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MISSING

THE O. A. C. REVIEW

"THE PROFESSION WHICH I HAVE EMBRACED REQUIRES A KNOWLEDGE OF EVERYTHING."

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The Prospective Supply of Seed Oats for Ontario

G. H. CLARK, Seed Commissioner, Ottawa.

MORE than 5,000,000 bushels of oats for seed may be required in the province of Ontario next April and May. The 1916 oat crop throughout the province of Ontario and the west half of the province of Quebec was fair on areas of moist clay land where thorough tiled drainage permitted of early seeding. It is estimated, however, that the crop on fully 80 per cent. of the total area was seriously weakened in vigor as the result of extreme climatic conditions. The effect of this weakened vigor may be, to a greater or less extent, to reduce the yield of oats in the province of Ontario for the 1917 crop.

In the Maritime provinces the oat crop was satisfactory and the quality of the grain was good. Oats at Halifax, however, usually command a price equal to that of the Winnipeg Grain Exchange plus the cost of the freight. Maritime seed oats therefore may be available to the farmers of Ontario at a cost of about 35 cents per bushel more than the cost of western grown oats of the same commercial value for milling.

There is an abundant supply of No. 2 Canada Western (C.W.) oats in the Prairie provinces at the present time. In addition there is a limited supply of No. 1 C.W. oats. These two grades of oats are much in demand for the manufacture of oatmeal. Expert buyers of milling oats endeavor to select cars that are particularly clean and of superior quality and pay a premium to get them. The quality of oats for milling is affected, to a very limited extent only, by the presence of a small precentage of wild oats. The commercial grade No. 2 C.W. oats commonly contains up to 150 wild oats to the pound.

Ten years ago one car of oats out of every seven graded No. 2 C.W. at Winnipeg was found to be free from wild oats. Now it is difficult to procure any considerable quantity of oats in any part of the Prairie provinces that will grade No. 1 C.W. seed oats, a special grade established by the order of the Governor-in-Council as follows:

"No. 1 Canada Western seed oats shall be composed of No. 1 or No. 2 C.W. oats and shall contain 95 per cent. of white oats, sound, clean and free from other grain; shall be free from noxious weed seeds within the meaning of the Seed Control Act, and shall weigh not less than 34 pounds to the bushel."

A Seed Purchasing Commission of this Department was established by order-in-council about the first of October and given authority to purchase seed of wheat, oats and barley to fill requisitions from municipal governing bodies in the rusted and frosted areas of the Prairie provinces. They have been unable to procure their requirements of No. 1 C.W. seed oats, although they have published a definite offer to all and sundry that they will accept delivery of warehouse receipts of all No. 1 C.W. seed oats inspected into any of the Government terminal elevators, and pay therefor a premium of five cents per bushel in advance of the closing price for the day for the same commercial grade of oats on the Winnipeg Grain Exchange.

Many of the cars of oats offered are found to contain two or three wild oats per pound, but are otherwise of excellent quality, and would grade No. 1 seed. In consideration therefore of the unusual shortage of seed oats I have therefore authorized grade for No. 2 seed oats, which will be in every respect the same as No. 1 seed oats, except that they may contain not more than eight wild oats to the pound. These No. 2 seed oats are being specially binned in the Government terminal elevators where they may be held intact until about the opening of navigation. They will remain the property of the shipper and may be purchased through the usual channels of the grain trade at a premium of two or three cents per bushel. It is believed that there will be a fairly large supply of seed oats of this quality.

I am not recommending the farmers of Ontario to buy No. 2 C.W. seed oats because they are not free from wild oats. Even the No. 1 C.W. seed oats are free from wild oats only within the meaning of the Seed Control Act which allows one wild oat per pound. In my judgment the farmers would be well advised thoroughly to clean their own oats to a weight of not less than thirty pounds per measured bushel rather than to introduce wild oats on clean land. Many farmers who can afford it would doubtless prefer to pay the higher price for Prince Edward Island grown seed of the Banner variety than to use No. 1 C.W. seed oats, which are considered practically free from noxious weed seeds, but which are composed of a mixture of varieties of oats of the long white type.

The farmers of Ontario will do well to understand that if their own oat supplies are unsuitable for seed then they should not defer placing order for their seed oats until after the first of March. The action recently taken in the Prairie provinces is calculated to stimulate the prompt movement of the best quality of oats in the Prairie provinces, considered from the viewpoint of seed purposes, and by the middle of February wholesale seed and grain merchants should be in a position to procure car loads of recleaned seed to fill reasonable requirements from the retail trade. Car loads of oats at the Government terminal elevators at Calgary, if ordered by the middle of February, would reach Ontario points about a month later. Retail seed grain dealers throughout the province may be disposed to purchase supplies somewhat in excess of their requirements in former years but after making reasonable allowance for the provision that may be made by the wholesale and retail grain trade those farmers who defer procuring their supplies of seed oats until late in the season may find it to be practically impossible to procure oats that may be considered at all suitable for seeding.

It is necessary also to warn Ontario farmers against buying oats that are known under the grade nomenclature of "Feed" oats. Most farmers and many local grain dealers do not fully understand that the term "Feed" in official grades of oats, as "No. 1 feed oats," implies that the oats have been frozen or are otherwise unsound. Extra No. 1 and No. 1 feed oats are commonly superior in general appearance to the commercial grade No. 1 or No. 2 Canada Western oats. The latter grade name, however, means that the oats are sound and suitable for milling purposes and therefore are vital and suitable for seeding provided that they are clean. In any case it is advisable, this year in particular, that farmers make a germination test of the oats they intend to sow by planting one hundred grains in a box or pot of soil which should be kept moist but not wet, and at about living room temperature in a sunny window in their own homes. The information obtained from such a test will be of more value to them than the report of germination test of samples sent to the seed laboratory, Department of Agriculture, Ottawa, where samples are tested for farmers free of charge.

Some Practical Hints on Lettuce, Radishes and Tomatoes Grown Under Glass

Editor's Note.—This is an extract from an article sent in by James D. Nairn, Bartonville, Ont. Mr. Nairn is very favorably situated. He is a little over two miles from Hamilton market, and has good roads winter and summer. He uses a motor truck to carry his produce to the market, thereby saving much time. He makes a specialty of greenhouse vegetables and caters to a special trade in Hamilton.

I devote all my time to lettuce in the fall and winter and then follow up with tomatoes in the spring. I use radishes as a catch crop and if I run short on lettuce plants any time in January or February the sales seem to be better for radishes.

Grand Rapids Lettuce seems to be the standard for winter trade with me. I have grown other varieties but for winter sales they do not sell as well on our market. I like to get good healthy plants grown and transplanted inside for inside work. I plant 8-in. x 8-in., and have all the planting on the ground level. I use benches only for the raising of young plants from seed.

Tomatoes: I sow the seed about January 1st, and get a good vigorous growth. I then plant them out from March 1st, to April 15th, according to the time I get the last crop off. It is not a good practice to plant anything between the plants even if they are small as you may injure the first bloom. I plant 14-in.x32in., and force them as much as possible. I do not like overhead watering for tomatoes. Carter's Sunrise is my favorite variety. I grow about 10,500 plants and grow nothing else with the spring crop of tomatoes. I use ¼-in. iron stakes and trim to one stem. Tomato Blight is a very bad disease and nothing seems to check it. The only way seems to be to keep your plants growing and harden them. They seem to resist the disease more as the bright days come along.

I find that on the benches the earth should be changed every year but on the ground the soil will last for three years if well taken care of in the summer months. I do this by using a good straw mulch and plenty of water.

I like a good sandy soil with a little black muck soil mixed in with it for the lettuce and radishes with the tomatoes following.

Report of the Dairy

Name and Breed of Cow.	Age of Cow	Days in Milk	Days b't'n C'lv'g	Lbs. meal in year	Lbs. Silage in year	Lbs. Mangels in year	Lbs. Clover Hay	Lbs. Alfalfa	Cost of Pasture	Net Cost Feed from end of year to next calving	Total Cost Feed
Young Springwood, H.	5	365	452	3936	12270	6435	5088	4416		1.07	133.19
Molly Rue Rattler, H.	3	365	390	3852	11200	4920	4386	4392		.16	122.31
Blackie, G.H.	14	365	383	3963	10203	6213	4352	4392		3.46	127.01
Molly Rue, H.	6	365	386	3658	11170	6310	4732	4231		4.89	124.55
Golden Rose, Sh.	8	365	407	3333	10164	10298	2453		5.07	6.79	103.47
Toitilla Rue 2nd, H.	4	365	405	3380	10553	9848	2223		6.94	2.64	95.48
Marg'et Cornucopia, H.	10	365	455	3924	11375	6850	3972	4764		.85	131.73
Beauty of O.A.C. 3rd, H.	5	364	394	3094	11240	8338	2502		5.07	4.61	91.32
Toitilla Rue, H.	5	365	381	2876	10331	8238	2305		6.40		80.59
Barbara, G.H.	5	365	432	Figures incomplete.					8.72	15.28	83.66
Lady Maud, Sh.	8	365	730	2353	8952	8308	2130		8.72	30.00	106.24
Mercena Neth. O.A.C. 2nd, H.	5	365	403	3408	10867	9448	2553		6.94	2.64	95.48
Molly Rue 2nd, H.	5	365	456	2958	13584	7976	5098		2.00	6.02	90.48
Brampton Noblesse Tapon, J.	4	365	731	2087	6022	5725	1712		6.82	10.16	67.55
Beauty of O.A.C., H.	12	365	457	3813	11427	6167	4732	4392			130.85
Mercena Neth. O.A.C. 3rd., H.	3	348	365	2051	7738	5500	1710		7.19		74.79
Iford Fairy Duch'ss, Sh.	4	335	336	2066	9458	4910	4894	4370			100.19
Brampton Dulcie, J.	5	362	422	2541	7456	6450	2083		9.10	9.30	79.42
Iford Waterloo Baroness, Sh.	4	353	385	2983	9211	5230	2980	4320			104.49
O.A.C. Minnie, Ayr.	6	365	532							18.82	109.51
O.A.C. W'ite Rose, Ayr.	5	365	488						7.62	16.33	79.95
Mercena Rue Rat'ler H.	3	261	261	1489	4578	3290	1060		7.19		49.07
Flora Hope, Sh.	2	361	361	3286	9811	4905	7170				97.07
Toitilla Rattler, Hol.	2	265	300						7.19	3.74	59.88
O.A.C. Glennie, Ayr.	5	263	365	2141	9354	4540	5874			11.83	92.55
O.A.C. Dreamy, J.	6	313	380	1817	5538	4685	1678		7.96	1.29	56.26
Br'mpt'n Reverencia, J.	5	365	564	1402	10330	3700	3141		1.10	9.94	49.39
Buds Minnie 2nd, Ayr.	2	340	364	1224	5904	1690	1334		7.19		43.31
College Toitilla Rattler, H.	2	356	362						7.00		64.50
Puddington Solo, Sh.	4	349	395	2320	7190	6150	2131		7.62	4.00	71.40
Toward Pt. Anne, Ayr.	4	273	369	1903	7286	4150	1834		7.19	.81	62.02
Bargower White Sousie, Ayr.	4	237	365	1519	6964	3400	2478		7.19		57.80
Floss Guarantee 2nd,	2	365	390	1388	6190	4110	1296		7.19	3.10	51.73
Signals Blend, G.	5	300	365	1390	6606	4830	1825		7.19		50.36

Herd at O. A. C.

Lbs. Milk	Lbs. Fat	Value Fat	Value Skim Milk.	Value Fat and Skim Milk.	Profit For Year.	Profit With Milk at $1.60 per cwt.	Return for $1.00 Worth of Feed.	Cost 100 lbs. Milk.	Cost 1 lb. Fat.
20110	821	278.12	38.57	316.69	183.50	188.57	2.38	.66	.16 1-5
16975	640	221.19	32.65	253.84	131.53	149.46	2.07	.72	.19
17011	636	219.05	32.75	251.80	124.79	145.16	1.98	.74 3-5	.20
16466	602	206.85	31.52	238.37	113.82	137.64	1.91	.75 2-3	.20 2-3
12395	560	188.21	23.79	212.	108.53	94.85	2.05	.83 1-2	.18 1-2
15253	554	186.48	29.41	215.89	121.19	149.43	2.28	.62	.17 1-10
14978	554	191.16	28.85	220.21	88.28	107.93	1.67	.88	.23 4-5
14808	535	175.95	28.59	204.54	113.22	145.53	2.24	.61 2-3	.17
14041	513	173.61	27.13	200.74	120.15	144.22	2.50	.57 1-2	.15 2-3
14702	509	171.25	28.19	199.44	115.78	151.59	2.38	.56 3-4	.16 1-2
11891	506	170.99	22.78	193.77	87.53	84.02	1.83	.89 1-3	.21
14515	483	159.88	28.05	187.93	92.43	136.77	1.97	.65 4-5	.19 3-4
12677	469	153.35	24.54	177.89	87.41	113.60	1.97	.71 1-4	.19 1-5
7428	417	142.46	14.02	156.48	88.93	51.29	2.32	.91	.16 1-4
13178	416	141.99	25.54	167.53	36.68	80.	1.28	.99 1-4	.31 1-2
11123	404	137.91	21.43	159.34	84.55	103.16	2.13	.66 1-3	.18 1-2
9537	384	131.62	18.26	149.88	49.69	82.40	1.49	1.05	.26
7913	382	131.26	15.06	146.32	66.90	46.19	1.84	1.00 1-3	.20 4-5
10410	381	129.93	20.04	149.97	45.48	62.07	1.43	1.00	.27 2-5
9481	375	124.93	18.21	143.14	33.63	42.19	1.30	1.15 1-2	.29 1-5
8746	333	101.40	16.82	118.23	38.38	59.98	1.48	.91 1-5	.24
8188	324	108.54	15.72	124.26	75.19	81.94	2.53	.60	.15 1-8
7773	318	107.68	14.92	122.60	25.53	27.29	1.26	1.25	.30 1-2
8297	305	110.38	15.98	126.36	66.48	72.87	2.11	.72	.19 2-3
7423	300	95.86	14.24	110.10	17.55	26.22	1.19	1.25	.30 4-5
5075	298	103.81	8.75	112.56	56.30	24.94	2.00	1.11	.18 4-5
8817	292	97.10	11.05	108.15	88.76	43.67	2.19	.84 2-3	.17
6514	282	92.90	12.46	105.36	62.05	60.92	2.43	.66 1-2	.15 1-3
8116	272	93.58	15.68	109.26	44.76	65.36	1.69	.79 1-2	.23 2-3
6497	271	93.94	12.48	106.42	35.02	32.56	1.49	1.10	.26 1-3
5844	236	81.06	11.21	92.27	30.25	31.49	1.48	1.06	.26 1-4
5628	230	76.22	10.79	89.01	29.21	32.25	1.50	1.02	.25
4944	187	64.28	9.51	73.79	22.06	27.38	1.43	1.04	.28
4285	183	63.25	8.20	71.45	21.09	18.19	1.42	1.18	.27 1-2

Soil Fertility Management

EDITOR'S NOTE.—This is an address given by Henry G. Bell, Agronomist of the Soil Improvement Committee of the National Fertilizer Association, before Ontario Agricultural and Experimental Union, Ontario Agricultural College, Guelph, January 10th, 1917. Mr. Bell is well known to many Review readers, being a graduate of O. A. C. in '05.

