1	12.6	35.0	72.5	127.0	200.5
1 " 100	7.3	11.9	33.1	69.2	120.6	190.5
1 " 150	6.7	9.5	26.6	56.0	97.3	154.4
1 " 200	5.7	8.2	22.8	48.0	83.9	132 5
1 " 250	8.1	7.5	20.4	42.4	74.4	117.0
1 " 300	4.6	6.9	18.4	38 2	65.5	107 0
1 " 400	4.1	5.9	16.5	32.6	60.3	90.7
1 " 500	3.7	5.2	14.8	30.1	54.0	81·6
1 " 600	3.3	4.7	13.3	28,0	48.6	74.0
1 " 800	2.9	4.1	11.4	24.0	41.9	65.0
1 " 1000	2.6	3.7	10.2	21 2	37.2	56.0
1 " 1500	2.1	3.0	8.5	16.8	30.8	47.0
1 " 2000	1.9	2.8	7.4	15.0	25.0	40.8

Depth and Distance Apart.

These two factors are, to a certain extent, controlled by the size of tile. The distance between drains depends largely on the kind of soil. In general cases underdrains in clay soils should be not more than 25 to 35 feet apart. In sandy soils 35 to 80 feet, with the average depth of, say 3 feet. This would hardly apply to swamp lands, nor can any fixed rule be laid down. However, in soils needing drains this will act as a guide. In both above cases the water table would be about 1¾ feet from the surface, at a distance midway between the two lines of tile. But if the depth of these tiles be only 2½ feet then the drains must be closer together in order to keep the water table sufficiently low. Drains must be placed below frost level and then deep enough as needed to insure satisfaction. Knowing that the water table is curved higher between drains than at the tile, we would advise digging drains from 3 to 3½ feet in depth, but owing to the many influences in our irregular land surfaces and formations, each farmer has a distinct problem and knowing his conditions better than others must use his own judgement.

Maps and Records.

How many farmers who have under drained could tell exactly where each drain is located and what of his successors? It takes but a short time to make a complete map of the farm, with all drains charted exactly to a convenient scale. This, with other records, should be both useful and valuable in locating obstruction in tiles or in putting in or in constructing new drains.

Estimate of Cost.

The pertinent question is, how much will drainage cost? Let us consider in order the various items of expense. After a more or less careful survey of the land by either farmer or surveyor, the number of tile needed is known. The cost and weights of the same may easily be obtained from the nearest factory and expense of freight and hauling readily estimated per ton.

As to the cost of digging, we have already stated that this depends largely upon the nature of the soil. This work is usually contracted for and estimated per rod. Digging by hand a ditch 3 feet deep in heavy soils the cost would be from 65c. to 70c. per rod and on light soils 30c. to 40c. Digging by hand and plow the cost would be lessened in the former case to 40c. or 50c., and in the latter 25c. to 30c. per rod. The digging machine previously mentioned will greatly lessen this outlay. This machine is manufactured by the Buckeye Traction Ditcher Co., of Findlay, Ohio, there being several models, but the machine purchased is an average size for digging to a depth of 4½ feet. Where these machines have been used the average charge per linear rod is 7c. for each foot in depth, or 21c. per rod in a 3 foot ditch. Add to this 2c. per rod for fuel and 1½c. per rod for the

board of two men, the total cost is 24½c. per rod. This machine digs from 90 to 120 rods per day easily and owners make big money, while compared with other methods, the farmer saves. This machine purchased by the Nova Scotia Government will be used in as economic a manner as possible, to cheapen cost, to stimulate drainage and perform this operation for the farmer when, owing to dryness of midsummer or a lack of labor, other methods would be impossible.

The cost of filling ditches with the team and scraper is from 10c. to 15c. per 100 feet, as compared with 25c. to 35c. when done by hand. Providing the farmer does his own surveying, laying out of drains and superintending, all costs have been included.

Before closing, I would like to draw the attention to the possibilities of disputes as to out lets or drains running across neighboring lands. "The Drainage and Water Course Act," (Chapter 67, Vol. 1, Revised Statues for Nova Scotia, 1900), provides for such contingencies According to this Act, owners of adjoining lands are compelled to give natural outlets for drainage water and assist in sharing expenses for the same. It also provides necessary appointments of engineers, inspectors, contractors, etc., as well as the regular procedure according to law should there be any disputes over the same. Limited space permits only the mentioning of this Act, but by so doing it may aid someone in perplexity over such matters.

Profits and Benefits.

