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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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Vegetable Seed Growing in Ontario

By A. H. MacLennan, B.S.A., Vegetable Specialist

THE production of seeds of farm and vegetable crops in Canada is assuming large proportions this year on account of our inability to obtain it from the former sources in Europe. As this source will probably be closed for the next two or three years, it behooves us to produce as much of it as possible during that period. Of course we cannot expect to produce it as cheaply as they did because of labor costs, but much of this has been removed through the government aid given to seed producers in quantity.

Seed production in Canada has been largely of the following: Mangels, sugar beets, field and garden carrots, peas, beans both garden and field, corn, garden beets, onions, celery, cabbage, spinach and radish. Many of these have only been produced to a limited extent and will always be limited on account of climatic conditions. Beets, onions, mangels, sugar beets, peas and beans seem to give good returns, and are being grown quite extensively here in Ontario, but much of our seed will be grown in British Columbia. When a gardener has greenhouse space and is growing celery outside in a large way, it will more than pay him to devote some of that space in spring to seed production, as his crop will benefit and he can always find a good market among his fellow grocers for any surplus growing.

In this article I shall deal only with vegetable seed. Seed production divides itself into two classes; the small garden and the large area producer. This latter refers to the man who produces seed in large quantities under contract for the wholesale trade. On account of the quantity he grows, he can negotiate successfully with the wholesale buyer. Prof. Macoun in his pamphlet, "Every Gardener, his Own Seed Grower," urges each man with a garden to plant two beets, two carrots, five onions, two cabbages, two turnips, three celery plants for his seed in 1919. This can easily be done and the results at Ottawa give the following amounts that have been obtained there per plant: beet, 2½—5½ ozs.; cabbage, 2—5 ozs.; carrot, 1½—2½ ozs.; celery, 1—2½ ozs. (outside); onions, ¼—½ ozs.; parsnips, 2—4 ozs.; turnips, 5—9 ozs.

Johnson in his book on seed-growing gives the following amounts per acre in a good season. Beets, 1000 lbs.; onions, 600 lbs.; cucumbers, 250—500 lbs.; carrots, 500—600 lbs.; beans, 15—30 bushels; cabbage, 400—500 lbs.; tomatoes, 200—300 lbs.; spinach, 1000—1500; celery, 400—500 lbs.; corn 40—60 bushels.

From present indications seed-growing in Ontario may be classed as follows:

Worth while, growing a large amount—onions, beets and beans.

Worth while, growing a small amount—cabbage, radish, tomatoes, spinach, celery (under-glass.)

Risky crops—carrots, corn, cucumbers, melons, lettuce and parsnips.

These latter are classed as risky because they can be grown more cheaply in other parts of the continent, and are more than usually susceptible to climatic changes, especially at flowering time. Among market growers, celery and lettuce may be wintered over in frames and allowed to grow there the next season with very good results. Radish seed also may be grown during the summer in frames.

Here is a comparison seed prices in 1915 and 1918:

Retail Prices	1915	1918
Onions, per lb.	$1 95	$5 35
Beets, per lb.	1 25	2 50
Beans, per lb.	25	70
Cabbage, per ¼ lb.	90	1 75
Radish, per lb.	1 05	2 20
Tomato, per ¼ lb.	1 05	1 50
Spinach, per ¼ lb.	1 15	3 00
Celery, per oz.	3 00	2 00
Carrots, per lb.	1 87	3 50
Corn, per lb.	25	50
Cucumber, per lb.	1 40	2 25
Melons, per ¼ lb.	65	90
Lettuce, per ¼ lb.	65	1 00
Parsnips, per ¼ lb.	1 15	3 50

Onions, beets, carrots, parsnips, cabbage and celery are biennial crops, or take two years for the development of seed. The seed of the root-crops, except parsnips, is sown in late June or early July as usual; the roots are lifted in September, sorted over, keeping only the specimens true to the variety type. These are then carefully stored in cool quarters in sand over winter. Parsnips are sown as usual in the spring and may be left in the ground over winter or lifted as the others. When the soil is in good shape the roots are taken out and planted in rows. The rows in each case are three feet apart, the beets being planted eighteen inches apart in the rows, the carrots and parsnips six to eight inches in the row. As soon as the bulk of the crop is ripe it is harvested. Where only a small area is grown it may be picked as it ripens.

The onion seed bulbs are selected from the regular crop at harvest time and should be stored over winter in a fairly cool, dry place. In spring they are planted out in rows three feet apart, the bulbs six inches apart and six inches deep. They are harvested when first seed ripens and are allowed to dry in a cool storage where they are spread thinly.

Two "Paris Golden" Celery Plants at O.A.C. for Seed Production.

Celery is selected from the growing crop in the fall; the celery being planted in frames and covered for the winter to prevent freezing. Or if grown in a greenhouse are stored in a cellar until late February, when they are planted in the bed three feet apart each way. The seed is harvested when the bulk of it is ripe.

Cabbage plants are selected in the fall and are generally stored in pits or planted directly in the field where they are to grow. When set they should be four feet by two feet, the top of the

(*Continued on page* xvii.)

Seed Potatoes in Relation to Disease

By J. E. Howitt, Prof. of Botany, O. A. C.

In Ontario during the past three years the yield per acre of potatoes has been abnormally low. Running out of varieties, and adverse weather conditions have been the explanations offered for the poor crops. These factors have helped no doubt to reduce the yields, but in the opinion of the writer one of the chief causes of the poor crops of potatoes obtained in many parts of the Province has been the prevalence of certain of the so-called "physiological diseases" of potatoes such as Leaf Roll, Mosaic and Curly Dwarf.

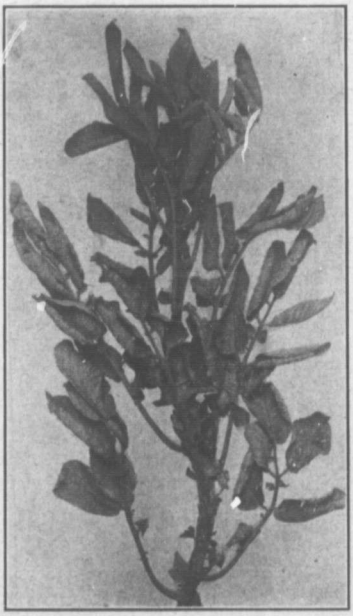
In order to understand the importance of these diseases in the reduction of the crop and in their relation to seed potatoes, it is necessary to consider each of them briefly.

Leaf Roll

The cause of this disease is unknown. It has been observed in numerous fields in the potato growing districts of Old Ontario. In some fields examined this summer (1917) over 60% of the plants were affected with Leaf Roll.

Economic Importance.—Experiments and observations show that Leaf Roll may reduce the yield to a very marked extent. In experiments conducted by Mr. Murphy, assistant in charge of the Dominion Field Laboratory of Plant Pathology at Charlottetown, P. E. I., it was found that the average yield of plants diseased with Leaf Roll in Prince Edward Island is 1.66 ozs., while healthy plants of the same variety yield 19.0 ozs. The corresponding yields per acre would be 26 bushels and 297 bushels.

Symptoms.—Symptoms of Leaf Roll are very variable. Affected plants are always more or less dwarfed and in some varieties the leaves assume a characteristic upright, almost staring habit instead of drooping over in the normal way. This symptom is sometimes absent, the plants presenting instead a low-headed, bushy appearance. When the crop is badly affected the poor growth of the foliage is very noticeable. It is practically never as



LEAF ROLL

green on affected plants as on healthy ones and occasionally on certain varieties it takes on a purplish or reddish color at the tips and around the margins of the leaves. Rolling of the lower leaves is always associated with the disease. This is often rather incon-

spicuous and may not extend beyond the leaves lying close to the ground, although it may affect the intermediate and even the topmost leaves. Marked rolling of the upper leaves, however, is often seen on plants not affected with Leaf Roll. The rolled leaves on plants affected with this disease begin to die early. The harsh, leathery texture of such leaves is a constant symptom. This point may be tested by feeling them with the fingers. The tubers of affected plants are small and are borne generally on very short tuber-branches (stolons) or even attached in a cluster to the stem.

Means by which Leaf Roll is spread.—Leaf Roll is chiefly transmitted through the seed. Tubers from affected plants invariably produce diseased plants. There is also evidence to show that the disease may spread from plant to plant in the field. Just how, is unknown, as up to the present time no parasite has been found associated with Leaf Roll.

Prevention.—The surest way of avoiding loss from Leaf Roll is to secure fresh seed from districts free from the disease. Fortunately, this is possible, as Northern Ontario and certain sections of New Brunswick, Nova Scotia and Prince Edward Island are comparatively free from this trouble.

Mosaic

The cause of this disease is also unknown. It has been observed in many fields in Ontario. When it is severe there is very noticeable reduction in the crop.

Symptoms.—The foliage of plants affected with Mosaic is somewhat wrinkled or corrugated and mottled, with faint, light green or yellowish spots. These symptoms vary considerably, being well marked in some cases and not so noticeable in others. The stalks of diseased plants are often more bare near the ground than those of healthy ones, partly because the affected foliage does not spread out and droop down normally and partly because the lower leaves sometimes fall off in the last stages of severe attacks. The tubers of affected plants are normal looking and sound, and their keeping or eating qualities are not impaired.

Means by which Mosaic is spread.—Like Leaf Roll, Mosaic is transmitted through the seed and is spread very largely by the use of seed from diseased plants. It is also spread from plant to plant in the field, probably by insects as is the case with related diseases.

Prevention.—If the disease is not very prevalent in a field, remove the affected plants so as to secure seed as free as possible from Mosaic. If the Mosaic is very abundant, secure fresh seed from a field or district free from the disease. It may be necessary to discard susceptible varieties in order to avoid loss from Mosaic.

Curly Dwarf

Is another disease of unknown cause, frequently met with in Ontario, especially in unthrifty fields of potatoes. It appears to cause a very noticeable reduction in the crop. Plants affected with Curly Dwarf are dwarfed and the foliage is markedly curled and wrinkled. This disease is known to be transmitted through the seed.

Prevention.—Remove affected plants so as to secure seed free from Curly Dwarf or secure fresh seed from a field or district free from the disease.

Since all these diseases are transmitted chiefly through the seed, the importance of disease-free seed is apparent. Where can such seed be obtained? At the present time these diseases, especially Leaf Roll, appear to be very prevalent throughout Southern

or Old Ontario, and thus seed grown in this part of the Province is almost sure to be infected. Fortunately, however, New Ontario and certain sections of New Brunswick and Nova Scotia are reported to be comparatively free from these troubles and seed from these localities should produce a crop comparatively free from Leaf Roll, Mosaic and Curly Dwarf.