H. G. BELL

GENTLEMEN:

THE keynote of these meetings is undoubtedly efficiency. Efficiency summons not only the maximum efforts of every citizen of this great empire, but it calls upon every acre to yield its utmost. The universal cry is for food. Never within the history of people now living, was there such a universal shortage of cereals, root crops, meat and animal food products. The last report of the International Bureau of Agriculture, Rome, shows an estimated shortage of over one billion bushels of food cereals. Last year's wheat crop in this country was between a hundred and a hundred and fifty million bushels short of previous years. Last year's potato crop was similarly far below that of normal seasons. In the land of your neighbors to the south, there has recently been declared a shortage of nearly four hundred million bushels of wheat thus reducing their possible export to a little above nine million bushels as compared to a possible export of four hundred million in 1916.

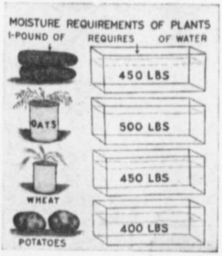
During the past two years you have been placing great emphasis upon the bearing capacity of your soils and the productive power of your livestock. Your excellent association under the able direction of its untiring secretary, Dr. C. A. Zavitz, and his co-laborers, has been instrumental in pointing out the way of increasing yields of the important cereals and root crops of this province. Purer seed, better methods of tillage, judicious crop rotation, care in time of planting have done a great deal toward this improvement, but still the members of this association and farmers in general believe that there are higher attainments yet possible. Ontario's average yield of winter wheat per acre is a little over 20 bushels, and of spring wheat a little over 18 while that of Great Britain is well over 30 bushels per acre. Ontario's yield of potatoes for the past 10 years has not exceeded 113 bushels per acre, as an average, while that for the United Kingdom for the years 1905 to 1914 was over 213 bushels per acre. There are precise and definite reasons for these larger yields and better quality of products on land that has been under tillage for centuries instead of for decades, and it is to investigate these important points that you are now assembled.

In presenting the study of the soil, and its fertility, I do not claim to have discovered any panacea for low yields, nor shall I attempt to elaborate any new discovery. The work which is herewith presented is a gathering together of current knowledge concerning the tillage of the soil and the management of plant food.

A Proper Plant Home.

In order for largest crops to be produced, the home of the plant must be suitable. Much of the land of this whole continent is producing less per acre than it is able, on account of the lack of drainage. The Physics Department of this splendid institution has rendered invaluable service to this province, and in fact to North America, in its advocacy of increased tile drainage. Hundreds of acres in every county in this country are curtailed in their productiveness on account of surface water standing on the soil late in the spring and frequently throughout the growing season. These wet lands are slow in warming up in the spring; hence vegetation is slow in starting, which circumstances result in immature and deficient crops whose ripening season is cut short by early frost. The late Professor King of Wisconsin, over 15 years ago pointed out that in order to evaporate one pound of water from one square foot of soil surface, it required 956 heat units, and resulted in lowering the temperature of the soil over 10 degrees Fahrenheit. Hence, the bad results of standing water on our soils are twofold; first, such water as could be drained off fills the spaces between soil particles and shuts out the air; second, the surface water standing on undrained soils reduces soil temperature as the water evaporates.

Plants must have water, however, since they are a type of creation that cannot take any but liquid food; that is, all plant food must dissolve in soil water or in root juices in order for it to be taken up so that it can be built into corn, oats, wheat, potatoes or other plant products. To give you an idea of the amount of water that is necessary to produce our normal crops, I direct your attention to the accompanying chart on "Water Requirements."



Water is stored in the soil by deep fall plowing and by turning under as much as possible of decaying plant matter or humus. Humus performs six great duties which are as follows:

(a). Organic matter or humus, which consists of decaying plant stalks, stubble, straw and the like, binds together sandy soils and gives them capacity to retain or hold water.

(b). Organic matter or humus gives the soil power to catch and hold soluble plantfood, which the plant is not prepared to take up.

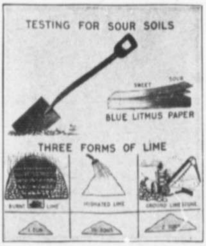
(c). Organic matter acts like a sponge, giving the soil water-retaining capacity.

(d). Organic matter opens up heavy clay soils and allows circulation of air within them.

(e). Organic matter forms a home for soil bacteria.

(f) Organic matter forms the food of soil bacteria.

When these minute forms of life, known as bacteria develop they break down soil particles and organic matter within the soil into such forms that it will dissolve in water and can be used as plantfood. These tiny forms of life require a drained soil, yet one with a sufficient amount of moisture in it. They also require free circulation of air within the soil.



SOILS MUST BE KEPT SWEET.

One of the conditions essential to the growth of soil bacteria is that the soil must be sweet. This requirement is equally true for the free bacteria that live within the organic matter of the soil, and for those tiny forms of microscopic life which live in the little knots or nodules on the roots of legumes such as peas, alfalfa, and common red clover. Soils under tillage tend to become sour. In fact, hundreds of acres in almost any locality clearly indicate this condition by the lack of wild clover in the sod which covers the soil, and by the presence of sheep sorrel and moss growing in the sod. If, however, you wish to make absolutely certain whether the soil is sour or not, it is easy to obtain a small book of litmus paper. Under normal sweet conditions litmus paper is purple in color. As soon as it comes in contact with anything that is of a sour nature, such as vinegar or acid of any sort, the purple color turns to a sort of bright pink. In order to test the soil bury a leaf of this paper about three or four inches deep. Leave it buried for 15 or 20 minutes. When the leaf is removed, if it has turned pink, there is indication that the soil where it was buried is sour. Soil which turns litmus paper pink is in need of lime. Lime is a corrector, not a plantfood. This is a point that is well to keep in mind at all times. Not a few men are applying lime to their soils and feeling that all that is necessary to be done has been done; whereas, by adding lime to the soil, they have simply made conditions perfect, as far as the sweetness of the soil is concerned, for the growth of plant life, which includes the tiny microscopic life known as bacteria. While, for best results in the soil, it is absolutely necessary to keep it sweet, one should always keep in mind that lime does not add plantfood, but makes the re-action of the soil perfect for plant growth. Lime may be added in any one of four or five forms. It may be purchased in the form of raw ground limestone, air-slaked burnt lime, hydrated lime, marl or agricultural lime. In any and all of these forms it corrects soil acidity. On soil which is normally rich in organic matter, it is most satisfactory to use ground limestone or marl since these correct soil sourness and do not tend to deplete the organic matter of the soil. On the other hand, if air-slaked burnt lime is added to a heavy clay soil, it tends to draw the tiny particles of soil together and to make the crumb of the soil coarser. This is a distinct advantage, because one of the outstanding difficulties of a heavy clay soil is that its particles tend to pack so closely that air circulation is, to an extent, prohibited. The addition of air-slaked lime corrects this bad condition.

PLANTFOOD IS FOUND IN THE SOIL

THE FOOD OF THE PLANT.

Beside the plant's having a suitable home, it must have suitable food, if it is to thrive and do its best. Before we make a definite study of the food of plants, it will be interesting to recall the story of how the plant feeds. The accompanying chart tells this story in graphic form. The roots are the trunk lines bringing up the raw material,—the dissolved salts of the soil,—to Nature's factory, the leaves of the plant. The green material of the leaves is Nature's machinery. Under the action of sunlight this machinery is set in motion and the raw material brought up in solution by the roots is re-combined with the constituents of water and carbon-dioxide gas which the plant gets from the air, and is built up into starch, protein, fat, fiber, sugar, and other plant constituents.

The plant is made up of 13 constituents, 12 of which it gets largely from the soil. One constituent which forms about 40 to 55 per cent. of the normal plant composition is taken in through the leaves. It is known as carbon-dioxide. Of the 12 remaining constituents, 8 are classed as essential and 4 are classed as unnecessary. They may be taken up by the plant, but they do not perform as far as is known, any essential function in the process of plant growth. Of the 8 essential constituents, all but three are perfectly familiar to this audience. On account of the increasing scarcity of the last three constituents, — nitrogen, phosphoric acid and potash—the world has come to look upon these as the essential platfood constituents. As a matter of fact they are no more essential than the other 10 cons ituents, yet the ease with which they are depleted fully warrants the great amount of attention that is being given to their up-keep in the soil.

NITROGEN.

A soil deficient in nitrogen, shows its shortage by producing a short strawed grain crop. Nitrogen seems to be the constituent of plantfood that has to do with the growing of the stalk of the plant. An unbalanced supply of nitrogen may cause too great a growth of stalk or straw and result in an inferior quality of grain or other products. Too much nitrogen also produces a slow ripening crop, and one that is easily attacked by disease. Nitrogen is never used in its pure gaseous form by the plant, but is taken up from the soil in soluble salt form, or in certain other organic forms.

PHOSPHORIC ACID.

Phosphoric acid seems to have an important bearing upon the ripening of the crop. On soils deficient in phosphoric acid, the crop does not ripen within the growing season at its disposal. This constituent should be especially interesting to farmers of Ontario,—particularly those who are intending to grow a large type of silage corn. Your season free of frost is shorter than that which prevails in the corn belt; hence, you should be interested in any soil addition which will assist in making it possible to hasten the crop to maturity within the days free of frost at your disposal.

Phosphoric acid seems also to have an important effect on the filling of the kernels of wheat, oats, corn and other cereals. A soil notably short in phosphoric acid produces poorly filled cereals.

Potash.

Potash comes in for a lot of discussion during these war times. Pure potassium, as you have already seen could not be used in its elemental form on account of its extreme activity when it comes in contact with water. Potash is used in some soluble salt forms. The duties of this substance are numerous. It seems to have an important bearing upon the power of the plant to take up the nitrogen of the soil. It also seems to influence the laying down of starch. A soil which is sufficiently supplied with potash, as well as with other plantfood constituents, produces a strong growing plant which seems to have maximum power to resist plant diseases.

Sources of Plantfood.

The essential constituents of plantfood,—nitrogen, phosphoric acid and potash—are first found in Nature's great storehouse, the soil. When the founders of this country first began to till its soils, they could produce heavy yielding crops of excellent quality simply by planting the seed and harvesting the ripened crop. This, indeed, is the story of Western Canada at the present time, where another generation of pioneers are fast depleting the store of plantfood which Nature has stored up. There comes a time, however, when by continuous cropping both the supply and the balance of the plantfood are seriously interfered with, and the result is that smaller yields of inferior quality are produced. For a hundred years past farmers in general have recognized the value of plantfood in stock manure. Yet, as I go up and down various parts of this continent, I observe farmers throwing stock manure out under the eaves of the barn where every rain can wash through, carrying off its brown stream from the manure heap. This brown stream contains over half of the soluble nitrogen and potash of the manure. In order to get best results from manure, it should be carefully protected from rain and snow, and compacted to prevent burning.

Manure is weak in one plantfood constituent. You will notice by the analysis, as shown on the chart that it has a considerable amount of nitrogen and potash, but it is deficient in phosphoric acid the plant ripener. For a cereal crop,—that is for wheat, oats, barley, corn, etc.,—manure should be supplemented by acid phosphate. Dir. Thorne of Ohio, whose careful work has extended over a quarter of a century, reports in his Bulletin 144 that the use of 40 pounds of acid phosphate per ton returns a good profit on investment and results in a larger yield of better quality crop.

Nitrogen From Legumes.

A great deal is being said these days about the discovery of Hellriegel and Wilfarth, announced to the world in 1886, demonstrating that legumes, by virtue of the bacteria living within the nodules on their roots, have the power of absorbing nitrogen from the air that circulates between the soil particles, and of fixing this nitrogen in the soil so that the soil is richer in nitrogen after growing legumes than it was before. This is serviceable knowledge, yet the limitations of legumes to affix sufficient nitrogen for normal large crops of cereals and other crops should be recognized. Some farmers are saying, "If we can get clover or other legumes to grow, we need not buy nitrogen to apply to the soil." For the last two or three years we have been in communication with the leading experiment stations of this continent and Great Britain, and have obtained the expressions of leading scientists relative to the question of the amount of nitrogen fixed in the soil by bacterial action on the roots of common farm legumes.

Penny and MacDonald, of Delaware College of Agriculture, state in their bulletin No. 86:

"How much of the nitrogen found in the clover is 'new' and how much drawn from the soil we have not tried to determine by direct experiment, if indeed it be possible to determine it on the large agricultural scale, that is, in open field work. But is should be emphasized that by no means all of the nitrogen in clover is to be credited to clear gain; a portion and probably in some cases more than half is 'old' nitrogen taken from the soil. There is every reason to believe, however, that the richer the soil in nitrogen the less the amount of 'new' nitrogen is taken from the air. . . ."

BALANCING PLANT RATIONS

PLANTFOOD IN SOIL

SOIL	NITROGEN	PHOS. ACID	POTASH
SANDY	POOR	POOR	POOR
CLAY	MEDIUM	MEDIUM BUT LARGELY UNAVAILABLE	MEDIUM BUT LARGELY UNAVAILABLE
MUCK	ABUNDANT BUT LARGELY UNAVAILABLE	POOR	VERY POOR

PLANTFOOD REQUIRED BY CROPS

CROPS	NITROGEN	PHOS. ACID	POTASH
HAY	ABUNDANCE	FAIR SUPPLY	FAIR SUPPLY
GRAIN	FAIR SUPPLY	ABUNDANCE	FAIR SUPPLY
ROOTS	GOOD SUPPLY	FAIR SUPPLY	ABUNDANCE

In presenting this opinion, I do not wish to appear to be discouraging the growth of legumes. I heartily believe in their use and advise the incorporation of legumes in a rotation of crops. Yet, I believe it is in the interests of the whole world that farmers recognize the limitation of legumes, and realize that there are many factors which may greatly diminish the amount of nitrogen fixed by legumes.

The Fertilizer Problem.

"Shall I use fertilizer on my crop?" "Can I make a reasonable profit by fertilizing my wheat, or corn, or potatoes?" These are questions which farmers by the thousand are asking today. Let me say that it is the experience of reliable experiment stations of this country and Europe and the experience of thousands of successful farmers, that great profit in increased crop yields and products of superior quality accrues to farmers when fertilizers of suitable analyses are properly used on soil in good physical condition. By suitable analyses, I mean that the fertilizer chosen should make up for the characteristic weaknesses of the soil, and should meet the characteristic requirements of the crops. These you will find tabulated on the accompanying chart. For instance, sandy soil is notably weak in nitrogen, phosphoric acid and potash, while muck soil is normally well supplied with nitrogen, but weak in phosphoric acid and very weak in potash. Added to this, farmers should know that cereal crops take out a fair supply of nitrogen, a large supply of phosphoric acid and a medium supply of potash, while root crops take out a medium to large supply of nitrogen, a fair amount of phosphoric acid and an abundance of potash. With these two classes of information at his disposal, the farmer should be in shape to choose fertilizers of an analysis to make up for the deficiencies of his soil, and to meet the special needs of the crops, at least sufficiently near in order to do intelligent experimenting.