As to the profits and benefits of drainage, much might be said. Surely if drainage will make our soils earlier, better aired, sweeter, warmer, deeper, and more drought resistent; if it will give proceeds from waste land which before drainge produces nothing; if it will double the annual production of many other areas, or diminish the costs of management and farm operations by reason of doing away with rough, broken fields, open ditches, etc.; into useful, productive, healthy estate; if it will do all this and much more, then is it not worthy of our most careful consideration.

It has been the aim of the writer to suggest a few practical improvements to farmers uninterested in or using older and inefficient methods of drainage. Few of these ideas are original, but have been gathered from various sources and experiences, but all are practcial and easily understood. Graduating stndents from this institution should do all in their power in their home districts to increase the interest in this great branch of farm improvement.

Lost.—Between the College and somewhere else, an Englishman, answering to the name of "Baynes. Is of a very determined disposition,and is very fond of frequenting dance-halls. May be easily recognized by his stories of Africa and Australia. Finder please return to College and get scalped.

Diseases of Plants.

THE diseases of plants are chiefly due to fungi. A few are caused by very low forms of plant life and a few by bacteria. If there are diseases of plants comparable to the common non-contagious diseases of animals, they have not yet been understood.

The farmer rarely appreciates the loss he sustains from plant diseases. Occasionally he does when a season is is favorable for their development and he loses the entire crop; but annually these diseases take a constant fairly large percentage from the yield.

It is this constant, and to a great extent unknown loss, which is, however, the serious loss rather than the exceptional one. The yield of fruit or of grain is nearly always diminished, so that a "good crop" or "good yield" is really much less than it should be.

While many plant diseases are not entirely preventable, nearly all are capable of control by intelligent methods of farming. Smut of grain and ergot are practically capable of prevention; rust of grain can be greatly reduced, while scab and rot of fruit can be controlled. As diseases are produced by the growth of fungi, the first step is the destruction of all such fungi, as far as possible; the burying of all plant remains as leaves, stubble, poor fruit and such material, completely under ground; the removal and destruction of all diseased plants or parts of plants when possible; clean culture so that no wild plants are harboring the disease; these are the first essentials. Then, good culture and the application of suitable manures so that the plants make the best possible growth. The early sowing of crops on land which, by drainage and culture is warm and ready for the crop, and on which the crop receives the least possible check in growth due to unfavorable seasons, is of nearly equal importance. Often a week's difference in sowing may make the difference between a good or poor crop. Undrained places in a field often furnish the starting point for some disease like rust of grain, and from this it spreads to the healthy parts of the field. In such cases it were better if such places were left unsown. The use of seed or plants free from disease is of importance. Many an orchard has been ruined by the inportation of a disease on some few trees, which disease spread to the healthy trees and killed them also. Grains and vegetables are often affected in the same way. Care therefore should be exercised in getting only healthy seeds or plants, and then retaining such and propagating from them in succeeding years so long as they remain healthy. If these methods are pursued much expense in combating disease by sprays and other means can be saved, and better yields, both in quality and quantity, secured.

Disease is not normal and in many cases can be prevented at little or no expense by observing correct method of culture, care in selection of seed or stock; suitability of soil and conditions, or can render the protective measures much less expensive as well as add to the farmers' income. H. W. S.

Roots for Feeding Purposes.

Comparison of Some of the Most Common.

In deciding on the variety of roots to grow for feeding purposes, it is well to figure out the amount of nutrients they supply, as well as the total yield per acre. Let us take the most important ones—turnips, mangels, sugar beets and potatoes. We find in Nova Scotia that these roots, when grown under uniform conditions, yield in the proportion of about 800 bus. turnips, 700 bus. mangels, 450 bus. sugar beets and 300 bus potatoes per acre. The following table shows amount of digestable nutrients supplied by these roots:

AMOUNT OF DIGESTIBLE NUTRIENTS FROM ONE ACRE.

	Dry Matter. Lbs.	Protein. Lbs.	Carbo-hydrates	Ether Extract.
800 bushels Turnips	5482	480	3888	96
700 " Mangels	8822	462	2268	42
450 " Sugar Beets . . .	3645	297	2754	27
300 ", Potatoes	3798	162	2934	18

We find that potatoes, altho much richer in carbohydrates, lb. for lb., than any of the others, do not yield nearly so much nutrients per acre, only giving about one-third as much protein, two-thirds as much carbohydrates, and one-fifth as much ether extract.

Potatoes are argued by some to be a very profitable crop to grow for feeding purposes; but I do not think they can be nearly so profitable as turnips. They are not as safe to feed, and are more susceptible to insects and blight.