From the standpoint of the reduction of disease and the increase in yield, the importation of disease-free seed seems to be essential at the present time. Those who are finding that home-grown seed is not giving them as many bushels per acre as formerly are advised to try imported seed from disease-free districts. Such seed can be obtained from New Ontario and certain parts of Nova Scotia and New Brunswick. Those who wish to secure such seed should write to Mr. Justus Miller, Assistant Commissioner of Agriculture, Department of Agriculture, Toronto, who can give them the names of the men in these districts who have disease-free seed for sale, that is, seed that is not infected with Leaf Roll, Mosaic or Curly Dwarf.

It must not be thought, however, that simply importing such seed will prevent the occurrence of all kinds of disease. Seed from localities where Leaf Roll, Mosaic and Curly Dwarf do not occur should produce a crop free from these diseases; but such a crop will be just as subject to many of the common fungus diseases of the potato as a crop from home-grown seed, and therefore, if the potatoes are to be as free as possible from all kinds of diseases it will be necessary to treat the imported seed with formalin to prevent Scab and Black Leg and to spray the plants thoroughly and repeatedly with Bordeaux mixture to prevent Late Blight and Rot.

Yield and Quantity of Grain Crops

The total yield of wheat for Canada is returned as 233,742,850 bushels from 14,755,850 acres, as compared with 262,781,000 bushels from 15,369,709 acres in 1916. Of oats the total yield is 403,009,800 bushels from 13,313,400 acres, as compared with 410,211,000 bushels from 10,996,487 acres in 1916. The yield of barley is 55,057,750 bushels from 2,392,200 acres, as against 42,770,000 bushels from 1,802,996 acres in 1916. The average yields per acre of these crops are, in bushels, as follows; the corresponding figures of 1916 being placed within the brackets: wheat 15.75 (17.10); oats 30.25 (37.30); barley 23 (23.72). The total yields of the remaining crops are as follows: rye 3,857,200 bushels; peas 3,026,340 bushels; beans 1,274,000 bushels; buckwheat 7,149,400 bushels; mixed grains 16,157,080 bushels; flaxseed 5,934,900 bushels; corn for husking 7,762,700 bushels.

The quality of the grain crops of 1917, as indicated by the average weight in lb. per measured bushel, is as follows: Fall wheat 59.37 lb, as compared with 59.52 lb. in 1916; spring wheat 59.48 lb. as against 56.51 lb.; all wheat 59.46 lb. as against 57.10 lb.; oats 33.55 lb. as against 33.86 lb.; barley 46.97 lb. as against 45.66 lb.; rye 53.44 lb. against 54.95 lb.; peas 59.81 lb., against 59.88 lb.; beans 59.70 lb. against 60 lb.; buckwheat 46.49 lb. against 46.35 lb.; mixed grains 44.41 lb. against 43.13 lb.; flax-seed 54.73 lb. against 54.99 lb. and corn for husking 56.18 lb. against 56.51 lb.

Seed Potato Situation in Northern Ontario

By G. W. Collins, B.S.A.

IN the growing of potatoes it is extremely important that good seed of strong vitality be used. It is a well-known fact and generally believed that Northern grown seed will have greater vitality than that produced in more Southern climates. This being the case, why should the farmers of Eastern Ontario not look to the Northern Districts for their seed potatoes? For this purpose the Province of Ontario has, lying within its own borders, some of the most suitable land to be found anywhere. Probably one of the finest sections in the whole North land for the production of potatoes is a portion of the District of Thunder Bay. While splendid crops of potatoes have been produced in all parts of the District, a section particularly well suited to the growing of potatoes lies adjacent to and west of the Twin Cities (Fort William and Port Arthur). This section has an area of about 40,000 acres, the greater part of which has a sandy or gravelly loam surface soil and a red clay sub-soil. Here potatoes are cultivated under ideal conditions of soil and climate, and it is a very common sight to see ten, fifteen and twenty acres of this crop under cultivation on one farm.

A 15-acre Potato Field is not an uncommon sight in Nothern Ontario.

In addition to favorable soil and climatic conditions, our growers have never had to spray potatoes for bugs or blight as both are practically unknown in this Northern District. There is, however, a small amount of Black Leg, Rhizoctonia and Mosaic in the district; but these diseases will be eradicated and controlled by those growers who are producing first class seed potatoes, as the fields will be thoroughly rogued of diseased plants and only disease-free seed will be used. Many of our growers are specializing in this important crop and are fully aware of the possibilities of producing high-grade seed for market, either in Eastern Ontario or in the Central Western States.

In order that our District might produce a large quantity of seed potatoes next season, the Ontario Department of Agriculture is supplying a considerable quantity of pure seed to supplement what our growers already have, and all of this seed will be planted next spring and grown under conditions mentioned above. Hence, next fall there should be a large quantity of seed potatoes in this district for sale. This Northern grown, disease-free seed should find a ready market in Eastern Ontario.

There are many varieties of potatoes produced in this district, but of all those grown, the Carmen No. 1 is the premier potato. Under field conditions this variety has given larger yields of more uniform tubers than any other variety tested, including Gold Coin and Green Mountain. Being of good quality and an excellent keeper it will readily sell to those who know it.

For the seed market our growers will produce three varieties, viz: Irish Cobbler, Carmen No. 1 and Green Mountain. As an early potato the Irish Cobbler yields well in this district. It is favored by our growers and will soon be one of the leading varieties in this locality. Both of the late varieties will be grown, the former for both seed and table purposes, while the latter will be produced chiefly for the seed market as it does not mature sufficiently in this district to be of good table quality. Although there is a fairly large supply of potatoes in this district at the present time, Eastern growers will be unable to secure a supply of seed from this source next spring as no system of inspection was carried out last season. There should be, however, a large supply of first-class seed potatoes available next fall, and Eastern growers would do well to make a thorough trial of this Northern grown seed. Good varieties, true to name, disease-free, graded tubers will be produced and offered for sale by our growers. The logical market for this high class seed is in Eastern Ontario.

Cultivate kindly, those friendships of your youth; it is only in that generous time they are formed. How different the intimacies of after years are and how much weaker the grasp of your hand after it has been shaken about in twenty years' commerce with the world, and has squeezed and dropped a thousand equally careless palms.
—Tennyson.

Good Seed and the Vegetable Grower

By Walter J. Cooke

IN considering the subject of seed-production for the vegetable grower, we find his dependence on seed of high quality greater than in any other branch of agriculture. His results must be certain, the essence of chance in his crop must be eliminated. The reasons for this are easily understood. He has the highest-priced land, the choicest location of the most fertile soil. His labor is high-priced, his holding near large cities forces him to compete with munition works and large industrial plants. The ever-increasing price of the abundant material, essential in his intensive cultivation of a few acres, adds to an overhead, which forces the grower to produce maximum crops or face financial failure.

One of the foremost causes of failure in agriculture is poor seed, weak in germination, wanting in trueness to type and lacking in vigor of growth.

We read today the ever-increasing necessity for home-grown vegetable seed and the advice is timely. Difficulties, however, arise in practice that will probably prevent the grower from becoming his own seedman until forced to do so by dire necessity. It might be possible for growers to co-operate. If each grower would undertake to produce enough seed of one given variety to supply his neighbors, the business of home production would be simplified, insomuch as one man would be forced to become a specialist in the production of only one variety.

The troubles found in popularizing seed-growing among vegetable-men are many. The saving of many of the parent stocks until spring in good condition would prove awkward under ordinary storage conditions. The control of insects and diseases that would attack seed-growing stock and the proper saving and cleaning of seed to sow from the seed drill as well as commercial stock would also deter the grower from becoming his own seed-merchant.

The most outstanding feature against seed production, however, lies in the fact that the grower's time is entirely taken up in the most exacting departments of his occupation. He must oversee, as a rule, his working force; he must personally attend to the control of insects and diseases, and the marketing end of the business generally falls to the lot of the owner. He has little time remaining to attend to the unremittent and scientific work of growing his own seed supply.

With scientific men difficult to retain in our present conditions the vegetable grower takes the course of least resistance and buys his seed from outside sources. Sometimes it is possible to obtain a few seeds locally from parties making a specialty of certain varieties, but the bulk of the seed is obtained from seed merchants. Some seed-houses grow a large percentage of their seed on their own farms; some supervise the growing of seeds on the farms of contracting parties, and still other companies buy the bulk of their supplies outright. In the case of reliable firms the best stock obtainable is purchased, and firms that do not value their reputation buy the cheapest seed obtainable regardless of quality. When the sources open to the grower are noted it is easily understood that he must use great judgment and do some experimental work to secure reliable seed.

Even the reliable firms may not produce seed that is desirable. One firm may make a specialty of a certain

variety for the greenhouse; another for the northern grower for outside planting, and still another firm will breed his strain for southern conditions. One seedman may select his variety for great productivity; another may have the same variety not so productive, but of better quality and still another may sacrifice both attributes in his strain for disease resistance.

The grower, therefore, must find the strain that gives him what he most desires, or is most suitable for his particular section.

Good work has been done by the government in forcing seed firms to designate the percentage of germination. This is a great help to the grower. A low germination is not fatal, but a sparse sowing of it would be disastrous. Many of the garden seeds retain their vitality for several years and the grower can easily buy these a year ahead, test them for germination, quality and vigor of product and use them for his sowings the following year, if satisfactory.

There are some seeds, however, that a grower may produce in his own garden with little trouble. Those that produce seed from seed in one season. The cucurbits, corn, beans, peas, tomatoes and potatoes are the most easily saved of our garden seeds and can be successfully grown if a few rules are followed.

If any one variety of vegetable is desired true to type the seed plot must be far removed from any of its own family; else a cross-fertilization will occur and the variety ruined for seed true to type.

Corn should be saved from the edge rows of a plot isolated from any other variety. If two or three rows were planted alone for seed purposes the wind would so scatter the pollen that the resulting seed would be useless. The edge rows of your patch are desirable because the better light and circulation gives a better matured seed. The saving of corn, from late maturing varieties, in Ontario, is a gamble as the early frosts so often injure the product.

Tomatoes must be well removed from other varieties and owing to a tendency to revert must have constant selection.

The cucurbits must not be planted in proximity; the different species having a tendency to cross-fertilize. The seed from a luscious melon may produce melons with a distinctive squash-like flavor if the squash and melon patches were in the same section of the garden.