Fertilizers must be properly applied if best results are to be obtained. In my investigations I have found men claiming that they did not get sufficient returns from plantfood, and on investigation have found sometimes that they either gave the fertilizer poor application by scattering it on the surface of poorly prepared soil and neglected to work it into the soil; or they distributed it on top of sod land and plowed it under so that the available plantfood was not within reach of the tiny plants. For best results, available plantfood or fertilizer should be worked into the soil at about the depth at which seeds are planted.

I have tried in this outline of the fertility question, to point out that the fertility of the soil is after all dependent upon a number of closely related facts, —in short, to point out that the successful management of a farm is, after all, not a simple problem but a proper blending of a great number of factors which added together mean farm success. In order to place the idea concretely before you, I call your attention to the arch of successful farming, where I have endeavored to locate in places of relative importance, what I consider the main factors of farm success and to corelate with them those essential factors which must also be taken into account in order that the whole structure may stand. These are history making days for this great Dominion. Its young men have gone forth by thousands to fight for their ideals. The call comes stronger than ever for those who remain to make maximum use of their opportunities, to provide that without which success

cannot rest with Great Britain and her allies. Food is just as essential as munitions. If strong vigorous armies are to be maintained in the field, and if the populace at home is to thrive, there must be no scarcity of that which alone can maintain life. This is Ontario's opportunity. With her normally responsive soils splendidly subdued she can put into practice the splendid information relative to crop varieties suited to soils and climatic conditions, which this good organization has done so much to demonstrate and can put into effect the splendid lessons of tillage that the College has been placing before the Ontario farmer for the last half century. Ontario can well make use of the experience of the older parts of America and of Europe which have demonstrated beyond question that the right use of fertilizer, farm manure, proper tillage, drainage, good seed, crop rotation and lining when necessary insure farm prosperity.

Making a Start With Bees

By G. F. Kingsmill, B.S.A.

WITH many people "bee fever" is a periodic disease. It is very prevalent in spring when the work for the coming season is being planned. "I think a few bees in the orchard are a good thing and besides we will get enough honey for our own use." And with this in mind the work for the summer is planned.

Perhaps a bee tree has been cut from the woods and hauled during the winter to the yard near the house. This makes a start in beekeeping; but it is a long road before the bees will be housed in modern hives permitting modern systems of management. Better by far to send an empty hive over to a neighboring beekeeper and have him hive a second swarm in it. This swarm would be worth a couple of dollars. Securing a second swarm in this way will make a good foundation for next season's harvest, but not for this season as it will take the bees all their time to build up and gather sufficient stores to winter themselves. If a good swarm comes from a neighboring apiary and clusters on a limb where it can be easily reached, and it is hived in a modern hive, they should not only gather sufficient for their own needs but also a small surplus that may be taken off the hive. The ideal way to secure the bees is to purchase in the spring from a well known beekeeper a good strong colony with a good queen, in a modern hive with combs built in the frames so they can be lifted out for examination. True he will charge a good price for his stock for it is worth a good price—anywhere from $7.50 to $12.00. The bees will be headed by a vigorous queen in a well made hive and with these two important requirements many of the obstacles that bother the amateur are removed.

Merely securing a colony or two of bees will not assure large returns and unlimited success with beekeeping. In average years the bees make a little honey and board themselves. In good seasons they may make a surplus of fifty to one hundred pounds, while in poor seasons they will be a bill of expense, because they may require feeding sugar syrup to prevent starvation in the winter.

The greater part of Ontario could support many more colonies of bees, and until these regions are stocked there will continue to be a loss from the nectar that will go to waste. If regions are overstocked the bees are as cattle grazing on a closely eaten pasture and scarcely able to gather sufficient food for themselves, let alone store a surplus for the beekeeper. In districts where large apiaries are found, and it is usually in such places that "bee fever" seems to be most prevalent, the beginner would do well to investigate very carefully the possibilities of his bee pasturage before venturing into the business.

To have ideal conditions the nectar bearing plants should form a succession of bloom, the nectar secreted in sufficient quantities for the bees to get it, and the flower not too deep for the bee's tongue. The alsike, white or dutch and sweet clovers, basswood, raspberry, goldenrod, fruit bloom, dandelion, and many other weeds form a natural succession of bloom. The red clover is a very heavy nectar producing flower, but the head is so deep that the bee cannot reach the nectar with its tongue, so is useless as a honey plant.

The bees must have a home—a hive. This is not a large structure with provision for light and a complex system of ventilation and the doors and windows with padlocks to prevent robbing; but merely a small box-shaped structure built on a scientific principle. The Langstroth hive has been widely adopted and seems very popular. It is made in three sizes—8, 10 and 12 frame. The 10 frame is a convenient size, not too small and not too heavy.

Using wired frames and full sheets of foundation the bees will build the combs in the frames so they may be removed without tearing away the comb. The principle of the bee space has been employed to keep the combs from being joined together and made fast. The hives and fittings should be made exactly to measurement or the principle of the bee space will not work. For this reason factory made equipment often proves more satisfactory than home-made or ordinary saw-mill cutting. A 10 frame Langstroth hive, consisting of bottom board, brood-chamber, queen excluder and super costs about $3.00 in flat. A beekeeper's supply catalogue will furnish a list of the necessary equipment.

Experience in handling bees is of more consequence than equipment. The Provincial Department of Agriculture has done much to supply information about beekeeping. Bulletins, short course, popular lectures, etc., all tend to simplify the mysteries of the hive and honey bee. The summer apiary demonstrations are particularly valuable in that the actual bees are handled, their working noticed, and the instructor in charge of the meeting explains what he finds in the hive. The actual experience cannot be had at lectures, but must be obtained from the bees. Obtain information from books, lectures and conversations and experience from the bees, and success is almost bound to follow.

BEREAVEMENT OF THE FIELDS.

Soft falls the February snows, and soft
  Falls on my heart the snow of wintry pain;
For never more, by wood or field or croft,
  Will he we knew walk with his loved again:
No more with eyes adream, and soul aloft,
  In those high moods where love and beauty reign,
Greet his familiar fields, his skies without a stain.

  Soft fall the February snows, and soft
He sleeps in peace upon the breast of her
  He loved the truest; where, by wood and croft,
The wintry silence folds in fleecy blue
  About his silence, while in glooms aloft
The mighty forest fathers, without stir,
  Guard well the rest of him, their rare sweet worshipper.

—Wilfred Campbell.—In memory of Lampman.

The Middleman and His Products

By JOHN S. PORTER, Dominion Live Stock Branch.

EDITOR'S NOTE.—This address was given in connection with a short course in Business and Marketingat the O. A. C., on Friday evening, January 19th, 1917.

I take it that we are all agreed that there must be some organization as a medium for the distribution of products of the farm to the consumer and that an organization for this purpose cannot be maintained without being paid for. It does not matter whether it be the produce dealer, co-operative association or the farmer himself who fills the function. If the farmer sells his own produce to the retailer or consumer he must count his time and labour in doing so. He must also figure wear and tear on horses and wagons if he delivers the goods in this way. Then he must take into consideration the cost of collecting for payment and the possibility of bad debts. If he sells through a co-operative association in which he is interested the same applies, only he pays for the services of the association and he has a share in the profits if there are any. Should he sell to a produce dealer, he indirectly pays for this service. Therefore, the point is that this service must be paid for. It cannot be done for nothing.

The need of wholesale produce distributors may be best demonstrated by consideration of certain reasons:—first, to procure the greatest economy in local shipments. The quantity sent at one time is usually too great for consumers and the average retailers to handle. Second, shipments from farmers vary in quantity from shipment to shipment and for different times of the year. The city supply of many commodities come, first from one producing section and then from another. The average consumer or retailer must be able to buy frequently in order to correlate their requirements. Furthermore, the shipments from the country at one period will be insufficient, whereas at another season they are much greater than retailers and consumers can absorb. This surplus must be carried by another class of dealers from the time of surplus production to that of insufficient production. Third, the qualities of commodities marketed by farmers is variable. It is usual that each consumer wants a certain quality all the time, and each retailer has a fairly definite class of trade and must have uniformity in quality. Fourth, the business relations between farmers and consumer or retailers in the consuming centres are difficult to establish and difficult to maintain. Fifth, retailers as a rule are notoriously slow pay, even wholesalers who are in close touch with city retailers have their difficulties in making them pay for goods within reasonable time. Farmers cannot afford to wait for their money. This obstacle is almost enough in itself to prevent any general direct selling from the farmer to the retailers in the cities, and the same applies in selling direct to the consumer. Innumerable attempts at direct selling have been given up for this reason. These reasons suggest the function of the produce dealer. These functions are not generally understood. They are much more difficult to perform and require a much greater degree of organization and business ability than most people realize. My experience has been that a produce business operated on absolutely day to day trading (what

I mean by this is buying today and selling tomorrow) gives the operator only a bare living, and only an efficiently managed business will succeed in even doing this.

Expenses in large centres of population are high. Considerable capital is required. A large ware house with cold storage facilities is necessary. Horses and waggons for delivery are required. Office staff, salesmen, warehousemen and drivers, taxes, light and heat, books, stationery, also bad debts, and many minor items, must be provided for.

The percentage of cost of doing business depends, of course, upon the volume and economical administration. At present, with the high cost of labour and taxes, etc., the percentage will run from seven to ten per cent.

You will no doubt say, "If the above is true, why is it that there is such a wide margin between the price paid to the farmer and that which the consumer pays?" In answer to this question, I admit the margin looks excessive as a rule, but the produce dealer who does day to day trading gets only a moderate portion of this margin. The country store-keeper gets some. Some farmers are of the opinion that the country store-keeper handles his produce for love. If he does not take a profit directly out of the produce he handles he gets it out of the merchandise he sells or exchanges to the farmer.

He does not, as a rule, care to handle produce, and the only reason why he handles it is that it brings trade to his store. Then there is the man who goes from farm to farm with a wagon, picking up produce. His services have to be paid for. In some instances there is also the country town produce dealer who accumulates produce in quantities. He buys from country stores and gatherers, and sells to the city produce dealer. He also takes his toll. Then, before the produce reaches the consumer, it passes through the retailers hands. The cost of operating the average retail business in large cities ranges from twelve to twenty per cent., and, in some instances, even higher. This may seem to you high, but, nevertheless, it is true, according to my my own experience. Rents, labour, delivery, taxes, light and heat are very expensive. Then we have transportation charges in addition. I am frank to admit that some of those handling produce in the country are an unnecessary burden and could be dispensed with. It is like the situation with regard to railroads in Canada today. At many points there are as many as three lines where there is only business for one, in which case competition increases rates instead of reducing them. So it is at many country points in regard to the number of people engaged in handling produce. When the statement is made that there are too many middlemen, it means one of two things; either there are too many classes of middlemen, that is, too many successive steps, or that there are too many of each class. As to wholesale produce dealers, generally speaking we already have relatively large businesses. On the other hand, there are innumerable small stores scattered all over our large cities and it is this part that is so frequently condemned by those looking for a solution of the marketing problem. One of the principal causes of the high cost of operating a retail business in large towns is due to the demand for expensive service by the great majority of consumers. A large body of women, and, in fact, some men think it is lowering their standing to carry the smallest parcel home.—Rotten pride.—You will perhaps say

"Some produce dealers make a lot of money and become wealthy. How do you account for this?" It is true some have made considerable wealth, but it has not been made out of day to day trading. These dealers usually are very shrewd business men and speculate. They accumulate stock when prices are low and have courage to hold until prices advance. They do not always read the markets right and, of course, in this case they may lose considerable money. But if they misjudge once they usually hit right at other times. If they do not, they will soon be out of business. Speculation, however, is hazardous, particularly if a man borrows for the purpose. There are two kinds of speculaators. One might be termed a legitimate speculator and the other a gambling speculator. The former estimates the requirements of his regular trade and provides for it by storing at seasons of heavy production for the off-season. The gambling speculator may have no established business or he may have a regular trade but buys far in excess of his established business requirements, in which case it is purely gambling and is the kind of speculation which should be discouraged. Such gambling speculators are an injury to the trade and to the community in general. Some very bad failures have occurred in Canada in my time from unwise speculation in produce. On the other hand, some have been successful and these are the produce dealers who are prosperous.

The produce business is like any other business. A successful business of any kind depends upon the management, whether it be farming, manufacturing or trading in produce. You know that some farmers are good managers and do well, whilst others are always scratching on the bottom. It is the same in the produce business. Some dealers do well, whilst others fail or make a bare living.

Large companies pay high salaries to their managers. It is not usually the question of the size of the salary. The first consideration is the ability of the men. I am of the opinion that the reason why so many farmer's cooperative associations do not make good is that they do exactly the opposite. A manager is employed because he is low-priced, and you usually get quality according to what you pay for.

It must be admitted that the distribution of produce is a business in itself and a successful business is not built up in a day. It takes years of experience and many ups and downs. Customers have to be secured, care has to be taken not to contract bad debts, good judgment has to be used in studying the markets and in buying. Besides, conditions are changing continually and new markets have to be looked for and studied, as what suits one community does not suit another. Sometimes considerable loss is made in opening up new outlets and it requires a great amount of courage to stay with the game.

The cold storage business, as I have seen it grow from a mere inception to a mammoth industry, is a very simple matter, and although in popular imagination it has been loaded with hobgoblins and regarded as a principal tool of manipulators, its economic utility is really very plain. When it is considered, taking eggs for example, that 40 per cent. of the year's production in this country occurs in April, May and June, and only about 12 per cent. in October, November and December, it seems self-evident that public interests demand the holding of a certain quantity from flush season to the season of scarcity. Cold storage is the means by which this holding is made possible in the most economical manner, considering the quality and the commercial value of the goods held. The effect of this artificial distribution of supplies is to increase the price of fresh eggs during the season of heavy production, as, if all eggs were forecd on the market during the flush season, prices would be ruinously low at this time.

The carriage of eggs in cold storage is a business open to all, the incentive is profit, the business is inherently of a speculative character. The production of eggs during the winter months varies greatly from year to year according to the weather, and stored eggs in January come into competition with widely varying amounts of fresh eggs at that season.

There is no means of knowing at what price spring eggs can safely be stored. Sometimes too many are stored in relation to their cost and a surplus is left to be forced to sale during the winter months at more or less heavy losses. Sometimes too few are stored and, a severe winter following, results in early exhaustion and more or less extreme profits are made. As far as I know, there is no certain unanimity of action among dealers in storing or withdrawing from storage. Each operates on his own judgment though some may be influenced by the known dealings of others, and many may take the same course at the same time.

You may think that the arguments I have used up to this point appear to justify the present system of market distribution. I have purposely refrained from alluding to the weak spots in the system because I feel it is necessary for us first to obtain a clear conception of the fundamental facts already stated. There certainly are defects in the marketing system just as there are in manufacturing or in agriculture. Certain weaknesses have been unearthed, many of which are not recognized by most of the casual observers. I will endeavour to classify them:

First,—Those connected with marketing at country points.

Second,—Those connected with the transportation systems.

Third,—Those connected with the wholesale trade.

Fourth,—Those connected with the retail trade.