Next we come to sugar beets, which yield considerably more protein than potatoes, but are much below turnips in all the nutrients, only giving about two-thirds as much protein, two-thirds as much carbodyrates, and one-third as much ether extract. I do not think

sugar beets can be considered a satisfactory feed crop, because the yield is much too small; they also require about twice the amount of labour to harvest them, and are more difficult to cultivate on account of their deep rooting in the ground.

Mangels stand next to turnips in the list, although the most watery of all. Mangels are slightly richer in protein, lb. for lb., than are turnips, but are much lower in carbohydrates an dether extract.

In Nova Scotia we find, as a rule, that mangels do not give as large a total yield as turnips, which brings them below in all the nutrients, yielding slightly less protein, about 40 per cent. less carbohydrates, and about 50 per cent. less ether extract.

Turnips are not quite so easily harvested as mangels, and are apt to taint the milk if not fed intelligently to cows. Feeding just after milking overcomes this difficulty, however.

When we find that turnip seed germinate more readily, grow vigorously, are preferred by most animals to all other roots, and in Nova Scotia we find that, as a rule, they yield about 43 per cent. more dry matter, 4 per cent. more protein, 70 per cent. more carbohydrates, 128 per cent. more ether extract, I think that we must consider Swedish turnips to be much the superior root to grow for feeding purposes in most cases.

P. M. K.

Honesty is Upheld.

Minnesota Follows Other States.

IN the case of the International Harvester Company of America vs. Charles Cater, the United States Circuit Court at Fergus Falls, Minnesota, Judge Willard presiding, on January 28th, held that the defense that a company is a "trust" or "illegal combination" is not a good defense, either under the Sherman anti-trust law or under the laws of Minnesota.

Cater was administrator of the estate of F. L. Wilkins, deceased, of Marshall, Minnesota. Wilkins was an agent for the company, and the proceeding was to compel Cater to turn over the proceeds of sales that had been made by Wilkins pursuant to the terms of a commission agency contract; also to recover property and for implements sold to Wilkins.

An erroneous account of what was decided in this case on a previous occasion has recently appeared in certain newsapapers. They reported the reverse of what was then decided.

It has also been decided recently in Michigan, Indiana and Ohio that a purchaser of an article cannot avoid

paying for the property purchased by undertaking to plead the illegality of the contract of purchase and sale.

Mr. Justice Holmes, of the Supreme Court of the United States, in one of his recent decisions, said: "The policy of not furthering the purpose of the 'trust' is less important than the policy of preventing people from getting other people's property for nothing when they purport to be buying it."

The absurdity ot such defense as was offered in the Minnesota and other similar cases must be apparent to every fair-minded mun. All business concerns will welcome the news that as fast as such pleas are presented they are given the adverse ruling. The courts uphold common honesty, at least, and the sooner those inclined towards dishonesty learn the truth of this, the better it will be for all concerned.

A Fish Story.

O. suggested that I should call this yarn, "Stung once more," but as D. was stuffing the half of a large pillow into his mouth at that time, I let the remark pass unnoticed. He never does say anything very important anyway; but he can certainly lie. So can I, but I never do when I'm telling a fish story, for strange to say, no one ever believes. But to proceed.

This happened in the spring-time of '11, just after we four passed the N. S. A. C. exams, and were preparing to spend an arduous summeas "tillers of the soil." D. suggested that we all go to his place for a few days' fishing; and accordingly we went, not that we expected there would be any fish, but just to please D., who has an awful temper and uses very bad language when aroused. S. and D. went on together, and O. and I came on a few days later, having remained in Truro for the purpose of letting O. spend a few hours with his lady friends, and of giving us a chance to get our outfit ready.

Our outfit was certainly unique, for O. never had fished in anything but his mamma's wash-tubs, and for compliments, so he did not know exactly what to buy. He had read somewhere that fish were attracted by bright colors, and had rigged himself out in a brilliant plaid suit. Someone had sold him a pocket fishing-rod, and he had enough fishing tackle to go round Onslow and half-way back again. He got plenty of hooks and flies, but capped the climax by going into a butcher's and inquiring for 'worms for bait."

Finally we got started for D's. and after numerous adventures, arrived safe and sound - except that O. had taken the box of hooks for his match-

box, and put about 6 hooks thru his finger while looking for a match. D and S. met us at the station, and took us home, where we slept the sleep of the weary till dawn the next day. Then we rose, breakfasted, and started for the river. S. and I carrying all of outfit, while D. and O. sauntered along, pipe in mouth, calling out orders as though they were lords of the earth.