The potato, although an enlargement at the end of an underground stem, rather than a true seed can be improved under home conditions of growth. That the average yield of potatoes in Ontario is 114 bushels per acre instead of 250 bushels, is largely the result of planting tubers of poor vitality. To increase the vitality of the potato, immature seed should be produced; that is, tubers from vines which never ripened. The only method of producing this desired result in Old Ontario is to plant a few rows of potatoes for seed very late in the season. The frost cutting the vines when they are still green gives us a tuber of good vitality and this with a roguing of the patch for diseased plants will do much to increase our yield of this popular product.

The saving of seed from varieties of vegetables other than those mentioned would require more science than the average grower would care to exercise, and more time than he could spare in his busy season.

It opens another avenue for the trained O. A. C. graduate to use his scientific training and business ability in an occupation which would be a Godsend to the community, and assure a good remuneration to the manager—that of producing vital seed, true to name and of high productivity.

The Experimental Union as a Source of Good Seed Supply

PROF. W. J. SQUIRRELL

IF any justification is required for including the Experimental Union on this program as a source of good seed, it will be found in its past record. For thirty-two years this organization has been supplying farmers with good seed of the best varieties, and during this period of time 88,604 farmers situated in every township and every county of Ontario have received material.

The seed, distributed through the medium of the Experimental Union, was nearly all grown in the Experimental field at the College. This seed was carefully tested for a period of five years or more and must have shown some special merit to warrant its distribution. Some of this seed has been the product of importations from foreign countries, and some of it of systematic selection and of artificial cross-fertilization. The Experimental Union has realized, and realizes today that one of the chief weaknesses in crop production in the Province is the presence of too many varieties in the different classes of crops. Its aim, therefore, has been, and is, to send out a comparatively few varieties and those only of the very best.

The Experimental Union has given to the farmers of Ontario such varieties as the Mandscheuri barley, the O. A. C. No. 21 barley, now practically the only kinds grown; the O. A. C. No. 72 oats, one of the most grown oats in Ontario; the O. A. C. No. 3 oats, the Dawson's Golden Chaff and the O. A. C. No. 104 winter wheats and several other varieties whose records speak for themselves.

The Experimental Union has provided the basis of seed supply for much of the work of the Canadian Seed Growers' Association, the Field Crop Competitions, School Fairs and other organizations.

A large share of the prizes obtained by exhibitors in the past few years at the Provincial Winter Fair at Guelph, at the Eastern Winter Fair at Ottawa, and at the Canadian National Exhibition at Toronto have gone to varieties which were first distributed by the Experimental Union.

Some of the largest seed houses in Canada have considered varieties of seed, which had their source in the work of the Experimental Union, of sufficient importance to feature them in their seed catalogues.

It is true that the Experimental Union only deals in small quantities, and it is also true that occasionally we have complaints from farmers because we do not send more seed. These men say, "We can't be bothered with these small quantities, but send us a bushel or two and we shall be glad to grow them." If it were possible for us to send these larger amounts, which it is not, we would be defeating the chief purpose for which the Experimental Union exists, that of enabling the farmer to find out for himself and under his own conditions which methods or varieties are best suited to his farm. The average farmer I think, much over-estimates the time it requires for these small quantities to increase to large amounts. It is possible for one seed of oats to increase to one hundred bushels in three years, and we have had experimenters who from the third year's crop from seed supplied by the Experimental Union

have sold hundreds of dollars worth of seed.

Sufficient seed is sent to each experimenter to sow 1-80th of an acre, excepting in the case of potatoes when the amount is only enough to plant 1-160th of an acre. In addition to these amounts it is possible for paid members of the Union to get one "Member's Special" which consists generally of five pounds of seed.

The farmer who obtains Experimental Union seed, though the quantity may not be large, is sure of getting, free of charge, seed of varieties true to name, the best seed of these varieties as the seed is all handpicked, and material free from any fungus disease where it is possible to make it so.

The Department of Field Husbandry keeps a list of men who have good seed for sale, and farmers who wish to obtain seed of those varieties which have been distributed for some time by the Experimental Union, in larger quantities than is regularly supplied for experiment, may do so by writing to the Director of Co-operative Experiments in Field Crops.

Perhaps the chief causes of the success other than the supplying of good seed in the distribution work of the Experimental Union lies in the fact that it is able to reach every farmer, even those the most remote from the chief seed centres, and that its method of operation is competitive.

The obtaining of the best seed of the best varieties cannot be too strongly emphasized when we consider, if we take the case of alfalfa alone, that it is possible to get seed of this crop which will vary in production from nothing to nearly five tons of hay per acre. No farmer could have better insurance on his crops than is provided by the sowing of the best seed.

The Development of a Seed

R. E. Stone, Ph. D., Lecturer in Botany, O. A. C.

SINCE nearly all of our field and garden crops are grown from seed most of us are interested in the way seed develops. In order to understand how one is formed it will be necessary to see what it contains and also to go farther back and see from what, each structure is developed.

The seed consists of an embryo or young plant, the germ, together with a certain amount of stored food, the endosperm, for its use, and the whole protected by one or more seed coats. In order to produce seed the co-operation of several flower parts is necessary.

The parts of a flower necessary or essential for seed production are: First, the stamens, and second, the pistil. Each of the flower parts produces one or both of the essential elements.

The stamens are formed just inside of the bright corolla. The large structure at the top of each stamen is the anther in which is produced tiny grains, the pollen grains, which furnish the male element in fertilization.

The pistil is in the center of the flower. Each pistil has a stigma to receive the pollen, a style or connective, and an ovary at the base. In the ovary small oval structures called ovules, are produced. Each ovule is attached to the ovary wall by a little stalk called a funiculus through which food will enter the developing seed. The ovule proper consists of a large central structure called the embryo-sac, which contains the egg or female element and a fusion nucleus which will be concerned in forming the food reserve. The embryo-

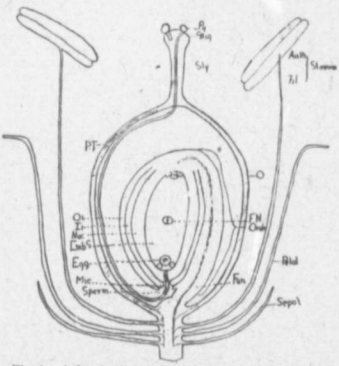


Fig. 1. A flower, Anth.—anther; P.g.—pollen grain; P.t.—pollen tube; Stig.—stigma; Sty.—style; O.—ovary wall. Ovule with its parts: Fun.—funiculus; O.i.—Outer integument; I.i.—inner integument; Nuc.—nucellus; Mic.—micropyle; Emb. s.—embryo sac; Egg—female element; F.n.—fusion nucleus.

sac is protected by several coats; first, the nucellus, then the inner integument, and finally the outer integument. The integuments do not form a complete cover but there is a minute hole through them known as the micropyle.

In order that a seed may be formed it is necessary that the egg in the embryo-sac be fertilized, that is, unite with a male element or sperm, and this is brought about in the following way.

The pollen grains are brought to the stigma either by wind or insects, or in a few cases by water. When a pollen grain lands on the stigma of a suitable pistil it germinates or sprouts and sends out a slender tube, that is a pollen tube, which grows down through the style into the cavity of the ovary and is attracted to the micropyle of an ovule. It then grows through the micropyle, pierces the nucellus and enters the embryo-sac. The end of the pollen tube then dissolves and allows the sperms to escape into the embryo-sac. Each pollen grain gives rise to two male elements or sperms, so two sperms enter the ovule.

One sperm will fuse with the egg. This constitutes fertilization. The fertilized egg now begins to grow and from it a young plant or embryo, the germ, is formed.

The second sperm fuses with the fusion nucleus and forms the endosperm nucleus and this will give rise to the endosperm or reserve food for the young plant. In some cases, as in peas and beans, the embryo or germ is very greedy and absorbs all the endosperm before the seed is ripe.

As the embryo or germ and the endosperm increase in size the nucellus is crushed. The inner integument grows somewhat and forms the thin, delicate inner seed coat or tegmen. The outer integument increases much in thickness and becomes hardened and waterproof, forming the outer seed coat or testa which protects the seed from injury.

When a seed is ripe the germ ceases to grow, the endosperm becomes somewhat dry, the outer seed coat or tesa becomes firm. In this condition the seed is capable of enduring dry weather or cold, so that by means of seed the plant passes through seasons unfavorable for growth.

When the seed is placed in a warm, moist place, it will take up water. The embryo will begin to grow again, break out of the seed coat, use up the endosperm and finally form a new plant having characters of both the plant on which the seed was formed and the plant which produced the pollen.

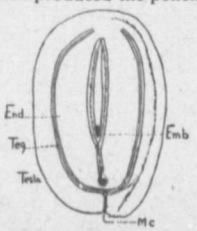


Fig. 2. A seed. Mic.—micropyle; Testa—testa; Teg.—tegmen; End.—endorsperm; Emb.—embryo or germ.

Home-Grown Mangel Seed

By B. W. Maxwell, '18

UNDOUBTEDLY the greatest problem that will confront the farmer in 1918 in responding to the call for production will be the securing of an adequate supply of labor, either skilled or otherwise. The labor shortage will scarcely permit of an increased production by virtue of a greater acreage tilled; hence, the only logical solution for the situation must be in our concentration of efforts upon the greatest possible acreage that the labor existing can handle. We must realize, however, that efficiency in production with the shortage in labor which at present faces us, can only be secured by more attention to and better cultivation of the soil, and by the sowing of choice, pure seed of the best varieties of farm crops.

The source of root seed, for which Canada was dependant upon Europe, has practically become exhausted, and on account of this state of affairs Canadians must realize that the time is ripe for establishing and developing certain industries in the Dominion, which were either not in existence before the war or were conducted on a small scale. Among these the production of mangel seed is an important one, and an industry whose development would make Canada independent of foreign markets.

Mangels are bi-ennials, i. e., they require, as a rule, two years to develop seed. Their first year is employed in the development of roots in which is stored the food. The second year, on planting, the food is utilized in the formation of the seed-bearing stalks.

When selecting roots from the mangel crop to be used for seed production the following year, a very close selection is advisable. All roots selected should be perfectly sound, free from disease and conform as nearly as possible to the ideal type of the variety. They should be uniform in color, size, shape and general character of top. Prongy roots should be avoided. The mangels thus selected are then stored at a temperature of from 33 to 38 degrees, F., a well constructed and properly ventilated cellar affording satisfactory conditions.