In discussing these weaknesses, I will confine myself to those connected with marketing at country points, and with the wholesale trade.

The principal weaknesses of the system of marketing at country points are:

First,—Too many people make their living out of marketing produce; many of these are what might be termed parasites on the business.

Second,—Carelessness in handling and packing goods.

Third,—Insufficient attention as to the quality of goods.

Fourth,—Poor business management on the part of local buyers, country store-keepers and farmers' organizations.

Fifth,—Poor roads from farm to country shipping point.

Sixth,—Lack of honesty on the part of some country buyers and some farmers.

The principal weaknesses of the organization and methods of the wholesale produce trade are:

First,—Opportunity for sharp practices and sometimes dishonesty.

Second,—Lack of uniform standards for produce and inadequate inspection and grading systems.

Third,—Lack of adequate market information which is not biased. One difficulty with the quotation problem is that the economic functions and value of market quotations, especially their use as a trading or settling basis, has never been fully recognized or understood.

Fourth,—Lack of sufficient organization and means of obtaining and assimilating market information resulting in uneven distribution of produce among the several markets, with consequent gluts and scarcity.

Fifth,—Lack of standardization of methods, customs, grades, packages and trade terms in the different markets. It would simplify the market problem greatly if uniform standardization was recognized on all markets.

It is only necessary to recite these various shortcomings of our present system to prove that the marketing problem is vastly complex and that improvement can be brought about only by careful study along the various lines and by application of one remedy here and another there.

The object of this paper is to state the case rather than to present a solution. I, however, believe farmers' co-operative associations have a place in the marketing system. It has been proved beyond doubt that they have by the experience in several European countries, the most outstanding example is Denmark. The progress in that country in co-operative marketing has been marvelous. I am a believer, however, that there are limitations to which co-operative organizations should go in marketing.

There are many features of the marketing system that can be dealt with efficiently only by the Government itself. We already have Government inspection of grain and apple grading. Government grading inspection and regulation covering the marketing of farm produce is, in my opinion, an important factor in the solution of the market problem. We need it more particularly now than ever, as we are becoming more important exporters. Our reputation is at stake in foreign markets and should be closely guarded by Government supervision.

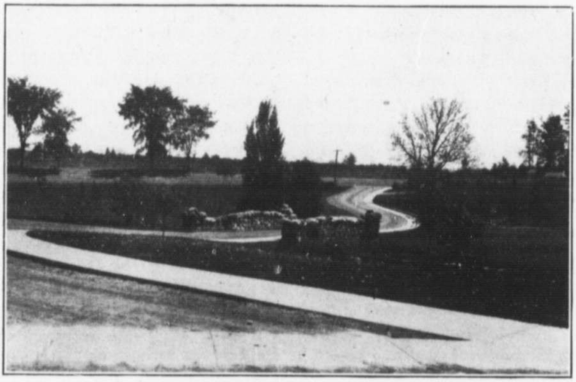
Finally, education in marketing is necessary. The principles of marketing should be part of every school course. Special courses should be developed in agricultural and commercial schools, and the general public should be educated to the fact that if it requires elaborate services from retailers it must pay for such service.

I have wandered a good way from the subject we are here to discuss this evening, namely, relations of the produce dealer to the farmer, but I have thought it necessary so that we may have a better understanding of the functions of those engaged in the wholesale produce trade. I believe such gatherings as this are very helpful to a better understanding between the distributing trade and the agriculturalists. It is an excellent move, and Dr. Creelman has shown good judgment in inaugurating it this evening. I hope it will not be the last, and that it will be the beginning of closer relations and a better understanding between the produce dealer and the farmer.

Experimental Work in Vegetable Growing at the Vineland Experiment Station

By O. J. Robb, B.S.A.

Editor's Note.—Mr. Robb graduated from the Ontario Agricultural College with Class '15, and received an appointment at Vineland Experimental Station. He has charge of the vegetable and garden work which is being carried on.



View of Entrance to the Horticultural Experimental Station, Vineland.

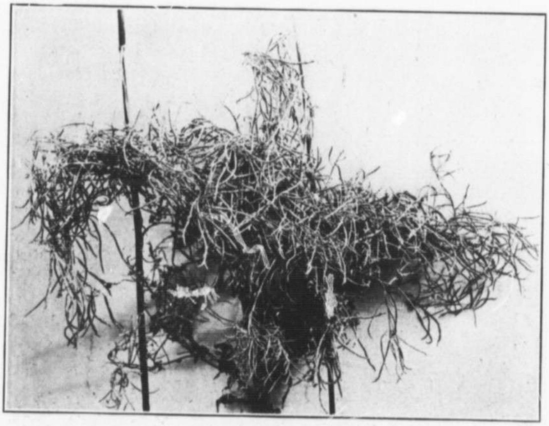
PERHAPS vegetable growing is receiving more attention than any other branch of agriculture during the present period of high priced food products. This is due not so much to the upward trend of the prices of other materials owing to war conditions although it is an important factor, but it is mainly due to a lack of production of all kinds of vegetables. The yield has been cut down during the season of 1916 to almost one-half the average, principally on account of the very unfavorable season and partly on account of a scarcity of labour.

Vegetables are a necessity in the diet of the people and are depended on to supply the main part of any well balanced ration.

During the present scarcity of vegetables generally, with the resulting high prices, one is often asked the questions,—"What are our experiment stations doing to relieve the situation?" or "Is there any reasonable solution of the difficulty other than the wholesale importation of vegetables against a protective tariff?"

While the labor problem is daily becoming more and more acute it must adjust itself in time to the existing conditions. It is not the purpose of this article to discuss this phase of the subject nor even the commercial side of vegetable growing.

The one great means though not the only one of accomplishing immediate and far reaching results through the experimental farms is by the distribution of selected seeds of selected



Cauliflower Producing Seed

varieties. Another method of helping is by sending out advice as to varieties adapted to certain localities as to cultivation and handling methods and as to fertilization and irrigation results.

All of this information is of no use unless it is presented to the farmer in a practical and business like way.

A short summary of a part of the work carried on at the Vineland Station is given below with a few of the more outstanding features.

Considerable attention has been devoted to the production of vegetable seed during the past two years with the result that in 1915 a large quantity of garden beet, onion and carrot seed was produced all from selected roots and bulbs. Practically all of this seed was distributed early last season in small samples to over one hundred and fifty growers who asked for it and the reports sent in from these growers all speak very highly of the seed and most of them are asking for more to try in 1917.

Following up the start made in 1915 more seed of the following vegetables were produced during the season of 1916 in varying quantities and the greater portion of this will be available for distribution this season: Onions, two varieties (Red Globe, Red Wetherfield), garden beets (Detroit Dark Red), carrots (Chantenay), cabbage (Danish Ballhead), cauliflower (Dwarf Erfurt), celery (Giant Pascal), parsnips (Hollow Crown), tomatoes which have produced over 800 bu. per acre and some very early sweet corn of the Malcolm variety

Similar work is being carried on with many other vegetables and will be noted later.

Cultivation, irrigation and fertilizer experiments are being conducted and reported on from time to time, such as the effect of frequent applications of Sodium Nitrate to early beets, carrots and celery. During the season of 1916 at a cost of $26.80 per acre for Sodium Nitrate a crop of garden beets were increased by 140 bus. giving at the market prices then obtainable a net

Strawberry Patch, Showing Irrigation

profit of $113.20 per acre. This experiment was conducted in conjunction with an irrigation test but while a slight profit was obtained from the irrigated block the wet season was not favorable for irrigation work.

Regarding the question of early seed potatoes a quantity of seed of the Early Eureka variety was secured from the North and tried out against the same variety from a southern part of the province. The results of only one season show that the northern seed is far ahead of the southern seed both as to earliness and as to yield.

Possibly the most thorough selective work has been carried on with tomatoes. We have just finished the third year of work on the original stock of twenty-six varieties. Under the plan of selection this means nearly two hundred selections to record and test out.

Selections were made as follows from each variety:

A. Earliest fruit.
B. Latest fruit.
C. Most uniform fruit.
D. Most uniform plant.
E. Most productive plant.
F. Smallest fruit.
G. Largest fruit.
M. Any desirable mutants.

These were made and carried through with very few losses and in most varieties the selections are becoming more distinct and show the effect of such selective efforts.

It is the object to secure a good smooth early tomato. There are many good tomatoes on the market to-day, but there is still room for great improvement.

Another phase of the work which is proposed to undertake is the testing and standardization of the varieties of tomatoes and other vegetables. This will require several years of testing and descriptive work.

The farm at Vineland is favorably situated for seed growing and this part is receiving some attention but the greatest work must necessarily lie in the comparative testing and description of varieties. This work requires good soil and above all a uniform soil. The soil on the station is fairly uniform but it is not a good vegetable soil as it inclines to be very heavy clay, however, the greatest advantage is taken of what facilities offer and a fair amount of reliable information is being secured.

Adapting Gasoline Engines to Burn Coal Oil as Fuel

By Prof. W. H. Day, Physics Department, O.A.C.

ON heavy tractors in the West coal oil has been used as fuel for years, and with good success. In Ontario it has been used but very little. Yet throughout the Province there are many thousands of engines burning gasoline, and many owners have been turning over in their minds the possibility of adapting their engines to burn coal oil. Among these was the Department of Physics, at the Ontario Agricultural College.

Our first endeavours to adapt the College ditching machine to use coal oil were made in 1913 when the price of gasoline ranged from 25 to 30 cents per gallon. We tried again in 1914. In both years our efforts were failures. In 1915 with the price of gasoline only 15 to 20 cents there was little to be gained by adopting coal oil. But when early in 1916 the price soared to 30 and even 35 cents the need for a cheaper fuel became urgent, not only for the College machine but for private machines as well, consequently, the work on coal oil or kerosene as it is coming to be called, was resumed. This time we succeeded so well that we now get at least as much work out of kerosene as out of the same quantity of gasoline.

It is an established fact that a gallon of kerosene contains considerably more heat than a gallon of gasoline, yet in striving to adapt gasoline engines to use kerosene the general experience has been that it has required considerably more kerosene than gasoline to do the same amount of work, the difference being stated at all the way from 10 to 30 per cent.

Now if kerosene contains the more heat why this large difference in favour of gasoline in general practice? Crude oil as pumped from the wells is a mixture of many compounds. When it is refined it produces gasoline, benzine, kerosene, etc. To refine the crude oil we must boil it. Here is where the different grades are produced. Most people are familiar with the term "boiling point" in reference to water. If a kettle of cold water be placed over a fire and the temperature of the water be taken with a theromometer every few minutes it will be observed that the water becomes hotter and hotter until it begins to boil, after which the temperature remains constant no matter how intense the heat supplied to the kettle until all the water has "boiled away." This constant temperature is the "boiling point" of water. At sea level it is 212° F. Now crude oil is different from water. It's boiling point is not constant. If a kettle of this liquid be heated as the water was, it will be found to boil even at 120 or lower, but if it be kept at that temperature for a time it will cease to boil, although there is still much of the oil left in the kettle. Now if the fire be made hotter the oil will begin to boil again. If we were to condense the oil vapour at the two different temperatures into liquid we would find that the first was lighter gallon for gallon than the second. It is in just this way that the different products from crude petroleum are separated. Ether is driven off first, then gasoline, benzine and kerosene in order as named. Some idea of the temperatures at which these are produced may be gained from the following: Heating a widely used brand of gasoline by means of an electric heater we noted the first fine bubbles of vapour form and rise to the surface fwhen the temperature of the liquid was 113°, although even before this the more volatible substances in the gasoline were vaporizing, as could be seen from drops which were formed by condensation on the inner surface of the glass vessel in which the boiling was being done. General violent boiling occurred at 176°, and at the same time vapour began to come out of the spout of the vessel rapidly, like steam from the spout of a tea-kettle. This it will be noted is 36° below the boiling point of water. As the lighter parts of the gasoline were driven off the boiling point kept on rising, reaching the high temperature of 302°, or 90° above the boiling point of water. Just what temperature would have been necessary to vapourize the heaviest portions of the gasoline we were not able to determine as boiling entirely dry might have injured the heater. Also heating a widely used brand of kerosene we noted the first condensation of the more volatile portions at 140°, the first bubbles of vapour at 212°, and general boiling with vapour rising from the spout at 356°, which is 144° hotter than boiling water. The highest temperature noted with the kerosene was 419°. In our first tests we used a copper kettle and at this temperature the spout melted off—419° is the melting point of half and half solder, i. e. solder composed of one-half lead and one-half tin. Once boiling began with either substance the temperature of the vapour above the liquid was found to be the same as that of the liquid itself, just the same as in the case of boiling water. Hence we see that it requires only about half as high a temperature to boil gasoline, i. e. turn it into vapour, as it does to boil kerosene. We also see that this particular brand of gasoline boils readily at 36° below the boiling point of water while with kerosene the same stage of boiling was not reached until 144° above the boiling point of water, and even at 419° some of the kerosene remained unvapourized. Now any part of the fuel which is not vapourized does not burn but comes out with the exhaust unused and is wasted. Another point worth noting is the great amount of heat required to vapourize either gasoline or kerosene. On this there is practically no information available, so we have had to make the necessary determinations. In the first place the fuel must be raised from the air temperature up to boiling point, and then turned into vapour. Both operations require heat, the total amount for gasoline beginning at freezing point being 1¼ times and for kerosene nearly twice as much as to heat the same weight of water from freezing to boiling point. Where does all this heat come from? Did the reader ever place his hand on the upper part of the carbureter or the intake pipe just above it and note how cold they are—sometimes much colder than the surrounding air? When the fuel is broken into fine globules part of it is vapourized by heat abstracted from the carbureter and intake pipe, and these in turn abstract heat from the air around them. But this is not sufficient to completely vapourize gasoline, and consequently many carbureters, especially those on "motors", are so constructed that part or all of the air drawn into the carbureter is pre-heated. This provides heat to aid in vapourizing the fuel, and for gasoline it may be sufficient, but if not the heat of the warm cylinder together with that produced by compression completes the vapourization. With kerosene under ordinary conditions it is different. The amount of heat required for it is almost twice as great and the temperature twice as high as for gasoline, and all the sources of heat together do not produce enough to vapourize the kerosene completely, consequently the heavier parts of it, which by the way, contain relatively most heat are not vapourized, but are expelled as liquid and consequently wasted. That is why general experience has found that it requires more kerosene than gasoline to do the same amount of work.

And this points the way to the solution of the problem: To ensure fullest returns from kerosene sufficient heat must be supplied to vapourize even the heaviest compounds in it. There are three ways in which heat may be applied:

(1). The kerosene may be heated.

(2). The carbureter or intake pipe, or both, may be heated.

(3). The air may be heated.

In 1913 we devised a method of heating the air only, by drawing it from around the water jacket of the cylinder. It proved entirely inadequate. In 1914 the makers of the engine furnished us with a device for heating the air, and with which some were reported to be obtaining good results. It consisted in drawing the air through a specially constructed cylinder head. We were unable to make it give satisfaction. In 1916, having gained a better perspective of the problem, a better appreciation of the large amount of heat and the high temperature required, we decided to provide heat in all of the three ways above mentioned. As the College machine did not start until well on in June the first actual installation was made on a private machine early in May. It proved successful from the beginning without alteration and two other private machines were equipped with it. These equipments were paid for by the private owner. Before the College machine started it too was equipped for kerosene.