O. fell into a pool of water about this time and lost both his pipe and his temper, but was pacified by D., who reminded him that the same thing had once happened to Abraham Lincoln. Nothing eventful happened till we reached the river, and commenced to fish. O. baited his hook, swung the line through the air with a mighty lunge—and hooked S. in the ear. Now S. is of German decent and can swear fluently in both English and his mother-tongue. The rest of us stuffed worms in our ears for ten minutes while S. performed gyrations with his tongue. After the air had become cleared, D. took out his clasp-knife and cut off a liberal portion of S.'s ear, and set free the hook. It was then moved by D. and seconded by myself, that O. should stand at least one-half mile from any human being (except himself of course) when making a cast, O. objected to this, but was soon kicked into subjection, and soon all was peaceful. D. S. and myself landed some two or three dozen beautiful specimens of trouthood, and O. managed to get a few himself. He had become disgusted with his brilliant scarlet suit, and had discarded it altogether, which probably accounted for his luck. By this time we were all hungry, so I set about to prepare luncheon. We cooked some of O's fish, which he had grown tired of carrying, and drank some of "Adam's Ale." In a few minutes we were all seized with violent pains, and rolled around in intense agony. O. thought he was poisoned, D. yelled for his mother, S. called for his girl, while I fainted entirely away. Upon examination and search, it was suggested that O. had omitted to remove the hooks from the trouts' mouths for fear of hurting them, and that we had swallowed the hooks, for I had neglected to clean the fish. We still carry those memorable hooks.

TO BE CONTINUED.

F. McK--z-e is one of our strongest students, as he was seen the other night with a Ful-ton on his arm

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The hen returned to her nest, only to find it empty. "Very funny," said she, "that I can never find things where I lay them."

C.-M--N, of the Juniors, must be trying to obtain some Government position, or be going to run an election. $1.50 for alcholic beverages has a suspicious look.

From the best authority we learn that William Scrapper and his dear and better half, are in a continual state of warfare, and in danger of breaking the holy bonds of hemlock.

Farm Cheese-Making.

By Miss Laura Rose.

Most of our country people are English enough to like home grown and home made food products. This is mainly why the making of small farm cheese appeals to them. If made at the time of year when milk is cheap one can produce an extra nice quality of cheese at a very reasonable cost.

Cheese does not hold its proper place in our dietary. It should be more largely used on our tables, and should often take the place of meat at a meal. A well-made, well-cured cheese is highly nutritious, not hard to digest, and if made in the home would be more freely used.

In manufacturing cheese on the farm we make the process as simple as possible.

From the time of starting until the cheese is put to press is between four and five hours.

The milk must be sweet and pure. If the fresh morning's milk is mixed with the previous day's milk it is usually in about the condition for making cheese in regard to the acidity. With the acidimeter it should show .18 to .19 per cent. acid or by the rennet test 20 to 24 seconds.

A large tin or new tub, in fact any clean vessel which will hold milk and not injure it, will answer as a cheese vat.

Heat the milk to 86° F. by setting it on the stove and stirring or by placing a clean can of hot water in it, and keep it as nearly at that temperature as possible. If the cheese is to be colored, use one small teaspoonful of cheese color to 100 lbs. of milk (10 gallons). Add the color to a pint of the milk and stir well into the milk in the vat.

For every 25 lbs. of milk use one teaspoonful of rennet. Try to get the rennet at some cheese factory; junket or rennet tablets, such as druggists sell, are often not satisfactory. Dilute the rennet in a cup or more of cold water and pour it in a stream up and down the milk, stirring well all the time, and continue stirring two or three minutes. Cover the vat to keep the milk warm. Try the milk occasionally to see when it has sufficiently coagulated, by inserting the index finger into the curd and with the thumb making a dent or slight cut in the curd just at the base of the finger, then slowly moving the finger forward; if the curd breaks clean like a firm but tender custard it is ready to cut. The time from setting or adding the rennet to cutting is usually about twenty minutes. The older or riper the milk the more quickly the rennet will act upon it. Over-ripe milk will give a dry, acidy cheese.

If one expected to make much cheese I would advise getting a set of

curd knives. While more tedious. a long bladed carving knife, or thin bladed sword answers the purpose. First cut lengthwise into strips, one-third of an inch wide, then crosswise the same, as well as one can horizontally. Begin stirring gently and continue the cutting if the carving knife is used till the curd is of uniform size. At the same time heat may be slowly applied. The vat may be set in a vessel holding warm water, or a clean can filled with hot water may be put into the vat. One-half hour should be taken to get the curd heated to 98 degrees. After it is brought to that temperature it is not necessary to stir continuously, but it must be frequently stirred to prevent the curd from matting, and the temperature must be maintained. The curd is usually ready to dip three and one-half hours from the time the rennet is added to the milk. The right condition for the curd to be in at this stage is asccertained by feeling the curd. If it is rather firm, has a shiny appearance, and falls apart when pressed in the hand, it is ready to have the whey drawn.