In the spring as soon as the land can be conveniently worked, and the danger of heavy frost is past the roots may be planted after the selected plot has been thoroughly worked into a fine state of tilth. To avoid the drying out of the roots by exposure to the sun, care must be taken in planting to see that the crowns are the only exposed parts at the level of the ground surface.

Planting is most satisfactorily done with a spade, placing the roots 30 inches apart each way. Cultivation as practised for potatoes is then carried on. The seed-bearing stalks will appear very soon after the roots are planted and these will continue to develop during the season and in July will blossom and set seed. Harvesting should commence as soon as the most mature seed clusters have turned light brown which is usually about September.

Cutting may be done by the use of a good sharp spade with which the extreme top of the root is cut off. The stalks are then gathered and tied in small sheaves. The sheaves are then butted; that is, the tops of the roots are cut from the ends of the stalks, and the sheaves are placed in rather open stooks.

The crop should remain in stook until the seed is quite dry and hard. In

(*Continued on page* xxv)

Seed Selection

By R. Creed

GOOD seed, like good live-stock, is produced only by a limited number of farmers in each locality. It is only by sowing the very best seed available that we can materially increase the production and quality of our cereal crops while labor conditions remain as they are. Cereal grains for seeding purposes must be selected in order to get the best strains and largest producers.

There are three methods of selecting seed.

1. Individual selection.
2. Mass selection.
3. Mechanical selection.

The first method has been adopted largely by the Experimental Farms and Agricultural Colleges. The second is the one adopted by the Canadian Seed Growers Association, and is used by the growers of good seed from the Atlantic to the Pacific. By this means thousands of bushels of good seed of cereal grains are placed on the markets annually. We will give a brief outline of the way in which mass selection is made as it is the most satisfactory plan of selection for the average grower.

Sufficient heads of grain of ideal type and heavy prolific tendency to sow a one-quarter acre plot are gathered from a field of ripe standing grain. Only heads which are large, true to type and free from disease are taken, thus, we get only the healthiest, hardiest and most prolific plants. These will produce grain true to type and fairly resistant to disease. The seed thus selected is used in the seed-plot and the best heads from this plot may be selected and is eligible for registration. The yield from the one-quarter-acre plot should be high, at least 20 bushels in the case of oats, and is "elite stock." This crop will next year produce first generation and so on. After the third generation the seed is not registered. Seed secured in this way is far above the average on the market because it is pure, true to type, plump and healthy and the selection has a tendency to produce thinness of hull.

This method may seem to entail a vast amount of work, but it does not. The time required to obtain a large crop of this selected seed is comparatively short for with the third generation the yield should amount to many thousands of bushels providing all the seed is used for sowing and the tilth and fertility of the soil is maintained. We must also remember that this seed commands about 20% higher price than that ordinarily produced. Most of our heavy producing fields that carry off the prize money in the Field Crop Competitions are those for which the seed has been specially prepared by selection of this sort. In these competitions purity of variety counts one-fifth of the total score.

Mechanical selection will grade the seed, but it fails to establish any standard either in purity of variety or type or kind of grain. A few large, plump grains are often produced on a stalk which may bear not more than twenty grains, but by mechanical selection these grains will be thrown in with the grains from prolific plants. In this way the average yield the following year will be considerably lowered. "Like begets like," in cereals as in animals.

Selection gives us better seed, pure, healthy, free from other varieties of the same kind of grain, and prolific. These facts should be an incentive to all farmers to make selections from their best varieties of cereal grains and thus increase the yield during these strenuous times.

The Honey Bee in Relation to Fruit and Seed Production

By J. B. Munro, '19

DARWIN, the great naturalist said, "No bees, no seed. No seed, no increase of the flower. The more seeds from the flower, the more flowers from the seeds." To completely understand the relationship between the bees and the production of seeds, we must know the structure of flowers and the functions of their various parts, and also the activities of the bees.

The flowers of different plants may be one of three kinds: 1. Both sexes are present in one flower, i. e., each flower contains both stamen and pistil.

2. Individual flowers may be of different sexes—staminate and pistillate.

3. The sexes may be separate in individual plants, and staminate flowers are borne on one plant while pistillate flowers are borne on another. In order for a seed to be produced it is necessary that pollen grains from the anther be transferred to the stigma and the ovule fertilized by it. A good illustration of how fertilization takes place is seen on page 316, figure No. 1. This shows the way in which the pollen tube reaches the ovule.

All flowers are not dependent on insects for pollination. There are many agents that assist in distributing the great numbers of pollen grains that are produced, but there are some flowers that are so constructed that the transfer of pollen must be made direct from flower to flower by insect visits, and bees are the most dependable insects for this work. In the economy of nature the wind and wild insects are sufficient agents for this work, but man has so concentrated his efforts and increased his orchards and fields, and by intensive cultivation has caused the "two blades" to grow where one grew that he must now provide means for the pollination of the blossoms or his labors will have been in vain.

The following notes from a lecture on "Blossom Fertilization" by Prof. J. E. Howitt, emphasize the importance of the honey-bee in the growing of fruit and seed.

"Cross-pollination is when the pollen from the anthers of one flower reaches the stigma of another flower on a distinct plant of the same species. The resulting fertilization is cross-fertilization. By a distinct plant is meant a plant produced from seed not produced by budding, grafting, cuttings, etc. Different apple trees of the same variety are therefore not distinct plants. The great majority of our plants are cross-pollinated and cross-fertilized.

"Bees are more important in their office of cross-pollinators than in the production of honey. As evidence of this we find first Nature's evidence and second, experimental evidence. Nature's evidence—the numerous special adaptations found among flowers for insect pollination and more emphatic evidence the numerous special devices tending to prevent self-pollination, namely (1) plants which produce flowers in which the stamens and pistils mature at different times. Some have flowers in which the stamens mature first, for example Wild Carrot, Pea, Mint, Sunflower and many others. Others have flowers in which the pistil matures first. Examples—Plantain and Meadow Foxtail and apple and pear to some

extent. (2) Flowers with the stamens and pistils in different flowers—some plants have the flowers with stamens and with pistils on the same plant, examples—Corn, Ragweed, Pumpkin, while others have the flowers with stamens on one plant and the flowers with pistils on another plant. Examples—Willow, Poplar, Date, Hops and Hemp. (3) Flowers with different lengths of stamens and pistils such as Primrose and Loosetrife. (4) Self-sterility—Flowers which must be cross-pollinated before they can be fertilized are said to be self-sterile. Many varieties of apples, pears, plums and peaches are to a large extent self-sterile.

"All these devices show how important it is that cross-pollination take place. The agents which bring about cross-pollination are water, wind, birds, snails, bats and last and most important of all, insects. Nearly every bright-colored flower we see is adapted in some way for insect pollination. Every mark upon the flower and every form has some significance in regard to insect pollination. Insects, as you know, visit flowers for nectar and pollen. They are attracted to them by the sweet odors and the display of color.

"It may be said that bees are absolutely indispensable for the production of fruit and clover seed and that a bee-keeper does not honestly steal his living, but that his bees earn every ounce of honey that they secure from the plants they visit."

The honey-bee has much to recommend it for the work of pollenating the blossoms in our orchards and fields. Nature has endowed it with perseverance and a love for work. She has also supplied the flowers with nectar to attract the bees. In taking the nectar from the flowers the bee gathers the tiny pollen grains on her hairy body and quite unintentionally transfers them to the next flower she visits. It is a noteworthy fact that bees do not go promiscuously from one kind of plant to another, but they visit flowers of the same species during the time of the honey flow from that particular source; thus, their work as pollen distributors is advantageously directed.

Bees do not gather nectar only from plants but when rearing brood they gather large quantities of pollen for food. This pollen is carried to the hive in little pellets on the hind legs of the bee and in passing from flower to flower the fine pollen grains are brought into contact with the stigmas of the flowers and some grains adhere and function in the fertilization of the ovules of that flower. The pollen that is carried to the hive is used in the preparation of food for the young larvae. Thus, we see that the bee in gathering food for her young and storing food for the winter is also doing a mighty work in producing food for mankind. It is estimated that the honey that the bees produce, though very valuable, is not nearly of so great value as is the work they do as pollinators.

Few people realize that there are not sufficient wild bees and other insects to adequately pollinate the blossoms in districts where large quantities of fruit are being grown or in areas where clover seed is being raised. Bees are the only solution to the problem of increasing production in these areas because they adapt themselves to man-made homes and artificial conditions. They cannot be domesticated but they can be controlled and handled with success providing the fundamental laws which govern their tendencies are obeyed.

Fruit-growers who are contemplating increasing their out-put this year will do well to study their neighborhood and see if they are surrounded by bees enough to pollinate the blossoms. If

bees are scarce no amount of cultivation will give a good crop for, while small fruits may be sufficiently pollinated by natural agencies, it requires the work of bees to transfer the pollen from flower to flower in the larger trees. Vegetable growers too must not overlook the importance of bees. They are necessary where cucumbers, melons, tomatoes and other fruits are being raised, and in green-house work bees can save a great deal of labor by pollinating flowers that would otherwise have to be done by hand. In areas devoted to the production of Alsike and White clover seed bees are indispensible.

It seems hardly possible that any plea should have to be made for the preservation of bees in fruit-growing districts, but such is the case. We cannot too strongly emphasize the fact that spraying during the time of full bloom has a most serious effect on the beekeeping industry. Filling the blossoms with poison spray simply means the destruction of thousands of our benefactors. It takes very little of the insecticide used in sprays to kill bees and if the colonies are working well spraying when the trees are in bloom is most disastrous. It will be well for fruit-growers to remember that spraying at the time of full bloom is of very little use even in controlling the codling-moth and there are now laws of the Dominion enacted against this practice.

Cleaning Seed Grain

By R. E. Begg, '19

THE Allies are asking the Canadian farmers to produce maximum crops of cereal grains. This is very essential at the present time, owing to the serious shortage of food-stuffs available for the Allied nations. The Canadian farmers are seriously handicapped by the shortage of farm laborers. For each farmer to get maximum crops of cereal grains, it is very important that the very best seed possible should be sown. It has been proven by our Agricultural Colleges and Experimental Stations that large plump seed gives the highest yield per acre. It is very necessary that each farmer prepare his seed grain for sowing, before the rush of spring work begins.

In cleaning seed the aim should be to obtain a sample containing only the larger and plumper kernels of the kind of crop desired. To produce a sample of this kind it is necessary to remove impurities such as straws, chaff, dirt and other inert matter, weed seeds, seeds of crops other than the kind desired, and any small, shrunken, immature and otherwise inferior kernels of the kind being cleaned.