Before entering into the details of construction it may be of interest to note the results obtained. One private machine worked on trenching 4½ feet deep in 1915 and on 3 foot trenching in 1916 so does not lend itself to comparison by the number of rods per gallon, but in both seasons it ran 10 hours per day, and it used 300 gallons less kerosene in 1916 than gasoline in 1915.

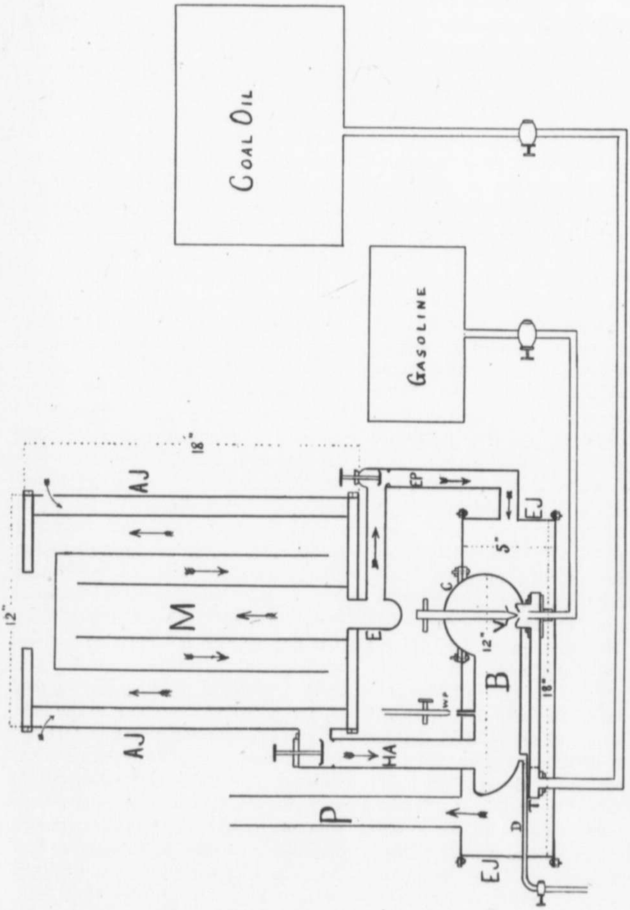
The other two during half of 1916 worked on the same farms as in 1915, and during the remainder up to Nov. 1st, they worked in the same locality, so that the land in which they were digging was approximately of the same nature as in the preceding year, the depth was the same, and the machines were operated by the same men. In 1915 they used gasoline and during the whole season dug on an average 4.83 rods per gallon. In 1916 they used kerosene, except for starting when engines were cold, and averaged 4.723 rods per gallon, or about 2.22 per cent. less than on gasoline the year before. These averages were obtained from 3,200 gallons of gasoline and 2,400 gallons of kerosene. While the land in which the machines operated was the same during the two seasons, there was nevertheless some difference in the digging. In 1915, on account of the rains in July and August the ground was moist, loose and easy to dig during the entire season, while in 1916, because of the wet spring followed by drouth during the summer the ground became baked and the digging was consequently very hard. However there is a partial offset to this, viz. the power required to propel the machine over the soft ground in 1915 was greater than that required for the same purpose in 1916, when the ground was hard and the wheels did not sink in the soil. A comparison of the number of rods dug per day while the machines were actually digging shows that they dug 1.3 per cent. less per day of 10 hours in 1916 than in 1915. And the time required for repairing in 1916 was ¾ of one per cent. greater than in 1915. These figures show that the work was slightly harder while the kerosene was being burned than while the gasoline was being used. Under all the circumstances I feel quite satisfied that we were able to do at least as much work with kerosene as we would have done with gasoline under the same conditions. I asked the four operators to state their opinions of kerosene from the practical side, and they all say that under ordinary loads they can see no difference, although under full load the engine does not seem to have quite as much "snap" in it when burning kerosene.

We are now using a grade of fuel cheaper than kerosene, and which seems to give even better results, being cleaner about the engine and faster, and the engine starts better on it when partly cooled down. Some oil companies call it "Engine Naphtha," and others "Engine Fuel." About one-third of the 2,400 gallons was in reality Naphtha or Engine Fuel.

The price of gasoline in 1916 delivered at the farms where the machines were working would have been about 33 to 35 cents per gallon, kerosene has cost 14 cents delivered and Engine Fuel 12 cents, so that the cost of fuel is reduced considerably below one-half by using the heavier oils instead of gasoline. Engine Fuel in Toronto then cost 10½ cents per gallon.

On the College machine it has not been feasible to make a comparison of value between work on gasoline in 1915 and on kerosene in 1916, because of lack of similarity in conditions. However, a number of tests were made trying out different fuels on the same plots this year, i. e., one ditch would be dug with gasoline and the next right beside it the same length and depth and in similar soil with kerosene or naphtha. The result appeared to favour the heavier oils but before reporting definitely it is desired to conduct a more elaborate series of tests where the load can be accurately controlled and measured.

The method of adapting the ditching machine engines to use kerosene is shown in the accompanying sketch. M is the original muffler fastened to the engine by the exhaust pipe E, B is the original mixing bowl or chamber, C the original carbureter body which is bolted to the engine at the intake port, V is the original needle valve for admitting fuel to the mixer bowl, AJ is an air jacket which we had built around the original muffler, making a ½-inch air space to which air is admitted through holes at the top of the jacket, those farthest from the outtake being largest and those nearest being smallest. The total area of these holes is the same as the area of the hot air pipe HA. EJ is an exhaust jacket



Section of Carburetter, Muffler, Gasoline and Coal Oil Tanks Showing Device for Using Coal Oil as Fuel in Ditching Machine Engines

built around the original mixer bowl and held in place by being bolted between the carbureter body and the mixer bowl. T is a small tank 10-in.x 4-in.x½-in., through which the kerosene must pass on its way to the needle valve. To distribute the flow through the entire tank there is a partition across it near the inlet and perforated with very small holes. The exhaust jacket EJ is connected by a two-inch pipe EP to the exhaust pipe E so as to bring about half of the exhaust down around the mixer bowl and the heater tank T. The pipe P allows the exhaust to escape after heating the mixer bowl and tank. As the oil takes several minutes to pass through T it is thoroughly hot, even boiling if desired, before passing through V into the carbureter. In the hot mixer bowl it meets with hot air brought from the air jacket around the muffler, thus producing the best possible conditions for evaporation. A valve is placed in both the exhaust pipe and the air pipe so that the supply of both exhaust and air can be adjusted. The best valve for this purposes is a "quick opening" angle radiator valve. WP is a water pipe with pet cock through which water is admitted drop by drop to the mixer bowl where it mixes with the air and oil vapour. It is necessary to provide a drainage pipe D with pet cock leading from the mixer bowl, so that any excess water may be drained out, e.g., in case the water might be accidently left running while the engine was stopped and flood the mixer bowl.

The reason for having the water is as follows: Considerable carbon (soot) is produced in the cylinder when kerosene is used, and this if not removed collects in a hard layer on the spark plugs and in the cylinders, the former causing the engines to miss fire, and the latter, when the layer is thick enough to become red hot, firing the engines too soon, thereby producing a sort of pounding known as a "carbon knock" and reducing their power. To remove the carbon a little water is constantly admitted into the mixing chamber drop by drop. This keeps the carbon soft so that it is expelled with the exhaust. Two of the private engines in the above comparisons had to be cleaned only once during the entire season. The third had to be cleaned three times. Either too little water was admitted to remove the carbon, or too little air or heat, or both, thereby producing more carbon than there should be. The College engine, although not in urgent need, was cleaned once when some repairs were being made.

If one were constructing an equipment after the plan outlined there are a few practical points that would help. The exhaust jacket and the tank T are both made of sheet iron. No soft solder should be used, for everything becomes so hot that the solder melts. The tank T should be acetylene welded, flange couplings being welded on to take the inlet and outlet pipes. The exhaust jacket may be either acetylene welded along the side, or rivetted, or fastened with short stove bolts placed close together. The ends of the exhaust jacket are made by cutting a piece of sheet iron one inch bigger each way than required and then turning a ½-inch flange all round. By means of this flange the ends are bolted in by short stove bolts as shown in the cut. They should not be welded or rivetted in as it may sometime be necessary to take the mixer bowl out of the jacket. The hot air pipe HA must be securely fastened to the mixer bowl B. This may be done by drilling and tapping it, and screwing the pipe into the hole, or a flange coupling might be fastened to the top of the mixer bowl. The exhaust pipe EP is shown in the cut as being tapped into the right-hand side of E and entering the exhaust jacket at the end. This was for convenience of illustration. As a matter of fact EP taps into the face of E, comes straight out toward the reader, then down and enters the side of the exhaust jacket. The drainage pipe D in reality came out of the side of the jacket instead of the end. The air jacket was made open on one side so as to slip down over the muffler, the edges at this open side being turned out, with holes drilled through them in places. When the jacket had been slipped down into position bolts were put through the holes and the two edges drawn tightly together as the nuts were screwed on.

When starting the engine with this equipment the tap in the kerosene pipe is closed and that in the gasoline pipe opened. This allows the gasoline to go direct to the needle valve without traversing the tank, and permits the kerosene to remain in the tank to become heated. In a few minutes these taps may be reversed, when the warm kerosene from the tank instantly comes into use.

To those not familiar with engines this equipment may seem complicated, but it is all quite simple to gasoline engine users. It cost about $45 to make these alterations on each machine, and they paid for themselves in from three to four weeks running. Now that the method is fully worked out the price could doubtless be considerably reduced.

While the exact lay-out shown in the cut is for Buckeye Traction Ditcher engines yet by applying the principles set forth most engines can be adapted to use kerosene successfully. By means of a little ingenuity together with the assistance of a good tinsmith, the details can be modified to suit the construction of different engines. Where the gasoline is supplied by pump-feed the heater tank should, if possible, be placed between the constant level tank and the carbureter. If this cannot be done it may be feasible to heat the constant level tank itself, but this is somewhat wasteful of heat, as the excess oil which flows back to the main tank would carry some heat with it, and the full effect of the heating device would not be obtained until the fuel in the main was heated to the same temperature as that in the auxiliary tank. If neither of these suggestions suits any particular engine then the oil must be heated before it reaches the constant level tank. This is open to the same objection as the second method.

Heating the oil, heating the air, heating the carbureter are all methods that have been employed before, but we have not been able to locate any device embodying the three. We know of a number that heat the oil, either by coils in or around the muffler, or by a heater tank with exhaust passing around it. Some heat the carbureter with water from the water jacket, in which case the highest temperature possible for the oil is that of boiling water, viz. 212°, and that is seldom or never reached, for when the water boils the engine soon becomes overheated and must be stopped. For kerosene we should have about 350° And many heat the air or part of it. Some combine two sources of heat. In cases where it takes considerably more kerosene than gasoline for the same work we would judge from our experience that insufficient heat is being used.

Of interest in this connection would be the table of comparative data we have worked out for gasoline, "engine fuel" and kerosene, in each case for a well known brand.

The second column shows the specific gravity or comparative weights of the liquids; it will be seen that in weight engine fuel is intermediate between gasoline and kerosene, and this applies to most of the other properties as well. The third column shows that these fuels are nearly twice as easy to heat as water. The fourth shows the number of calories of heat required to heat one gram of each from freezing to its general boiling point. The fifth gives the amount

Properties of Gasoline, Engine Fuel and Kerosene (Fahrenheit).

Fuel	Specific gravity at 63° F.	Average specific heat from freezing to general boiling point.	Heat required per gram up to general boiling point.	Latent heat or heat required to turn 1 gram into vapour.	Notes on boiling point			
					First condensation on inside of flask.	First bubbles of vapour.	General boiling point.	Highest boiling point noted.
Gasoline	.7327	.5161	41.20	86.68	77°	113°	176°	302°
Engine Fuel	.7963	.5394	83.07	82.64	124°	185°	338°	410°
Kerosene	.8037	.5384	96.91	82.26	140°	212°	356°	419°

of heat required to turn one gram of the liquid at boiling point into vapour. This is about the same for the three, and in the case of engine fuel and kerosene almost as much as to heat each from freezing to its general boiling point. This shows why heating the fuel alone is not sufficient. An engine using 12 gallons of fuel per day burns about 73 to 80 grams per minute, depending on which fuel is being used. In the case of kerosene this requires heat at the same rate as would be necessary to heat a pint of water from freezing to boiling in seven minutes, or one-seventh of a pint in one minute. If insufficient heat is applied to vapourize the kerosene before entering the cylinder, and the heat of the cylinder and explosion is not sufficient to complete the vapourization during the "power stroke" then the unused portion is expelled as liquid globules and may be vapourized in the hot muffler. When this vapour reaches the air it produces the "blue smoke" so often seen with kerosene—it is not smoke in reality but the vapour condensing and forming a cloud as water vapour forms a cloud above the teakettle. When the kerosene is thoroughly vapourized and all burned there is very little smoke indeed. The last four columns deal with the boiling point, and show very plainly the reason for the great difference between the behaviour of the different fuels. In this gasoline general boiling occurred 36 degrees below the boiling point of water, and so vapourization can be complete in cylinders as ordinarily cooled, especially if part or all of the air is heated. But with the other two fuels the vapourization requires a temperature so high that it is not available unless special heating devices are used.

Gleanings from a Summer's Work

By J. H. Kezar, '19.

AT the Ottawa Experimental Farm, the division of "Forage Plants" offer an excellent field of endeavour for the prospective "Ag. option" student. This department is comparatively small and one therefore comes more in contact with the heads of the different departments than is possible in the larger divisions where so many foremen and sub-foremen hold sway.

The work at the first of the season includes a great deal of hoeing. This is work that after a time becomes monotonous and lacks somewhat in instruction, but still, to become a master-hand at the art of hoeing is no mean accomplishment. As the ground dries up the work takes on a more hurried but yet a more interesting aspect.

The spring of 1916 was so wet that some of the fields could not be planted till after the first of June. So with the planting of mangels and corn delayed until time to plant turnips there was a great rush of cultivating, harrowing, ridging, and planting for about 3 weeks.

During the season of planting a little observation on the part of the worker was rewarded by seeing how the land can be best prepared and the seed best sown for the hoed crops as regards tillage, implements used, amount of labour required, and also the character and distribution of the different types of seed.

When the root crops were of a sufficient size they were all singled out to from 8 inches to 10 inches apart. Here again was proven that proficiency in the art of hoeing can not be acquired in a day.

During the wet days in the spring there was plenty of indoor work to be done. Some hundreds of pots had to be planted with single seeds of special varieties of grasses, legumes, and roots, the result of plant breeding work. Another indoor job was the painting of labels to be placed on plots. This had the advantage of familiarizing one with the names of the leading varieties of various forage crops.

Hay-making was dabbled in when the plots of alfalfa and clover were cut for the first time, prior to being left to produce seed. Here it was possible to note the stage of development at which these crops are cut, and also see approved methods of curing hay put into practice.