By the acidimeter it should show from .19 to .2 per cent. of acid, or when a little of the curd is squeezed well in the hand and pressed against a hot iron (a stove poker answers the purpose) and when gently with drawn leaves fine hair-like threads one-quarter of an inch long on the iron, it is a sign the whey should be removed.

If the vat is without a tap, dip the curd and whey into a strainer dipper or colander and put the curd in a large cheese cloth on a lever butter worker, if one is in the house. The curd must be well stirred for ten or fifteen minutes to allow the whey to escape; then it may be salted at the rate of one ounce to every 25 lbs. of milk. Sprinkle the salt over the curd; stir well, and allow it to stand a little while before putting it in the hoops. One cannot get along without a cheese hoop. It may be of wood or tin, but must be round, straight, strong and the ends clean cut without any rim to them. A nice size is 7 inches in diameter by 14 inches high; this will press a cheese weighing from 6 to 10 lbs.

The circle or follower of wood placed in the hoop on top of the curd must fit well or the cheese will have shoulders.

A bandage made of cheese cloth should be placee inside the hoop, and the curd put into it and a square of cotton wet in hot water, placed on the top before the wooden follower is put on. The temperature of the curd when put to press should be from 80° to 84° F.

Many contrivances may be used to apply the pressure—a cider press answers, or a fulcrum and lever press is easily constructed. Too much weight must not be put on at first, and the pressure should be increased gradually.

The next morning the cheese should

be taken from the hoops, dampened with hot water on the outside, the bandages straightened and trimmed and the cloth allowed to extend half an inch over the ends. Cut a circle of cheese cloth, the size of the top, place carefully on the cheese, cover with a square of wet cotton, place the hoop on the top and force the cheese into it. Finish off the other end in the same way. Put again to press till the next day. Take from the hoop and place in a cool cellar, turning it upside down every day for a month and then occasionally. Do not worry, if it moulds; it will be on the outside only, and should be well washed off before the cheese is cut. At the end of two months it should be ready for eating, but is better if kept for five or six months.

If the milk be sweet and good and the necessary care taken in the manufacture, this method produces a rich, meaty cheese much liked by every one.

We are told on every hand that farms are being destroyed by the amount of weeds that is overrunning the country to an alarming extent—so much so that if something is not done, the weeds are going to take possession of the farms, and why? One reason is that farmers have been driven by sheer necessity to abandon sheep-raising because of the ravages of dogs, kept very largely in the cities and towns, villages and townships by people who have no use for a dog, other than to annoy or injure his neighbor, as the wandering dog always does.

"I have been trying for twenty-years," said the poverty-stricken scientist, "to find some use for thistles."

"Why do you waste your time in such a foolish way?"

"Foolish? Don't say that. Think of the boon it will be to mankind if I succeed! As soon as any use can be found for them they will quit growing, unless they are tenderly cared for."

We gratefully acknowledge the receipt of the following contemporaries: Normal College Gazette, Dalhousie Gazette, The Argosy, The P. A. C. Review, and The McDonald College Magazine.

Farmers of Waterloo County, Ontario, expect soon to have their homes lighted, and stationary machinery run by Niagara power.

FAULKNER (when Lee's sleigh gave a sudden start)—"Dear girl, if you won't take my arm you'll be 'wallering' around in the snow in about a minute."

PROF. A. (calling roll)—"Mr. Dearborne!"
DEARBORNE (suddenly waking up)—"Sick."

CHRISTIE—"The Doctor says he can't exactly diagnose my case until he finds out what is the matter with me."

V-B-D--l--g must be taking some of the treatments as suggested by Dr. Standish in veterinary. Ginger, etc

It is "Costin" Cunningham considerable to attend College this term.

Potash Means Profit

During the fiscal year, ending March 31st, 1910, the consumption of Potash in the form of

Muriate of Potash and Sulphate of Potash

increased 89% over the previous year, which testifies to the beneficial effects attending the use of POTASH on all crops. : : : :

Order your Potash supplies early from reliable fertilizer dealers or seedsmen

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We cannot sell you fertilizers, being engaged exclusively in educational propaganda work, but it is our business to advise you how to

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