Improper cleaning of seed is in most cases due to the lack of the necessary riddles and screens, or to the fanning mill not being properly regulated. Any good fanning mill in which thorough control over the air blast is possible, and in which a series of four or more riddles and screens may be adjusted at will, can be fitted and operated to do fairly good work.

The air blast in a fanning mill is intended to remove as much as possible of the lighter material without unnecessary waste of plump seed; it is not strong enough unless a few good seeds are being blown out with the chaff.

This is the only way of removing some impurities which, on account of their small size, cannot be separated by sieves. The work of the air blast is doubly important on account of the fact that the removal of the light material assists the sieves, by removing part of the grain that would otherwise have to go through them, and preventing them from becoming clogged with this light material. In some mills this fact is taken into account when the air blast is increased, by automatically decreasing the shake of the sieves.

It is most important to have a full equipment of both wire and perforated zinc riddles and screens of all sizes made for small seeds. The riddle or top sieve should be large enough to let the seed through and hold back the larger impurities. When weed seeds similar in size to the seeds in which they occur are very prevalent, their separation cannot be satisfactorily accomplished. In cleaning such seed regulate the slant of the riddle, amount of shake and size of the opening in the hopper so that the sample will travel slowly, and as much as possible of the seed will find its way through the riddle. Impurities larger than plump seed will travel the length of the sieve and fall behind. Do not give the riddle so much shake or have it at such a pitch that much of the seed runs off with the weed seeds. The screen or lower sieve should be just large enough to let the good seed through. It is not large enough unless small kernels of the kind of seed being cleaned are taken out along with the weed seeds. Lower sieves are usually made of woven wire.

In cleaning cereal grains for seed it is often advisable to remove from one-third to one-half of the total bulk. When grain is thus thoroughly cleaned, most of the weed seeds will be removed with the screenings. Special attention should be given to the removal of smut. Unbroken smut balls are impervious to the solutions used to destroy smut spores on the surface of the kernels. Unless all smut balls are removed, the grain is liable to be reinfected, thus rendering the labors of treating it of no avail, by the breaking of a few of these smut balls. Farmers growing clover and grass seed should co-operate in purchasing a modern cleaning plant for such seed. It is very hard for individual farmers to clean such seed thoroughly with the common fanning mill.

There are many old fanning mills in use with many of the original sieves broken or worn out. These could be replaced by new ones or by obtaining new sieving and putting it on the old frames. It is advisable also that farmers obtain the right sieves for cleaning the different varieties of grain.

There is a spectacle grander than the ocean, and that is the conscience. There is a spectacle grander than the sky, and it is the interior of the soul. To write the poem of the human conscience, were the subject only one man, and he the lowest of men, would be reducing all epic poems into one supreme and final epos. It is no more possible to prevent thought from reverting to an ideal than the sea from returning to the shore. With the sailor this is called the tide; with the culprit it is called remorse. God heaves the soul like the ocean.—Joseph Cook.

Birds as Weed Seed Destroyers

By A. B. Jackson,'19

THE chief service rendered to man by our wild birds is the destruction or holding in check of insect pests. Another indispensible service is that of the Birds of Prey in feeding upon small rhodents and reptiles. Intermediate in importance comes the destruction of weed seeds by the members of the family Fraginillidae, to which belong the sparrows, finches, buntings, and grosbeaks, containing in all about one-seventh of our birds. These so-called

Types of Beaks—I. Seed Eaters. II. Insect Eaters. III. Birds of Prey.

"seed-eaters" are by no means restricted to that diet, for all consume large numbers of insects when they are available and also feed their young almost entirely upon insects. Weed-seeds form their most staple article of food during autumn, winter, and early spring. The bills of these birds are especially fitted for seed-eating being stout, short, and strong in order that the hulls or shells may be quickly broken and the kernel only eaten.

The following are a few members of the family which are worthy of note.

No bird is more welcome to the winter-weary than the Song Sparrow, the harbinger of spring. It arrives about the end of March and is much easier heard than seen, for when not pouring forth its abundance of cheery music, it is busy searching for seeds under rubbish, or along fences, or scratching in the soil. The Field, Vesper, Savannah, and Chipping Sparrows are all common and beneficial summer residents, while the White-throated, White-crowned and Tree Sparrows are migrants with us and at that time feed almost entirely upon weed seeds. A number of the latter always remain throughout the winter especially in the southern part of the province. The beautiful American Goldfinch is extremely fond of the seeds of the Scotch and Bull Thistles and materially aids in preventing the spread of these noxious weeds. The Towhee and Rose-breasted Grosbeak are also ground feeders to a very large extent and weed seeds form a considerable part of their diets. Among our winter seed gleaners are the Snow-bird, Redpoll, Slate-colored Junco, and Prairie Horned Lark. The two latter are more properly spring migrants, arriving in February. During the early part of the winter all weed stalks projecting above the snow are visited and deprived of any seeds still contained in them. In February and March, when a thaw or the strengthening sun has bared the southward slopes and fields, these are visited and diligently searched for seeds which would otherwise grow and be a menace to the succeeding crop.

The question naturally arises, does the consumption of seeds by these birds really assist to any material extent in the control of weeds? Close observations and studies have been

made, notably by Prof. F. E. L. Beal and it has been found that each "seed eater" consumes at least one-quarter ounce of weed seed daily during autumn, winter and early spring (about 200 days). Excluding the English sparrow and taking a conservative estimate of 75, as the average number of birds of this family per square mile in Ontario during these 200 days, we find that in a single season 208 pounds of weed seeds are consumed by them per square mile. This amounts to 106 tons consumed in Wellington County and over 5,200 tons in Old Ontario. When we consider that these are all surface seeds and so have a high germination percentage, we get some idea of the service these birds render toward lessening the prevalance of noxious weeds. Therefore, when any of these seed gleaners are feeding about his fields or garden, the farmer or gardener should know that they are doing a good work for him and that if encouraged to remain in sufficient numbers few uncovered weed seeds will escape their quick prying eyes. Further, excepting the English sparrow, none of the members of this family have any destructive habits to offset their beneficial work.

Margarine

Although margarine has justified its claim to furnish a satisfactory substitute for butter, its production is likely to cease for the present in Canada. The cottonseed oil which is a necessary ingredient in its manufacture comes entirely from the United States.

The shipment of margarine from the United States is now prohibited, and if the embargo applies to the ingredients as well as to the finished product, no more can be made until some substitute or the oil can be devised.

Get Out Your Sap Buckets

Farmers and others who have maple sugar outfits, even if they have not been in use for years, should put them to work this year. There is a sugar shortage, and Canadian maple trees should be made to produce to the maximum. So even if you haven't the most up-to-date equipment, tap all the trees you can and make the most of the facilities you have on hand. There'll be a good market for all the maple sugar and syrup produced.

The first run of Canadian maple sap begins down in Essex County, Ontario, generally about March 20. Gradually, the warm weather works northeast and the season ends up in Quebec when the leaves break the buds.

Red Cross Must Save

The executive of the Red Cross Society of Regina has asked that the advice of the Food Controller be carefully observed at any gatherings in the interests of the Red Cross and that if the hostess really wishes to serve food she should at least be careful not to use the commodities most needed overseas.

Boys and Girls Can Help

Seventy-one thousand boys and girls of school age last year increased the agricultural output of Ontario to the value of $125,000. Every farm boy and girl this year should be encouraged to rear a pig, a calf, a batch of chickens, or to grow a plot of potatoes, beans, corn or vegetables.

QUERY

BACTERIOLOGY

Contagious Abortion

Question.—Would you kindly give me information regarding abortion in stock, as I have never had any until this year and do not know if it is the disease, or caused by frozen corn, or I should say frozen ensilage, for I never had my ensilage freeze like it has this year.—A. F. D.

Answer.—Contagious abortion of cattle is a disease which is considered to cause heavier financial losses among cattle than any other disease, except possibly tuberculosis. It is very common in Europe and on the American continent. Much investigational work has been done and is still being carried on in connection with this disease. The cause of the disease is known, but satisfactory measures for its complete control or eradication have not yet been devised.

The trouble is due to the action of **Bacillus abortus** in the foetus and uterus of pregnant cows, setting up local inflammation which leads to any one or all of the following conditions; abortion, premature birth, retention of the foetal membranes, metritis and sterility.

Abortion may take place at any time during pregnancy. If it occurs in the early stages of gestation, the small embryo comes away enveloped in the inconspicuous foetal membranes and easily escapes detection. If it occurs after the foetus has attained considerable size, the foetal membranes are usually retained by the cow and the assistance of the veterinary surgeon is required to remove them. They should be removed within twelve hours after abortion, or fatal consequences may result from blood poisoning or bacterial infection. A catarrhal condition of the uterus may cause gradual death of the foetus which is not immediately expelled but becomes mummified.

Heifers, as a rule, abort earlier than cows. In herds recently infected the animals usually abort in from three to five months after pregnancy; in herds where the disease is of long standing abortion frequently takes place from the 5th to the 7th month of pregnancy.

Unfortunately, there are no well-marked symptoms of the disease until abortion is about to take place. The animal generally will appear to be normal and in good health until just before aborting. Then may be noticed a springing of the udder, enlargement of the vulva, an odorless discharge from the vagina, dullness and desire to be alone. Any, or all, or none of these symptoms may be noticed shortly before abortion takes place.

Much of the difficulty experienced in the control of the disease is due to lack of knowledge as to how the bacillus gets into the uterus.

Some investigators contend that it gains entrance indirectly through the alimentary canal by the ingestion of contaminated food and water; others contend that it gains entrance mainly, if not solely, through the genital organs previous to the sealing of the uterus which occurs within 30 days after conception.

It has recently been shown (Schroeder and Cotton, 1917) that the abortion bacillus is frequently present in the udder and adjacent lymph glands of non-pregnant cows, but not in any other part of the body and that it is given off in the milk from such cows, the cows appearing normal and healthy in every particular. In the case of affected pregnant cows, the bacillus is found in the uterus where it sets up the inflammation leading to abortion. It has been experimentally demonstrated that the bacillus will pass from the udder to the uterus of pregnant animals, the bacillus having an affinity for foetal tissues. **Consequently, the disease may be spread by milking operations, the milker passing from a non-pregnant animal that has the bacillus in the udder and is giving it off in the milk, to a pregnant animal, thus conveying the bacillus on the hands to the teats of the pregnant animal, whence it would gain entrance to the udder and pass to the uterus, leading to abortion.**

Attempts are being made to prepare a serum or vaccine the injection of which, into breeding cows, will prevent abortion. Some success has been reported, but further investigational experiments are necessary before any general application of such measures can be made.