The grasses are all grown in hills 3 feet apart; each hill containing one single plant which has been started in a pot as previously described. As soon as the first bloom appeared on these grasses plant breeding work was started. The most desirable individuals were selected and isolated by the use of cotton frames placed over them. These frames were left until the seed was well set and then, being sure that each plant was self-fertilized, the frames were removed to allow the seed to mature properly.

It has been found that by following this system of selection and self-fertilization that very superior individuals of the different varieties of grasses can be produced and thus the standard is being raised greatly.

A similar process was carried on with alfalfa. The nature of its structure demands that each blossom be given individual attention. A little flat stick about the width of a match is made. With this instrument the breeder must touch the keel of each blossom thus causing the stamens and pistil which are enclosed in it to be liberated thus pollenizing the stigma. The results with alfalfa are fully as successful as with the grasses as far as improvement of type of plant is concerned but continual self-fertilization seems to weaken the power of the plant to produce seed.

The growing of field roots for seed had quite an important place in the work of the division and several experiments were carried on in this line. For example: During the summer of 1915 some mangels were planted in July, and were allowed to grow quite close together. As a result they did not obtain much growth. These small roots, called "stecklings" were stored in a pit over winter and in the spring of 1916 were planted beside some full grown roots to produce seed. It was found that these "stecklings" produced nearly, if not quite, as much seed as the full sized roots. Some of the advantages of using stecklings are, first, if for some reason the first crop of roots were a failure, these could be planted late and used the following year to produce seed. Second, in producing roots for seed production, a great many more stecklings than large roots can be grown per acre.

The experiment carried on with mangels and turnips were principally variety tests. Generally speaking the "Good Luck" swede and the "Yellow Intermediate" mangel gave best results.

Many forage crops were tested out. Two of these were: "Silver Beet," and "Sainfoin."

Silver Beet is a plant almost identical with Swiss Chard. It was tested in comparison with "Dwarf Essex" rape and at the first cutting it was found to yield 1½ times as much by weight as the rape.

Sainfoin is a leguminous plant, not unlike alfalfa in appearance. It produces an abundance of seed but as forage crop is much too coarse.

Our summer's work ended with the harvesting of the mangel seed about Sept. 1st.

THE FARM OF TO-DAY

We'bathed the bossies' tootsies, we've cleaned the rooster's ears;
We've trimmed the turkey's wattles with antiseptic shears,
With talcum all the guinea hens are beautiful and bright,
And Dobbin's wreath of gleaming teeth we've burnished snowy white.
With pungent sachet powder we've glorified the dog.
And when we have the leisure we'll manicure the hog!
We've done all in our power to have a barn de luxe.
We've dipped the sheep in eau de rose; we've sterilized the ducks.
The little chicks are daily fed on sanitated worms,
The calves and colts are always boiled to keep them from the germs,
And thoroughly to carry out our prophylactic plan,
Next week we think we shall begin to wash the hired man.

—James J. Montague.

THE OAC REVIEW

ODELL

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EDITORIAL:

The Short Courses.

One of the most important features of the work of the O.A.C. is the short courses. How many of us have paused to consider its importance? These courses are serving the farmers of Ontario in a different manner than does our regular four year course. By this we only mean that they are put on during the winter months when the work on the farm is not hurried, and the length of course is such that the expense in coming here is not great. Attendance at these courses go to show the farmers' increased appreciation.

During the past four years there has been an enrollment of 1,648 students for agricultural short courses only, not including the enrolment of teachers for the summer school, while during the same period there was an enrolment of 1,570 in the regular four year course. This is important when we consider that each year brings to us nearly all new men in our short courses, while in the longer courses many names are counted four times. Further more we notice that the war has decreased only very slightly the attendance at these short courses while our freshman class this year is not one-third as large as that of 1913, the year preceding the outbreak of hostilities. The reasons for this may be, first, that those who can find time to take the regular course are in a better position to go to the front than are the farmers' sons who are doing their bit by way of producing food stuffs, and secondly, a large portion of every freshman class cannot claim to be truly farmers or farmers' sons. This year 38 per cent. of the freshman's class belong to this division. While a hasty conclusion may lead us to believe that the regular four year course is not catering to the wants of the farmers, it is not so, but is simply an evidence of the ever increasing interest in Canadian agriculture, and we may rightfully expect to see a further check to rural depopulation which was so important a few years ago. It is interesting to note that figures show that rural depopulation so far as our province is concerned stopped two years ago and after the war we shall surely see a great movement of people back to the land.

The Physics department this year is carrying on a new short course in drainage work, a fact very gratifying indeed, as much work in underdrainage is done each year in this province, and education of the farmers in this particular line is necessary in order for them to appreciate and fully understand the work done by experts when sent out by the department.

Another excellent course in Business and Marketing was inaugurated this year and the attendance of short course students at these evening meetings showed plainly their appreciation. What we want then is more short courses where the practical and theoretical knowledge of scientific agriculture may be given to those who are so deeply interested in this subject.

38th Annual Meeting Of The Ontario Agricultural And Experimental Union.

Perhaps the greatest lesson driven home to members of the Union was that of preparation for this year's crop. Owing to the unfavorable season last year there will be a marked shortage of seed, especially of oats and potatoes.

In another place in this issue an article by G. H. Clark, Seed Commissioner, appears in which he warms the people to be very careful in selecting their seed oats. An explanation of the classification of western oats is given and their chief objections stated are:—first, abundance of weed seeds, especially wild oats; second, the mixture of a vast number of poor varieties of oats; third, low germinating power of frozen or otherwise injured seed. He advises the use of home grown seed if at all possible in order to avoid these faults and so preserve the reputation which the O.A.C. 72 oat has made for itself in this province.

Potatoes for Seed was very fully discussed by Prof. Zavitz, Prof. Jones, Andrew Elliott, F. C. Hart, and many others. The census of opinion was that Ontario, especially Muskoka district, is very suitably situated for the production of high grade potatoes. The members were cautioned regarding diseases, methods of treatment and marketing of the crop. There should be an ample supply of seed however as the crop in the Maritime provinces was last year quite up to the average. A very important matter to attend to is the arranging for seed during the winter months and not leaving it off until seeding time.

Our Next Issue.

The March number will be a special on Rural Improvement. This is the first of a number of special issues which we hope to publish during the year. Owing to this fact articles on hand not pertaining to the subject will have to be held over until a later date.

ALUMNI

The Annual Reunion and Banquet of the Ottawa Valley O.A.C. Alumni Association, was held in the University Club Rooms, Ottawa, on the evening of January 17th, 1917. As in former years, the gathering was a unique success. Some thirty-five graduates and under-graduates were in attendance and a most enjoyable and profitable time was spent.

A feature of the evening's entertainment was a two-minute speech from each member present, telling briefly where located, and the nature of the work engaged in. This was indeed a successful experiment and served to make each other acquainted with the work being carried on by the various O.A.C. men present.

Among the guests of the Association were Dr. Jas. C. Mills, Ottawa, and ex-President of the O.A.C.; W. J. Rutherford, Dean of the College of Agriculture, Saskatoon, Saskatchewan; W. J. Black, Commissioner of Agriculture, Ottawa. Each of these men brought a message to the members present and related many instances of the success being gained by O.A.C. men throughout the Dominion of Canada.

The members of the Association who were in attendance are as follows:

Dr. Jas. C. Mills, Ottawa.

W. J. Rutherford, Saskatoon.

W. J. Black, Ottawa.

G. H. Clark, Seed Branch, Ottawa.

T. H. Mason, Live Stock Branch, Ottawa.

T. G. Raynor, Seed Branch, Ottawa.

W. Squirrel, O.A.C., Guelph.

R. Craig, Commission of Conservation, Ottawa.

F. C. Nunnick, Commission of Conservation, Ottawa.

R. J. Dickson, Forestry Branch, Ottawa.

W. L. Graham, G. Rothwell and A. J. Logsdail of the Experimental Farm, Ottawa.

A. E. MacLaurin of Macdonald College.

R. S. Hamer, Live Stock Branch, Ottawa.

M. Winter, District Representative, Renfrew, Ont.

A. P. MacVannel, District Representative, Picton, Ont.

J. E. McRostie, District Representative, Kemptville, Ont.

F. C. McRae, District Representative, Norwood, Ont.

W. M. Croskery, Kinburn, Ont.

Harry Sirrett, Brighton, Ont.

W. D. Jackson, District Representative, Carp, Ont.

W. G. Parker, Winchester.

J. Miller, Editor, Canadian Countryman, Toronto.

G. G. Bramhill, Experimental Farm, Ottawa.

G. H. LeLacheur, Seed Branch, Ottawa.

C. Hamilton, Seed Branch, Ottawa.
W. J. Lennox, Seed Branch, Ottawa.
J. S. Delahey, Renfrew, Ontario.
E. D. Eddy, Seed Branch, Ottawa.

In addition to the foregoing O.A.C. men, Messrs. F. E. Buck of the Experimental Farm, Ottawa, and E. S. Rhoades, of the Live Stock Branch, Ottawa, were present as guests of the Association and as representatives of Macdonald College.

The officers appointed for the ensuing year were:

Honorary Presidents: Dr. Jas. C. Mills, Ottawa, and Dr. G. C. Creelman, O.A.C., Guelph.
President: T. G. Raynor, Ottawa.
Vice-president: W. J. Black, Ottawa.
Secretary-treasurer: W. Dawson, Ottawa.
Committee: Geo. H. Barr, E. D. Eddy and Geo. Rothwell, Ottawa.

J. A. McArthur '17.

J. A. McArthur '17, not being averse to travelling, wandered some 400 miles north of Edmonton, Alta., and is now manager of a large farm at Spirit River, owned by Mr. J. D. McArthur, President of the E. D. and B. C. Railway. This farm is situated in the heart of the Peace River District, and it is the intention of the owner to make it a model farm in every respect. The past summer was spent in fencing, the erection of modern buildings, and the breaking of some 300 acres. Mixed farming in all its branches will be followed, and under the able management of Mr. McArthur gratifying results will be obtained. Mr. McArthur has purchased a farm near-by and works it in conjunction with the larger farm. We wish him every success.

Mr. Bell, an O.A.C. graduate whose article appears in this issue is well known to many of the Review readers. He was first, Assistant and Experimentalist with Prof. Zavitz, later, Assistant Professor of Farm Crops, Iowa State College, later still, Professor of Agronomy, University of Maine and last, in charge of the educational work of the Soil Improvement Committee of the National Fertilizer Association, Chicago, U.S.A.

G. Whitting '15 of Edgeley, Saskatchewan is in the Transport, 196th Battalion, London, Eng. Pte. Whitting, after leaving the O.A.C., attended a college in Saskatoon where he secured his engineer's diploma.

Captain Alfred Eastham '09, machine gun officer of the 6th Brigade has been awarded the Military Cross.

Lt. Cecil A. Webster has been heard from recently. Lt. Webster is in the Imperial Army and has seen a great deal of the hard fighting since July 1st, and so far remains unhurt.

J. P. Hales '15 is now at the Royal Naval Depot, Crystal Palace, Norwood, S.E., completing his course of training for the Royal Naval Air Service. Playford finds the work very strenuous but intensely interesting.

Wm. H. Hill '16 is now fully settled in the Laboratory of the Inland Revenue Department, 317 Queen St., Ottawa. Bill states that, although it is rather early to pass any judgment on the work he has to do, the present indications are very favorable indeed.

Higman and Grover Whittingham both of year '15 have enlisted for overseas service.

Athletics

The Art of Swimming.

G. H. Unwin, B.S.A.

Swimming has furnished a theme for many writers, ancient and modern.

The oft-told tale of Hero and Leander, from the Greek of Nuisaeurs, has been retold by Ovid, commented on by Virgil and immortalized by Marlowe. Lord Byron went so far as to emulate Leander's feat by swimming the Hellespont, a piece of bravado fully as absurb as the modern craze for "Marathons." But then it was Byron who did it. Again we have constant references to the custom prevailing among the Romans, of swimming the Tiber in flood. Most readers of Shakespeare are familiar with the passage from Julius Ceasar, where Cassius recounts his strength:

"For once, a raw and gusty day,
The troubled Tiber chafing with her shores,
Caesar said to me: 'Dar'st thou, Cassius, now
Leap in with me into this angry flood
And swim to yonder point?' Upon the word
Accoutred as I was, I plunged in
And bade him follow: So indeed he did.
The torrent roared and we did buffet it
With lusty sinews, throwing it aside
And stemming it with hearts of controversy."

Modern writers have taken up the subject in detail. Text-books on swimming are numerous. Articles in magazines, life-saving societies, aquatic clubs, all these are tending towards a greater general enthusiasm for this sport.

What saner or more rational form could the athletic mania assume? Indeed it is doubtful whether any one sport contains so much physical benefit, enjoyment, and practical value. Swimming has the advantages in that it developes all muscles equally and none abnormally. The runner developes his legs, the gymnast his arms and shoulders, the fencer and tennis-player each develope one fore-arm far in excess of the other. Foot-ball, hockey, and lacrosse are games in which most parts of the body are brought into play; but they can only be played for a short period during life and they frequently leave a man disabled or disfigured. Rowing again, is a fine exercise, but the effort of a race is enormous, and many leave this sport with weak hearts or other symptoms of over strain. The swimmer however can pursue his pastime for many years, moderating it to his physical condition; he requires no elaborate equipment, no expensive apparatus —enough water to keep him off the ground, voila' tout. As an exercise swimming is one of the best; it develops a man uniformly, gives him strong lungs and renders him hardy and indifferent to exposure.

Then as to the pleasure of swimming. It is grafted in the race of men. How many times have we braved the maternal wrath to slip down to the swimming pool? What hours of anguish have we spent waiting in vain for our hair to grow smooth and our eye less bloodshot before we returned to the parental roof? The boy who knows not the joys of a stolen dip is to be pitied. The man who has never swam "down the path of the rising sun," on a crisp, clear morning, has missed one of the joys of living which Browning is so fond of talking about:

"Oh, the wild joys of living! the leaping
from rock up to rock,
The strong rending of boughs from the
fir-tree, the cool, silver shock
Of the plunge in a pool's living water."

—To those unable to swim these rhapsodies may seem absurd. To them, water is always extremely wet and often unpleasantly cold. Their first attempt to swim seems to consist of much taking in of cold water, by nose and mouth, of stopped up ears, of hair that will not be comforted, of eyes that smart. However, nothing is worth having that comes without effort, and the reward is certainly worth while. When we come to think of it the very sensation of floating in any surrounding medium, of hanging suspended above the earth is fascinating. The same impulse makes it one of the chief ambitions of man to fly. The same feeling has caused men in all ages to break their necks trying to emulate the birds. Think of it. We can get a part of the pleasures of aerial navigation without any of the risk!

As to the utility of swimming, it is obvious to the smallest intellect. Drowning claims a large percentage of the roll of accidental deaths and many of these accidents would be prevented by even a slight knowledge of swimming. Many a man has gone down to death within a few feet of safety, struggling and gasping, impotent for lack of the knowledge to make a few simple movements. This is a practical age, an age in which we are constantly making provision against possible happenings. We insure against accidents by land and sea, from fire and water, earth-quake or train-wreck. Yet we neglect the simplest, cheapest and most satisfactory insurance against death by one at least of these dangers. Truly this seems the very acme of human inconsistency. Should not this be part of every child's training? The aim of education is surely to fit a man for all emergencies, to make him prepared on all points, to aim him for the struggle of life. Swimming should certainly be part of every man's physical training. As an exercise it is inferior to none, as an amusement it is equal to any, as a useful accomplishment it is superior to all branches of athletics.

There is neither time nor space to discuss here the various technicalities of swimming, the different strokes, their merits and defects. Besides such a discussion would be excessively uninteresting to all except the few who are experts. It may be of interest, however, to mention a few names connected with the history of aquatics, a few of the feats which stand out as wonders of strength and p uck. Roughly we may divide swimmers in two classes, speed-swimmers and deep-sea swimmers. By speed-swimmers I mean men who swim distances from a hundred yards to one mile in smooth water. Strictly speaking a mile is a long distance race, but the man who swims a mile in calm water at a good pace, is not necessarily the type of swimmer who can go out when the big combers are coming in ten, fifteen, twenty feet in height in regular succession, swim a mile out and back for the fun and make good time in the bargain. This latter art can only be possessed in perfection by men born and brought up on the coast, men wedded to the ocean by generations of ancestors, to whom navigation is a sixth sense, and the sea a kindly mother.

It is evident that in the branch of speed-swimming we can do a great deal better than our fathers. This of course is only natural, in view of the popularity of swimming as a sport, and in consideration of the systematic way in which that sport is now taken up. The performances of C. M. Daniels, of New York, champion speed swimmer of the world, would make our grandfathers "sit up and take notice." Many other names have become familiar in recent years. Kieran, Beaurepaire, Healy, of Australia, and Taylor of Chadderton, England, world's champion for distances between a quarter of a mile and one mile. The following table shows the marked improvement in speed-swimming, made between 1887 and 1908:

Distance	Old Record.	Record 1908.	Name.
100	1— 5¾	55 2-5	Daniels
202	2—54¼	2—34	Malway
440	6—21½	4—39 2-5	Beaurepaire
500	7—58	6—14	Taylor
880	14—17½	11—25	Taylor
1 mile	28—19¾	25— 4 3-5	Taylor

In 1907 Taylor also held the 440 yard championship with a record of 4 minutes, 43 seconds. The following year Beaurepaire, of Australia, lowered this mark by 3 3-5 seconds. Compared with the old record of 6 minutes, 21½ seconds, this is a wonderful performance. Since 1908, I believe several of these records have been broken.

The art of deep-sea swimming is one which is not within the reach of all. To those who have opportunities it affords a delightful pastime and also is a most useful accomplishment. To those readers who have access to back numbers of periodicals I would mention an excellent article which appeared in "Country Life in America," July, 1910. In this article the author, himself a member of the U.S.V. Life Saving Society, gives some first-hand information on the subject of swimming in rough water. Anyone who has lived much near the sea or on the shores of the great lakes, will know the pleasure of rising over the crest of the oncoming wave, or slipping through and gliding down the opposite slope of a big comber. It is a pleasure which must be experienced to be appreciated, and one almost impossible to describe in so many words.

In this connection it is not out of place to refer to Captain Webb's historic channel swims. Webb did not as some have stated, use a belt nor any kind of appliance. A curious incident occurred in the early part of his swim. A number of porpoises, evidently attracted by the smell of the porpoise grease with which the Captain had covered himself, surrounded Webb and solemnly accompanied him several miles on his journey. The swim itself is thus briefly described by a biographer

"A few seconds before one o'clock in the afternoon, Webb dived from the Admiralty Pier at Dover, and swimming on through the night by a three-quarter moon, reached Calais at 10.40 a.m. next morning (25th August), having been immersed for nearly twenty-four hours and having swam a distance of about forty miles, without having touched a boat or artificial support of any kind."

Of sixty attempts to swim the channel Webb's is the only successful one, though some have come very near accomplishment. On September 14th, 1908, Wolffe actually succeeded in getting inside Calais Pier, when he rolled over exhausted. Holbein, Meaous and Burgess have made plucky attempts. On one occasion Burgess was in the water 22¾ hours, during which, with swim and drift, he covered sixty miles.

There are innumerable stories of heroism and endurance connected with the sea. Their name is legion. But I have written enough, on a subject of but small interest to the majority of readers of this journal. If these disconnected scribblings have interested anyone to the extent of making him learn to swim, then they have accomplished much.

HOCKEY.

The hockey season opened at the college on Monday, January 22nd, when the Seniors and Juniors clashed in the first game of the inter-year schedule. Rooters showed the interest they intend to take in the coming games by their large attendance, and gave the new arena its "baptism" of hoots and yells which a body of students seem so capable of giving.

The game was "fast and furious," but mostly "furious" because the players seemed bent on playing the puck too much; except at certain periods they played the man and as a result got a minute on the fence.

Both teams showed some excellent material and fine individual work. McKenzie of the seniors is a perfect wizard with a stick and only by close checking was he kept from scoring. MacDonald of the third year also did some spectacular work; no wonder! Imagine a Scotchman over six feet tall and weighing around two hundred pounds coming down the ice at a 2.10 pace. Who wouldn't get out of the way?

The first fifteen minutes' play was about even. MacDonald got through and made a net, then McKenzie did an individual "stunt" and found the junior's net. "Rusty" Zavitz tried to stop Michael with his stick, and so had a minute's rest by the boards.

In the second period of play, the juniors forged ahead. Gandier made a lone rush and found the second net. This seemed to waken the seniors up and they made repeated rushes into the third-year territory but Richards did some expert goal-tending and stopped all coming his way. MacDonald and Newton finally got the puck and tried a little combination on which MacDoald scored again, finishing the period with a score of 3—1.

The last period was furious for a short time only, namely because of the fresh players being used by both teams. McKillican and Gandier had a head-on collision, through which the former hit the ice hard and the latter received a minutes' rest on the side. The third year kept the puck in the senior's territory continually and finally Newton passed to Gandier from the corner and the final score was made, ending the game 4—1 in favor of the juniors.

Mr. Iveson refereed to the satisfaction of all.

College Life

THE CARNIVAL.

With the lights burning bright, the
  arena a' glitter,
To the strains of the band, and the
  swift forms that flitter,
To the skir of their skates on the
  smoothest of ice,
When the lads they are jolly, the
  maids they are nice.

The new O.A.C. Arena was formally opened on Monday evening, Jan. 15, by a Fancy Dress Carnival. The night was clear and crisp, the ice smooth and glistening, and the music was all that could be desired; in fact everything tended toward making it a grand success.

The skaters presented a weird yet pleasing appearance in their various costumes as they whirled round and round the rink to the strains of the orchestra. The costumes varied greatly, running all the way from the gorgeous to the grotesque. The usual number of Hoboes, Coons and Clowns, were on hand and mingled freely and unabashed, among the Lords and Ladies; especially among the Ladies.

Professors J. W. Crow and D. H. Jones and Miss Cook, acted as judges for the evening. After great deliberation they presented the awards as follows:

Best Ladies' Costume—Miss Dorothy Day—Indian Queen.

Best Gent's Costume—S. R. West—Prince Charming.

Best Hard Time's Costume, Ladies'—Miss Margaret Creelman.

Best Hard Time's Costume, Gent's—H. J. Sullivan.

During the evening a booth conducted by the ladies of Macdonald Hall, in aid of the Red Cross, was largely patronized, a dainty little luncheon being served.—R.G.M.

LITERARY MEETING.

Juniors vs. Seniors.

With feelings of great joy and anticipation we assembled in Massey Hall on Saturday evening, Jan. 20, to enjoy an evening's entertainment, provided by the Union Literary Society. It was the initial meeting of the term and we must take this opportunity to congratulate the new president, Mr. Austin for the provision of so acceptable a programme. When the peals of music burst forth from the College Orchestra an eye witness could have observed feelings of wonder and intense enjoyment gleaming in the countenances of the audience. Feelings of enjoyment because of the charm of the music, and of wonder because they suddenly recalled evenings spent at the Grand or Royal Alexandra and wondered if it was again their good fortune to listen to such music.

One of the main features of the programme, however, was the inter-year debate between Messrs. A. B. Macdonald and L. G. Heimpel of the junior year and Messrs. W. G. Marritt and O. McConkey of the senior year. The subject under discussion was: Resolved: "That rural depopulation in Canada is due, to a greater extent, to economic than to educational conditions."

The affirmative argued, that from an economic standpoint farming failed to entice the young men and women of the present; that the middleman got away with a larger handful than he was meant to have by the size of the neck of the jug; and, that the manufacturing centres of to-day offered a better chance of investment than did agriculture. The negative from the tone of their addresses would have us believe that the children of our rural schools must be educated how to "raise eggs and feed chickens"; that the average young man must have a better business education, and, in short, that a broader education will be "the cure-all and the end-all here."

By this time, the audience was beginning to look wise and to conjure up a few facts in their own minds and to deduce a conclusion as to whether they could live more peacefully in the "fuller life" of the country or cast their lot with the toil and turmoil of the business city arena. The climax in their reasoning was almost reached when the sweet sound of a piano solo by Miss G. Martin resounded through the hall. This was immediately followed by another much appreciated number when Miss E. O'Flynn rendered a vocal solo.

The assembly, with the sound of the vocal solo still ringing in their ears were anxious to hear the verdict pronounced on the debate by the judges, Dr.

Stevenson, Mr. J. P. Sackville and Mr. A. MacLaren. Dr. Stevenson acted as critic and after a few well placed criticisms gave the decision of the debate in favor of the negative. The orchestra again rendered a selection with the same "old-time pep" and the meeting closed with the singing of the "national anthem."

A scientific explanation of the warm atmosphere which seemed prevalent in the room might be that the hurried words of Mr. MacDonald produced an increased motion of the molecules and hence heat resulted. Whatever may be the cause it would be a good policy to have a little better ventilation of the room next time.

Skating Party.

The Freshmen Red Cross Skating Party held in the college arena on Jan. 23rd, was a great success, socially and financially. The weather was ideal, the ice perfect, the band second to none and the girls—Oh! My!

Programmes were supplied to every person entering the rink and great was the confusion in the girls' section of the dressing room as the "fussers" arranged their bands. Practically every O.A.C. student who attended was accompanied by a fair companion, and consequently the "wall flowers" were few in number. As usual a few mix-ups occurred in getting the right person for the right bands, but thanks to the programmes they were not numerous. At eight o'clock the first band started, and rather contrary to the usual state of affairs every person was ready to skate. The reason this happened was owing to the fact that the party had been advertised to start at seven-thirty.

One good feature of the party was that it provided an opportunity, for many of the more bashful freshmen, to accompany a young lady to a social function for the first time since coming to the college.

Every year was well represented, and Macdonald Hall needless to say, furnished the greater number of the fair sex. The crowd, including also many from the city, numbered in the neighborhood of two hundred and fifty.

Refreshments which were prepared by an excellent caterer from downtown, were served from nine to ten o'clock, but somehow or other every person seemed to come to dine at the same time. owing to the small space and the eager desire of the hungry skaters to satisfy that inward craving, an odd cup of coffee was spilled, but otherwise no damage was done. Refreshments were abundant and ample justice was done by all to them.

At ten o'clock Cronk's band played the fourteenth selection followed by the National Anthem with which the party closed, and on all sides could be heard expressions of the enjoyable time they had spent.—W.C.H.

Smoker.

A Canadian evening was held at the Cosmopolitan Club on Friday, Jan. 19th. Like most of the evenings of this nature, everything was quite informal. A number of tables of four were made up, and games played. Billiards and pool attracted many. Some preferred to sit and chat, others to run the victrola, or play the piano. A number of old songs were sung as also many of the new ones.

During the evening those who were most familiar with Canadian life in East and West gave interesting descriptions of some of the phases of Canadian life, not common to the average person. Western life, especially that of British Columbia, as seen in its pioneer glory, was very well told by Mr. A. H. Tomlinson, who was Assistant Horticulturist for the B. C. Government, and has travelled all over the Province.

The purpose of holding such evenings is to draw the members of the club more closely together in a sociable way, and at the same time get an accurate knowledge of the different parts of our country and the way people live; of how the different nationalities adapt themselves to Canadian life; and their influence on it, and to have a jolly time as well.—P.L.F.

THE SONG OF THE SEASON

Jack Frost is King; the Winter breeze,
Is blowing chill o'er hills and leas,
And whirling flakes form fairy frieze
On hillside roof and grating,
Though Mother Earth is sleeping sound
And Nature, cold, is all ice-bound,
Though heaps of snow lie all round,
Yet Phyllis will go skating.

When night's dark mantle down is thrown
And the evening winds begin to moan,
I call, as pre-arranged by 'phone
And find the dear girl waiting,
Arrayed in sweater, snowy white,
Which well becomes her figure slight,
Depend on it, her costume's right—
When Phyllis goes a-skating.

The last waltz being played, I fear
An end of all this bliss is near;
And now I sadly sigh, "Oh dear!
I'm far from satiated."
Returning home her arm in mine,
I tell her that she's just divine,
To steal a kiss I fondly pine,
Since o'er my heart she skated.

—S, Rupert Broadfoot.

MACDONALD

Initiation At Macdonald Hall.

The predominating color at Mac Hall for the first two weeks of the present term would have cheered the heart of any true son of the Emerald Isle. Huge green bows tied bewitchingly under the chins of the January Freshies were to be seen in the Hall, on the street cars, at the skating rink and on various parts of the campus whither their owners had wandered.

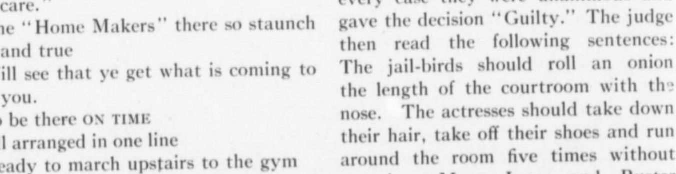
The bulletin board was anxiously watched each day, and on the morning of 18th., after rushing, pushing and jostling, an excited mob gathered around to read these lines:

ATTENTION FRESHIES!

Come to the Laundry ye Freshies bold,
Dressed in the garments ye've been told
At 6.15 assemble there
And rest assured "ye'll be handled with care."
The "Home Makers" there so staunch and true
Will see that ye get what is coming to you.
So be there ON TIME
All arranged in one line
Ready to march upstairs to the gym
Escorted by Homemakers so neat and trim.

In the gym which had been transformed into a courtroom, sat the learned judge, lawyers and jury waiting to seal the doom of the trembling miscreants. In they marched,—Jail Birds, Slum Kids, Italians, Mary Janes, Buster Browns, actresses and a lone Fiji Islander, escorted by a staunch police force. The prisoners were made to kneel in turn in front of the court, while the following various complaints were lodged: going down town too often, flirting with the car conductors, attending too many feeds, pocketing the leftovers, roaming around the halls in the wee small hours of the morning, holding too long and too frequent conversations over the telephone and of too much fussing.