In the meantime it is well to practise the strictest hygiene in the handling of herds where abortion is present.

The foetus, foetal membranes and exudate which will contain the bacilli in large numbers, should be buried deeply in quicklime. Everything with which they come in contact should be thoroughly disinfected. The aborting animal should be isolated and so long as there is a discharge from the vulva, the external genitals, thighs and udder should be washed daily with a suitable disinfectant as 2 per cent lysol or creso!. The cow should not be bred again until all discharge has ceased. The bedding contaminated with the discharge should be burned, and the stall well disinfected after the animal is removed. The attendant in charge of animals that have aborted should not have anything to do with other cattle without first changing his clothes and disinfecting his hands.

D. H. J.

FIELD HUSBANDRY

Substitute for Corn

Question.—It looks as though I will be unable to get any seed corn this spring. Could you recommend any good soiling crop that will help out?

Answer.—One of the best mixtures tested at Guelph and which may be used as an annual hay crop, green fodder crop and soiling crop is the following: Siberian oats, 2 bushels per acre; Prussian Blue peas, 1 bushel per acre, making a total of 3 bushels per acre. This mixture should be sown as early as the land can be made ready in the spring and cut when the oats are in the milk stage and the pea pods about one-half grown.—W. J. S.

Sowing Marquis Wheat

Question.—When would you sow Marquis wheat and how much per acre?

Answer.—Marquis spring wheat and other varieties of spring wheat should be sown just as soon as the land can be made ready in the spring. One and one-half bushels is the amount of seed sown on the average soil.—W. J. S.

Planting Old Seed Corn

Question.—Would you advise planting seed corn of the 1916 crop?

Answer.—If this was good seed when previously planted and the seed corn since harvest has been kept in a dry place it will probably germinate fully as well or better than most of the

seed produced in 1917. However, this is a point you could easily determine by making a germination test.—W. J. S.

Sowing Alfalfa

Question.—When is the best time to sow alfalfa?

Answer.—Alfalfa has been successfully sown, first, in the spring of the year on winter wheat just when the snow is going away: second, in the spring of the year with a nurse crop of barley sown at the rate of about one bushel per acre; third, about July 15th on land that has been well cultivated up to that time. In July the supply of moisture in the soil is almost at a minimum and, if sown at this time, care should be taken to sow the seed just after a shower of rain.—W. J. S.

FARM ENGINEERING

Correct Temperature and Humidity for Egg Storage

Question.—I desire information on egg storage, especially as to the correct temperature and humidity for the storage period from April to December. —F. A. B.

Answer.—Twenty-eight degrees will not freeze eggs in cold storage; and twenty-nine degrees F., is usually recommended as the most suitable temperature, as this gives a leeway of one degree for possible changes in temperature. For short period storage good results may be secured at a temperature of thirty-five degrees to forty degrees F. When stored for six months or more a temperature of twenty-nine degrees is considered correct, although there is no objection to their running down to twenty-eight degrees F. if temperature can be closely controlled.

The correct humidity for egg storage-room depends on temperature, but about 80% moisture is correct for a temperature of twenty-nine degrees F. The large plants maintain a lower relative humidity than this, but it is not recommended for long period egg storage. In fact, there is no objection to a relative humidity of 85% if circulation be good.—R. R. G.

Installation of Pump

Question.—I have a well about 150 feet from the house, and the water in it is never more than 22 feet lower than the floor of the wood-shed. Would it be practicable to locate the pump in the wood-shed instead of over the well?—B. L. D.

Answer.—The pump could be located in the wood-shed as you suggest with good results. It would be advisable to put a check-valve on the bottom of the suction pipe in order to keep the pump well primed all the time. A combination of check-valve and strainer can be secured, the strainer preventing small sticks or dirt getting into the suction pipe.—R. R. G.

FLORICULTURE.

Red Spider on Flowering Plant

Question.—I am enclosing a few leaves of Campanula Isophylla which has been troubled for years with some pest. Just as the plants are ready to bloom in the summer this pest gets very bad and the leaves turn yellow and sometimes the whole plant is killed down. Can you advise what to do for the plant?—E. J. McC.

Answer.—The small insect attacking the speciment plant you sent is what is known as the Red Spider, a very small minute insect that attacks the underside of the leaves of a great many plants. A dry, overheated atmosphere will induce the attacks of these pests. Possibly you have the plant in either a too hot sunny window, or near a radiator or fire heat. These plants like a rather cool, not too sunny position

A temperature of fifty to sixty degrees is quite high enough for them.

The best remedy is to spray the plants on the under-side frequently with clear water, or soapy water, and when the leaves are slightly damp, not too wet, dust the plant well with very fine, dry powdered Flowers of Sulphur. An application of the Sulphur can be made every ten days or so.—W. H.

Repotting Geraniums

Question.—I have some very nice geraniums. They have lived all winter, but have grown so long and stalked without leaves. Would you advise cutting them or slipping them? Any information you can give would be greatly appreciated.—T. M.

Answer.—If the geraniums you mention have got stalky and unsightly looking, I would advise you to cut them back at once. They should be cut back to medium hard growth, allowed to stay in the window in the pots, and sufficient water given them to keep the soil barely moist for five or six weeks until they break into growth a little. Then shake them out of the soil they are in, cut back the roots about one-half their length, pot them into a two-sized **smaller** pot than they were in before in sandy soil, keep them in the small pot in the window until well-rooted and top growth well started. Then repot them into original sized pot into better soil. They should make good plants by summer time, treated in this way.—W. H.

Care of Rhododendrons and Cyclamen

Question.—Will you kindly give me a little advice on the care of rhododendrons? How should they be treated after they have done blooming? Also cyclamen?—J. McK.

Answer.—Rhododendron plants in pots should be kept in-doors until about the middle of May in a cool window away from fire heat. The leaves should be sprayed or sponged with clear water once a week, at least. As soon as weather permits, toward the end of May, put the plants out-of-doors in partial shade on the north side of a fence or building. Plunge or sink the pot in the ground up to the rim. Put some coal ashes or air-slaked lime underneath the pot to keep out worms. The plants should be brought in-doors toward the end of September. These plants are not quite hardy in Ontario planted out-of-doors. They seldom do well after the first or second year. They require a peaty soil.

Cyclamen plants should be treated in much the same way during the summer. The soil should be kept moist, not too wet with both plants during the summer. The pots of cyclamen are best not plunged or sunk in the ground. —W. H.

HORTICULTURE

Managing a Young Orchard

Question.—Last year I bought my place here—about five acres. As far as I know, it has been in bluegrass and some clover for a number of years. I had it plowed and ditched this fall. Soil is a loam, ranging in color from brown to black, and sub-soil is a stiff, red clay. The whole place is set with apple trees three years old; 35 feet apart in the rows. The young trees are now six to eight feet high. I have set out dwarf pears as fillers between the apple trees. My aims are threefold: first, to force this orchard; secondly, to loosen up the soil; thirdly, to grow something between the rows to make the orchard pay before trees begin to bear.

I am keeping one horse, three cows, some pigs and one hundred and fifty chickens. I have been putting manure

around all the trees and shall cultivate this under next spring. Would you please advise me how to build up ground and orchard best. I was thinking of putting in oats (or spring wheat) and clover next spring and plow clover under following year. My chicken manure is mixed with saw dust and has been kept dry. I think it should be of good use.—M. T., Welland Co.

Answer.—As I understand it, your land is already planted to fruit trees. You now wish to grow other crops between the trees for purposes of revenue. I may point out that if the orchard is your first care, you will do well not to attempt too much by way of forcing the growth or by cultivating crops between the trees or near them. On the other hand, if you wish to grow all you possibly can between the tree rows your trees are likely to suffer. I will make my meaning clear by saying that fruit trees will not stand strong forcing as they are likely to be injured or even killed by cold winters if for any reason they have grown late in the season. The best orchard practice is to discontinue cultivation about and near the tree not later than 15th of June. This means that if you are growing crops which require cultivation close to the trees after this date, this cultivation will cause the trees to continue growth, whereas they should stop growing and ripen up for winter. It is quite practicable to grow crops in young orchards provided you keep far enough away from the trees so that late cultivation if required will not affect the tree. To be certain on this point I should say that one should not cultivate within five feet of a three-year old tree after the date stated; as the tree grows the distance will increase.

Early crops, or crops which get all their cultivation before middle of June could be grown safely in orchards, or even close to trees, but crops like mangolds, corn, late potatoes, strawberries and so forth could not be grown satisfactorily, unless care is taken to keep them at a distance from the trees.

You will understand, of course, that late growth may be caused in other ways than by late cultivation. For instance, one should not apply too much stable manure to young fruit trees; they require only a moderate application at the heaviest.

Having made clear the incompatability of fruit trees and other crops, I shall leave the matter to your consideration and proceed to your remaining question which is—How to build up the soil. Your plan of beginning with oats is alright (barley might be used instead) and the clover when ploughed down would add a great deal to the land; with crops like oats and clover you should allow plenty of space for cultivation close to the trees early in the season, or up to the middle of June. At this date you would do well to sow a crop of some kind in the cultivated space to slow up tree growth so it will mature before winter. Oats would be satisfactory for this purpose as would also fall wheat or fall rye. This strip of land on each side of the tree row should be ploughed the last thing in the fall, or early in the spring. This will turn the cover crop under and fix the land for tillage again, which should begin early in spring and continue as stated to about June 15th.

If you are successful in getting a stand of clover, you would probably plough it in fairly early the following spring and grow potatoes or other hoe crops. It seems to me that with the manure which will be made on the place and the occasional ploughing under of a clover crop you should be able to build up this land pretty quickly. Sawdust in itself is of no use as a fertilizer, and is sometimes objected to because

it allows the soil to dry out more than would otherwise be the case. Dry earth or sand would be much more satisfactory for mixing with chicken manure, than would sawdust.—J. W. C.

Plum Trees Fail to Bear Fruit

Question.—We have a lot of Burbank plum trees, supposed to be of an excellent variety but which though now of full size, the largest being 16 inches in circumference, have never yet borne a crop. They grow luxuriantly, blossom freely, but when the fruit has reached about the size of a grain of wheat, it turns yellow, dries up and falls off. We have nearly a dozen of these trees and this year I do not think there were a dozen plums on the lot. Have you any idea of the cause of this non-fruitfulness and can you suggest any remedy.