After each accusation the jury adjourned to the inner court room and in every case they were unanimous and gave the decision "Guilty." The judge then read the following sentences: The jail-birds should roll an onion the length of the courtroom with the nose. The actresses should take down their hair, take off their shoes and run around the room five times without stopping. Mary Janes and Buster Browns should dive for a coin in a dish



of flour. The slum kids and Italians were to entertain the spectators by dancing.

Special cases were then brought before the court. Several young ladies were accused of taking the course in Domestic Science for other than educational purposes, namely, with a view to matrimony. After being found guilty they were sentenced to sing several sentimental love songs.

The last case was then brought up. The accusation against the prisoner was that of having too many crushes on the boys of the O.A.C. and as a punishment she was forced to make a proposal to a chair placed in the centre of the room. The manner in which it was done showed a pretty thorough knowledge of the usual procedure in such cases.

The prisoners were then lined up across the front of the courtroom, and took the following required oath:

"We, the Freshies of the January Class of 1917, do hereby swear loyalty and obedience to the Seniors, Juniors and Homemakers 'A' and 'C.' and promise to uphold all the standards of Macdonald Hall and to conform cheerfully to all the rules and regulations pertaining thereto. So help us Emeline Pankhurst!"

Athletics.

As soon as college opened last fall, and the girls got more or less settled, they started to think about sports, and tennis courts were even put into use by people practising for the tournament, which went on during September, October and November.

The second Saturday we were at "Mac," the Annual Girls' Sport's Day was held. The girls had a chance to show the boys what a real game of baseball was like, besides a basket ball game and numerous races.

Later in November the girls challenged the boys to a game of baseball And just think of it, they won 21—9. Of course we will admit the boys were handicapped.

Stunt Night in the gym. was a festive affair. The Junior House-Keepers running away with the prize, for they portrayed, so successfully, what takes place at a Red Cross Field Ambulance Station.

Of course we must not forget the basketball games played in the evenings in our gym. between the different classes. And now too the girls are busy at hockey, and they have the makings of a fast team.

Thus Athletics, as always, take a high place in the life at "Mac." All the girls have a chance to have many a game of fun and all benefit by it.—D.C.

St. Valentine's Day.

"Muse, bid the morn awake,
Sad winter now declines,
Each bird doth choose a mate,
This day's St. Valentine's;
For that good bishop's sake,
Get up, and let us see,
What beauty it shall be
That fortune us assigns."—Drayton.

Valentine's Day is now almost everywhere a much degenerated festival, the only observance of any note consisting merely of the sending of jocular anonymous letters to parties whom one wishes to quiz. The approach of the day is now heralded by the appearance in shop windows of vast numbers of missives calculated for use on this occasion, each usually consisting of a single sheet of paper on which is seen some ridiculous coloured caricature with a few burlesque verses below. More rarely, the print is of a sentimental kind, such as a view of Hymen's altar, with a pair undergoing initiation into wedded happiness before it, while Cupid flutters above and hearts transfixed with his darts decorate the corners. Such is nearly the whole extent of the observance now peculiar to St. Valentine's Day.

At no remote period it was very different. Ridiculous letters were unknown; and, if letters of any kind were sent, they contained only a courteous profession of attachment from some young man to some young maiden, honeyed with a few compliments to her various perfections, and expressive of a hope that his love might be returned. But the true proper ceremony of St. Valentine's Day was the drawing of a kind of lottery followed by ceremonies not much unlike what is generally called the game of forfeits. Misson, a learned traveller of the early part of the last century, gives apparently a correct account of the principal ceremonial of the day. "On the eve' of St. Valentine's Day, "he says, "the young folks in England and Scotland, by a very ancient custom, celebrate a little festival. An equal number of maids and bachelors get together; each writes a true or feigned name upon separate billets, which they roll up and draw by way of lots, the maids taking the men's billets and the men the maids', so that each of the young men lights upon a girl that he calls his valentine and each of the girls upon a young man whom she calls hers. Fortune having thus divided the company into so many couples, the valentines give balls and treats to their mistresses, wear their billets several days upon their bosoms or sleeves, and this little sport often ends in love."

St. Valentine's Day is alluded to by Shakespeare, by Chaucer, and also by the poet Lydgate (who died in 1440). One of the earliest known writers of valentines or poetical amorous addresses for this day, was Charles, Duke of Orleans, who was taken at the battle of Agincourt. Donne, a poet of Shakespeare's time, remarkable for rich though scattered beauties, writes an epithalamium on the marriage of the Princess Elizabeth to Frederick, Count Palatine of the Rhine,—the marriage which gave the present royal family to the throne—and which took place on St. Valentine's Day, 1614.

"Hail, Bishop Valentine! Whose day this is;
All the air is thy diocese,
And all the chirping choristers
And other birds are thy parishioners;
Thou marryest every year
The lyric lark and the grave whispering dove;
The sparrow that neglects his life for love,
The household bird with the red stomacher;
Thou mak'st the blackbird speed as soon
As doth the gold-finch or the halcyon—
This day more cheerfully than ever shine,
This day which might inflame thyself, old Valentine!"

The origin of these peculiar observances of St. Valentine's Day is a subject of some obscurity. The saint himself, who was a priest of Rome, martyred in the third century, seems to have had nothing to do with the matter, beyond the accident of his day being used for the purpose. It is believed that it was the practice in ancient Rome, during a great part of the month of February to celebrate the Supercalia, which were feasts in honour of Pan and Juno. On this occasion, amidst a variety of ceremonies, the names of young women were put into a box from which they were drawn by the men as chance directed. The pastors of the early Christian church, who, by every possible means endeavored to eradicate the vestiges of pagan superstitions, and chiefly by some commutations of their form, substituted, in the present instance, the names of particular saints instead of those of the women; and as the festival of the Supercalia had commenced about the middle of February, they appear to have chosen St. Valentine's Day for celebrating the new feast because it occurred nearly at the same time.—Jean B. Grant.

During the week of January 10th, Macdonald Institute was favored with a distinguished and very interesting visitor in the person of Professor Boys Smith of Otago University, Dunedin, New Zealand.

Professor Boys Smith, is superintendent of the Department of Home Economics of Otago University. She is making a tour of the English and North American Schools of Household Science for the purpose of observing their methods and gathering new ideas for her work at Otago University.

"MUCH ADO ABOUT NOTHING."

Time—11.30 p.m.

Place—Room 234, Macdonald Hall.

Lee—You know, girls, Dr. Creelman says we must not waste our time in idle gossip, so tonight I propose that we discuss matters of national interest.

All—Hurrah! Hurrah!

Betty B.—Say, Shrimpie, do you know that when J.C. was over calling on me the other night he said all the boys thought you were engaged, for you wore a diamond ring!

All—Ha! Ha! Ha!

Shrimpie—Well, girls, I never told you all the circumstances of my engagement, did I? You see he was ordered to report immediately for overseas service. He at once came up to see me, not however intending to tell me of his love for he was too honorable to bind a girl to a man who might return from the front a hopeless cripple. However, the sight of me was too much, his love broke all bonds, and when he departed I was wearing his precious diamond. He does not object to my having a good time with the O.A.C. boys, though.

Laura—Well, I don't think it's any of J.C.'s business. Why don't you turn around Shrimpie and ask him if he's engaged for half the girls in the Hall think he is.

All—Poor Betty!

Glad—By the way, girls, did you hear that I. B. Martin is being sued for breach of promise?

Flynnie—Which one is sueing him?

Glad—Well, it might be Betty, or Florence, or Bessie, or perhaps even Shrimpie here might tell us something about it.

Flynnie—And he attended "The Only Girl," sat seventh row from the front on the left hand side. Too bad he didn't profit from the experience.

Mabel—Too bad Skinner is out of the Co-op. as I'm sure he would have given us our rink tickets for about $2.00.

All—Don't be sarcastic, Mabel.

Laura—He told me the other night that they could get along at the rink very nicely without us.

Betty B.—The horrid man! J. C. Neale doesn't talk like that. He said if the girls went down town to skate he'd go too, especially if I went along.

Lee—Oh, I know the reason the boys reduced the rink tickets—so that the girls won't skate down town for they like to skate with the down town girls.

Marie—Well, that doesn't seem to make any difference for they skate with the down town girls anyway. You know the Saturday the boys flooded the rink so the girls couldn't skate in the afternoon. Well six of the girls went to a down town rink—three sat on the bench, one had two bands, another one, and the other didn't have any but she skated all the time.

Laura—Were any of the college boys there?

Marie—Yes, McConkey, J. C. Neale and Neff were all there. McConkey seemed to be particularly attentive to a down town girl with a purple hat. He had six bands with her.

Betty B.—Say, do you remember the big box of candy Tubby Marritt gave Edith Elliott the night of the Philharmonic Concert? Surely you couldn't forget it for it is the only box of candy ever known to come into the Hall from the College.

Flynnie—No, Betty, you're forgetting. Just before Christmas J. C. sent a box over to be shared by the two Review representatives. I notice it was presented to you though.

Lee—Speaking of J.C. did you ever see him eat a beefsteak? I noticed him in at the Chink's one night. It was the funniest thing I ever saw. First he started at one side then he tried another and another and finally came back to where he had started from in the first place.

Marie—Perhaps he was looking for the germ of a bright idea.

Mabel—Oh, did you know that Husky Evans tried the combination of Houston and Hawkestone for New Year's? He reports that he had a splendid time.

Betty B.—Yes, and Mr. Neale was down viewing the ice-bridge at Niagara Falls.

Glad—Say, Betty, what a funny picture you have hanging up there. What in the world is it?

Betty B.—Why that's a picture of all the O.A.C. men. I have it hanging at the foot of my bed so I can see it the first thing every morning.

Mabel—What a pleasant awakening!

Flynnie—There's DeLong! I can tell him by his chamois gloves and the decoration on his upper lip.

Mabel—You'd wonder at Art. White wearing his bathrobe for a picture like that wouldn't you?

Lee—Here's a conundrum for you! Why does Art. White take a front seat in St. Andrew's Church on Sunday?

Marie—Oh, that's easy! Ask one of the girls in the choir. She'll soon tell you.

Flynnie—It's a good thing Ferguson is there. His red hair sort of brightens up the picture, doesn't it?

Glad—Don't you say anything about red hair. J.C. likes it, doesn't he, Betty?

Laura—Why there's Hugo! The appendage to his upper lip has attained quite formidable dimensions now, hasn't it?

Marie—Goodness! Where's the dictionary?

Monitor—All noise MUST cease by eleven o'clock.

Curtain falls.

Mr. S.—Did you notice that girl we just passed?

Miss I.—The one with blonde puffs and a fur hat and a military cape who was dreadfully made up and had awfully soiled gloves on?

Mr. S.—Yes, that one.

Miss I.—No, I didn't notice her. Why?

Eat, drink, and be merry to-day, for tomorrow you may diet.

Elizabeth—Can you keep a secret?

Jean—Yes, but unfortunately I always tell it to someone who can't.

Junior—What is your favorite quotation from Shakespeare?

Edith E.—"Tu be" or not "tu be."

The Freshmen have long known of the attraction of gravity. Now, however, some of them are discovering the gravity of attraction.

Doc. Reed (To Short Course Students)—Will one of you gentlemen volunteer a criticism of this black horse?

"Shorthorn"—He has a spasm on the left front foot between the elbow and the hock.

Doc. Reed—Evidently you have had more experience with a saw horse than with the living article.

Stillwell—Did you fellows ever hear the story about Sandy McPherson and the minister?

McLaren—I have heard it.

Stillwell—Well you tell it to the gang; you speak the brogue so naturally.

Mr. Graham (marking the register)—Where is Mr. McPhail this morning?

McPhail (absentmindedly)—Sick, sir!

Ed. Atkins—Pass the "cream" and sugar please.

Musgrave (in surprise)—What!

Ed. Atkin—Pardon the mistake, but I'm a kind of optimist anyway.

Pinkey Wallace (to gentleman waiting for a car)—How long since the last car went down town?

Gentleman—I don't know, but according to the time-table one is due now.

Pinkey Wallace—If that's the case we might as well walk.

Dr. Stone—Toward which end does the seed of the circium arvense taper?

Munro (philosophically)—Toward the sharp end.

Prof. Harcourt—What do we often find in water besides Hydrogen and Oxygen?

Mac. Girl—Fish.

Mr. Hunt (to McKenzie, entering "Hort" classroom while lantern slides are being shown)—Come in McKenzie, you're a little late, but we have a seat for you.

McKenzie (peering through the darkness)—Alright, but where's the usher?

It was so nearly a mistake. The Freshette from the South was on the ice for the first time and found it hard to navigate, even though aided by her proficient girl friend. Seeing a man gracefully curvetting over the glassy sheet she exclaimed:

"Oh! I'm going to ask that artist to teach me. He appears to be the skating instructor."

But the girl who had skated there before put her wise, saying:

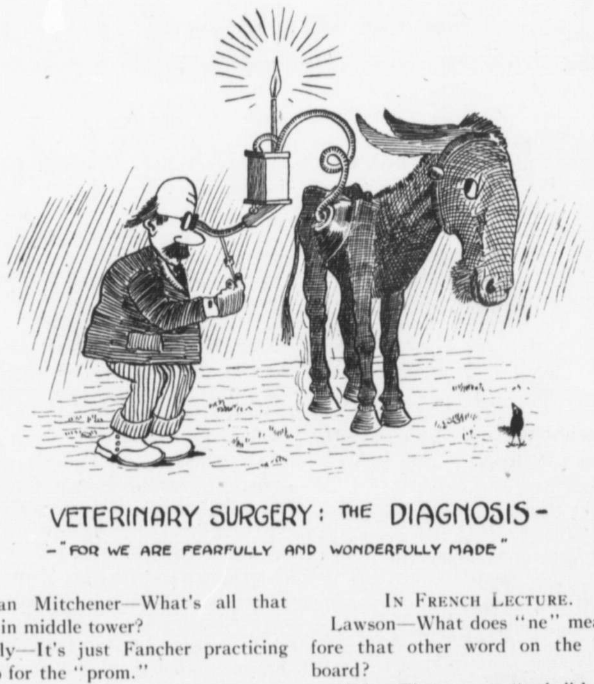
"You had better not, Mary; that's Mr. Quirie; he's very exclusive and might not wish to be bothered."

Ken Foreman (coaching basketball)—That's a bum shot for you Fancher!

Art. White—Well, look who's shooting!

Can anyone tell us why there was only one hole in the target after Prof. Day had fired five shots at it the other afternoon?

Who is responsible for the audible snoring in the vicinity of "Mill St." about the time for Bible Study Class every Sunday morning?



Dean Mitchener—What's all that noise in middle tower?

Sully—It's just Fancher practicing a solo for the "prom."

"Shorthorn'—What kind of fish do they catch at Poverty Pond?"

Bill Argue—Skates, I guess.

When does Bill Hawley purpose giving his next sleighing party? The last was so successful.

IN FRENCH LECTURE.

Lawson—What does "ne" mean before that other word on the blackboard?

Aikin—That means "only" because it is followed by "que" after the verb.

Lawson—O, that's what the d—thing is, is it?

Does Hamilton habitually spend his evenings down town, or is it just an occasional night out?