Answer.—It is scarcely possible that these trees are Burbank as I have never known a case where Burbank failed to bear early and heavily, whether other plums were found in the vicinity or not. The Burbank tree is very distinct in type and almost any gardener in your town would be able to recognize it on sight. Branches are few in number and are horizontal and drooping rather than upright. The probability is that the trees you have belong to a variety which is self-sterile and the only remedy is to top-graft in a few scions of some other kind or plant other varieties to blossom at the same time. It may be that the nurseryman substituted another variety instead of Burbank in which case he would probably use another plum of the Japanese class, to which Burbank belongs. Any plum planted for pollenizing purposes would in such case require to be Japanese, as the Japanese do not cross-pollenize with the common domesticas, which are European in origin.—J. W. C.

Apple Orchard Cultivation

Question.—I have a young apple orchard just coming into bearing. Please give me cultural directions for the same throughout the season.

Answer.—Begin cultivation in the spring as early as the land is ready to work, and continue until about the 15th of June. The spring cultivation can be started by ploughing or disking if the land is light. If the orchard is in sod it would be wise not to plough deep—four inches would be as deep as one dare go. Ploughing should be followed by disking or harrowing, so as to put the land in good condition and this cultivating should be repeated at intervals of not less than ten days until about June 15th. Our practice is to sow a cover crop such as rye, rape, buckwheat or a mixture at the last cultivation. This is ploughed down late in the fall or early the next spring.—J. W. C.

ANIMAL HUSBANDRY

Weight of Corn Silage

Question.—What is the weight of a cubic foot of corn silage?

Answer.—The weight of a cubic foot of silage varies with the depth of the silo and from experimental work, weights of from 18 lbs. to 45 lbs. have been obtained. The rule is, however, that a cubic foot of silage weighs 40 lbs. Owing to the variation in the quality of silage, and the different methods of packing, it is practically impossible to give the weight of a bushel of loose silage. It is impossible to say how much a foot of silage in your silo would weigh, because you do not give the diameter or height of the silo. However, a silo 15′ x 30′ is reckoned to hold about 105 tons.—H. M. K.

THE O.A.C. REVIEW

ODELL

REVIEW STAFF

J. B. MUNRO, '19, *Editor-in-Chief*

R. W. MAXWELL, '18, *Agriculture*
F. L. FERGUSON, '18, *Experimental*
C. F. PATTERSON, '18, *Horticulture*
G. R. WILSON, '18, *Poultry*
R. A. BRINK, '19, *Query*
A. M. STEWART, '19, *Alumni*
A. H. MUSGRAVE, '19, *Athletics*
A. B. JACKSON, '19, *College Life*
C. MURDOCK, '20, *Locals*
G. H. SCOTT, '20, *Artist*
OLIVE LAWSON, '18, *Macdonald*
M. BARBARA SMITH, '19, *Mac.*

EDITORIAL:

Mr. A. H. MacLennan, B. S. A., of the Horticulture Department at the O.A.C., has received appointment as Vegetable Specialist for the Province of Ontario. His headquarters will be in the Parliament Buildings, Toronto.

Ever since graduating from the college in 1908, Mr. MacLennan has been actively engaged in horticultural work and has made vegetable growing his specialty. He is one of our most competent authorities on the production of vegetables and vegetable seeds, and in his capacity as Vegetable Specialist he will be engaged in his favorite work. After lecturing in horticulture at O.A.C., Mr. MacLennan took up similar work at MacDonald College, Quebec, where he remained several years. Leaving there he entered the Heinz Company of Pittsburg and was in charge of seed production for that company until December, 1916 when he returned to Guelph to resume his work as lecturer in horticulture.

Few lecturers are better known to the students of both sides of the campus than Mr. MacLennan. He has a genial manner and is always ready to help the

student who is in difficulties with his work. He has the respect and esteem of all his acquaintances here, and all wish him success in his new position.

D. Douglas, Farm Manager

Every student who has attended the regular course at the O. A. C. in the past sixteen years is a personal friend of Mr. Douglas. Well they remember the first day of student labor at the college, and the recollections are all pleasant as far as Mr. Douglas was concerned with them. He was an excellent manager and a competent director of labor. The boys knew that he knew, and that was enough. He knew the boys by name and had a fair idea of their individual abilities before they had spent many days on the farm. Much of his success in the capacity of farm manager was due to his ability to read character and keep the boys profitably engaged while in his department.

We are sorry to lose Mr. Douglas from the college and will miss him in many ways, but we know that in his new position he will be as successful as he has been here. It is his nature to be successful. He leaves to take the position of farm manager on the government Farm at Olds, Alberta. The very best wishes of the Review and the students go with him.

Know Thyself

There is more truth than fiction in the article "On Criticism," appearing in the Macdonald columns of this issue. Criticism is a thing we all ask for but hate to receive. We do not mind having opinions about ourselves, and we do not fail to express them to sympathetic friends, but the moment a friend voices the same opinion we get huffy and resent any proffered advice. Most of us have conceit enough to picture ourselves a few steps higher on the ladder of intelligence than our friends see us. That is why, when the truth is forced on us and we are obliged to step down, we take a longer drop than we are prepared for.

Humanity is beset by two great evils, that of setting too high an estimate on our personal ability and achievements, and that of underestimating our capacity for mental and physical attainments. Which is the greater evil is hard to determine but the nearer we can keep to the "medium course," the more will our company be appreciated and the more good we can do where we are best known. Many of us realize which way our fault lies, but we are slow to change the course. Perhaps if we just ponder over some of the hard knocks we get and set about to overcome the cause we will show improvement in a short time.

Every rational individual has the ability to read his own character and if he will be true to himself he will do so. It is his duty to himself not to underestimate his natural ability, and yet he must assert his powers with modesty. Bluff will not stand the test of long acquaintance and diffidence is not admired even by friends, for to them it is a sign of weakness. Be natural. Study to know yourself and your possibilities and then without conceit or self-depreciation make your true self known to your friends. Till you are sure of yourself do not scorn to accept friendly criticism.

Borrowing Trouble

"From him that would borrow of thee turn not thou away," may be good advice to the farmers of Ontario at the present time. Borrowing has its advantages, but its disadvantages are always most thoroughly understood and relied upon by the lender. In view of the present labor problems and the

difficulties that manufacturers have to contend with, and the scarcity of raw materials for the manufacture of farm implements and machinery it will be wise for the farmers to co-operate with each other so as to overcome the necessity of purchasing new implements at this time. Most farmers are aware of the fact that they own machines that are perhaps used less than one week in the year and their neighbors have other machines which are in use about the same length of time. Fanning-mills, Manure-spreaders and various farm implements could be used co-operatively in many communities if the proper spirit existed among the neighbors. War conditions are going to bring about a more thorough community spirit and borrowing will have to be resorted to if the best interests of the country are to be considered.

From the lenders' view-point the following poem is one of the gems of English poetry. If taken to heart by those who borrow it may work wonders in improving conditions in many rural communities, and in other places.

Be quick to take it back again,
  The article you borrow;
And don't postpone that duty plain
  To some remote to-morrow.

I fear it sounds a little stern,
  And yet I have the feeling
That borrowing without return
  Is 'most the same as stealing.

Our neighbors good our needs supply
  Without a word of fretting.
'Tis wrong to pass such kindness by
  And pay it by forgetting.

Then take it back, whate'er you owe,
  Till neighbors all are sunny;
For friendly hearts, of course you know,
  Are worth far more than money.

Ex-Students of Mac Hall

Where are the girls who have left Macdonald Hall during the past decade and what are they doing? We are trying to get information regarding the graduates and ex-students of "Mac" because our readers are interested in them and will welcome any Alumni notes we can secure. The Editor will be glad to receive any information about these girls and contemplates giving space to it in the May number of the Review. Do not delay to send in what you can. Have it here by April 15th at the latest. You may not think what you know is of any interest, but it is to us. We are always pleased to get word of the girls and will appreciate a large response to this call.

It is easy in the world to live after the world's opinion; it is easy in solitude to live after our own; but the great man is he, who in the midst of the crowd, keeps, with perfect sweetness, the independence of solitude.—Emerson.

Dear Readers—

In our Christmas number of the Review we published a list complete to date which we had received of all the O. A. C. boys who had enlisted; also a list of those who had been killed; and a list of the members from the (Senior year with their over-seas address).

We wish to thank all those who assisted us in getting the list as complete as it was. There were some boys who had enlisted whose names did not appear. We regret the omission, but it was because we had not received the intimation in time for insertion.

We are endeavoring to secure the address of every O. A. C. boy over-seas who has enlisted, and publish it; as a reference to our readers, that they may have the address of any O. A. C. boy over-seas; furthermore that the Review may be a reference to our boys over-seas in knowing where their fellow-students are. Then the Review on reaching a Y. M. C. A. camp over-seas will tell any reader the address of all O. A. C. boys over there. It will bring many of our boys together at times, when they would not have met, had they not known their addresses.

The College Review is edited by the college students apart from their college studies,and to publish a list of so many names is considerable work; and especially at the end of the term when we are nearing exams.

We would appreciate very much if you would send us the name and address (over-seas) or home address (if returned) of any O. A. C. boy who has enlisted. We can not hope to have this list complete unless we have your kind and helpful support. This appeal is made to every reader of the Review. Mothers,send us the names and addresses of your sons; daughters of your lovers; fathers of your sons. Help us, help the college boys meet in Europe.

We take this opportunity to thank the many (who shall assist us) in anticipation of your valued reply to our appeal. Address all correspondence to the Alumni Editor, O. A. C. Review, Guelph Ontario.

We are also endeavoring to publish a list of all O. A. C. graduates who have positions at the various colleges, experimental farms, demonstration farms in the Dominion. We do not expect to get this list complete for some time, but we would very much appreciate the favor of any O. A. C. graduate working or employed at any government station or college in the Dominion, who will write us and give us a list of the names of O. A. C. men working at that college or experimental station or farm; also stating the department they are with; whether it be Botanical, Entomological, Chemical, etc. We hope also to include in this list the O. A. C. graduates

who have positions on the different farm papers and journals.

The following is the personel of the teams that have represented the Ontario Agricultural College in the International live-stock judging competition at Chicago since 1900 with their present occupation.

1900—W. J. Black, Agricultural Commissioner for Canada, Ottawa, Ont.

1901—G. I. Christie, Superintendent College Extension, Lafayette, Ind.

W. A. Dryden, Shorthorn Breeder, Brooklin, Ont.

F. Jacobs—Ranching in Alberta.

L. LaPierre (enlisted) Farming, Paris, Ont.

R. H. Williams, Professor of Animal Husbandry, Tucson, Arizona.

1902—D. H. Galbraith, Ranching in Province of Alberta.

*A. P. Ketchen (deceased) At time of death was Deputy Minister of Agriculture for Saskatchewan.

S. Pearce, farming, Iona, Ont.

J. A. McCallum, farming, Shakespeare, Ont.

F. H. Reed (enlisted) with the Department of Agriculture, Regina, Saskatchewan.

1903—No entries.

1904—A. Leitch, Department of Animal Husbandry, Ontario Agricultural College, Guelph.

W. J. Lennox, Seed Inspector, Dominion Department of Agriculture Office in Toronto.

H. Mayberry, Farming, Ingersoll, Ont.

W. C. McKillican, Superintendent Experimental Farm, Brandon, Man.

R. W. Wade, Director Live Stock Branch, Ontario Department of Agriculture, Toronto.

1905—J. Bracken, Professor of Agronomy, Saskatchewan Agricultural College, Saskatoon, Sask.

H. A. Craig, Deputy Minister of Agriculture for Province of Alberta.

W. A. Munro, Superintendent Experimental Farm, Rosthern, Sask.

H. B. Smith, Editor "Nor-West Farmer," Winnipeg, Man.

*G. G. White (deceased) at time of death, Professor of Farm Management, Manitoba Agricultural College.

1906.—H. Barton, Professor of Animal Husbandry, Macdonald College, Que.

R. S. Hamer, Assistant in Live Stock Branch, Dominion Department of Agriculture, Ottawa.

W. J. Hartman, Veterinarian, Agricultural College, Bozeman, Montana (?)

A. McKenny, Superintendent Essex Seed Farms, Amherstburg, Ont.

C. C. Nixon, Manager Continental Publishing Co., Toronto, Ont.

1907.—E. S. Archibald, Animal Husbandman for Dominion Experimental Farms, headquarters at Ottawa.

T. R. Arkell, Chief of Sheep Division, Dominion Department of Agriculture, Ottawa.

L. A. Bowes, Shorthorn Breeder, near Calgary, Alta.

R. W. Hodson, Real Estate and Farming, Battleford, Sask.

D. A. MacKenzie, Superintendent Demonstration Farm, Vermilion, Alta.

1908—H. C. Duff, Representative, Ontario Department of Agriculture, Grey County.

A. A. Knight, Representative Ontario Department of Agriculture, Victoria County.

N. D. McKenzie, Farming, Galt, Ont.

P. H. Moore, Superintendent Colony Farm B. C., County District Representative for Northumberland.

1909.—W. E. J. Edwards, Professor of Animal Husbandry, Michigan Agricultural College.

R. L. Moorhouse, Agricultural Con-

sultant International Nickel Co., Copper Cliff, Ontario.

W. R. Reek, Deputy Minister of Agriculture, Fredericton, New Brunswick.

A. M. Shaw, Live Stock Commissioner, Saskatchewan.

O. C. White (enlisted) Acting Agronomist, Central Experimental Farm, Ottawa.

1910.—H. A. Dorrance, Representative, Ontario Department of Agriculture, Dufferin County.

J. E. Smith, Journalist, "Farm and Dairy," Peterboro, Ont.

R. G. Thomson, Journalist, "Farmer's Advocate," Winnipeg, Man.

W. Toole, Journalist, "Farmer's Advocate," London, Ont.

I. B. Whale, Journalist, "Farmer's Advocate," London, Ont.

1911.—T. O. Clark (enlisted) Live Stock Branch, Department of Agriculture, Ottawa.

A. McMillan, Farming at Dutton, Elgin Co.

L. Stevenson, Director Experimental Farm, Sidney, B. C.

A. A. Toole, Live Stock Editor, "Farmer's Advocate," Winnipeg, Man.

E. A. Weir, Journalist "Farm and Ranch Review," Calgary, Alberta.

1912.—P. S. D. Harding (enlisted) Representative Ontario Department of Agriculture, Lanark County.

H. M. King, Lecturer in Animal Husbandry, Ontario Agricultural College, Guelph.

H. Nixon, Farming, St. George, Ont.

F. Shaver (enlisted) Farmers' Institute Branch, Ontario Dept. of Agriculture, Toronto.

W. H. J. Tisdale, Assistant Professor of Animal Husbandry, Saskatchewan Agricultural College.

1913.—J. M. Brown (enlisted) Assistant Professor of Animal Husbandry, Manitoba Agricultural College.

F. Forsyth, Representative Ontario Department of Agriculture Lanark County (vice Harding enlisted).

A. E. McLaurin, Assistant in Animal Husbandry, Macdonald College, Que.

J. W. Stark, Representative Ontario Department of Agriculture, Peel County.

G. Woltz, Representative Ontario Department of Agriculture, Haldimand County.

1914.—No exposition.

1915.—No exposition.

1916.—R. R. Fleming, Farming at Orton, Ont.

A. G. Skinner, Farming, St. Mary's, Ont.

P. B. Slack, Farm Manager, Corby Farm, Belleville, Ont.

O. C. Evans, Farming at Chilliwack, B. C.

I. B. Martin, Overseas.

1917.—F. L. Ferguson, L. E. O'Neill, G. R. Wilson, A. D. Munro, W. H. Graham, all at present taking 4th year at O. A. C.

The following article is taken from the "Times" of London, England, dated September 17, 1917.

Lieut. Alexander Percival Matheson

(Val.) Matheson, A. S. C., Acting Flight Commander and Pilot, Royal Flying Corps (previously reported in the death list of Christmas number of Review) was killed on July 13, 1917—age 22; was the surviving son of Mr. and Mrs. Alex. P. Matheson of Ardarum, Littlehampton, Sussex, and grandson of the late Sir. Alexander Matheson, Bart, of Lockalsh whom he evidently would have succeeded.

Lieut. Matheson was educated at Oundle, intending to take up engineering as a profession, but on leaving school

he entered the Ontario Agricultural College, Guelph, Canada, taking a four years' course in farming and forestry. When war was declared, he returned to Littlehampton and received a commission in the A. S. C. two weeks after his arrival. In November 1916 he was attached to the Royal Flying Corps of the 55th Squadron; and in February, left for the front with his squadron and was stated to be one of the bravest and best pilots in the squadron. His eldest brother, Captain Jan Kenneth Matheson, Seaforth Highlanders, was killed on May 13, aged 23, and his youngest brother, Roderick Kyele Matheson, Royal West Kent Regiment, who enlisted when 16 years of age, in the Royal Fusiliers, was given his commission on his 18th birthday. On going to the front he was attached to the Manchester Regiment and was shot through the chest on September 3rd and died as a prisoner-of-war on September 8, 1916. Mr. and Mrs. Matheson's son-in-law, Lieut. P. W. Gould of King's Royal Rifles was killed on August 24, 1916.

The sacrifice of Mrs. Matheson has been exceedingly great, as her three sons, and son-in-law have been killed in less than a year.

The Review and staff extends to her their sympathy in her sorrow.

No. 32 A 860 (3rd C. D. T. M. B.) Gr. R. E. Middleton, '18, who enlisted March 8th, 1916 in the 56th O. A. C. Battery, Gnr. Middleton was Bugler for the Officers Training Corps at the

R. E. MIDDLETON, '18

O. A. C., prior to his enlisting with the 56th Battery. He was made Bugler for the 56th Battery shortly after enlistment, in which capacity he served while 56th was in training at Petawawa, and on the ship taking them overseas. After reaching Whitly Camp, England the 56th Battery was broken up and Gr. Middleton was transfered to 4th Can. Div. French Motor Batteries. Later he was transferred to the C. D. T. M. B. On Nov. 5th, he arrived in France and was drafted to 5th C. Div. Heavy French Mortars; again to 3rd C. D. A. E. for work in Belgium. On Dec. 10th he was transfered to 3rd C. D. T. M. B. Finally to the Ammunition Column, and on Jan. 11th was seriously wounded. He is at present in V. A. D. Convalescent Hospital, St. Anselm's Walmer, Kent Co., England.

Lieut. R. C. Merrick, '18 visited College recently. We were all glad to meet Lieut. Merrick once more. He was very highly esteemed while at College here, by all who knew him. Lieut. Merrick was formerly a captain in the 201st Battalion, but reverted in rank to go over-seas over a year ago. He has been awarded the Military Cross for distinguished bravery at the Battle of Lens. He was seriously wounded while in action, and after being convalescent for a time in England was granted a furlough to Canada. Lieut. Merrick is now Mustering Officer for No. 2 Military District, Toronto.

Mr. Douglas, who has been Farm Manager at the Ontario Agricultural College for the past sixteen years, has accepted a position as Farm Manager of the Government Demonstration Farm at "Olds" Alberta.

Pte. W. B. Leach, '18 who enlisted in March of 1915 with P. P. C. L. I. has been wounded, and is home to Canada. Pte. Leach visited the College recently, and it is reported that he is on his way to the West to take up ranching at Bassino, Alberta.

Lieut. E. C. Hessel, '16 who enlisted in December of 1914 with the 33rd battalion returned to Canada recently. Lieut. Hessel enlisted with the 33rd Battalion, and was later drafted to the 1st Batt. He was wounded at the Ypres Salient in July of 1916.

Gnr. C. F. Luckham,'18 has received a position on the Department of Farm Management at O. A. C. Gnr. Luckham's work will be "Rural Survey" work.

Frank Hetherington, '19 has enlisted in U. S. A., and is at present in San Antonio, Texas.

Pte. R. A. Campbell, '14 has been mentioned by Sir. Douglas Haig (British Commander-in-Chief) as having performed excellent work in his position as a Divisional Observation Officer.

W. Dawson, '12 has accepted a position with the Motion Picture Bureau, Department of Agriculture, Toronto. Mr. Dawson had formerly been employed with the Publications Branch, Ottawa. He was editor of O. A. C. Review in his final year at College here.

Mr. William Chisolm, '16 has resigned his position with the Continental Publishing Co., publishers of "Every Women's World and Rural Canada" to accept a position with McConnell, Fergusson, Agency Toronto.

Capt. B. Bigger, '13 has returned to Canada and was visiting the O. A. C. recently. Capt. Bigger is en route to the

West where he intends to take up ranching.

E. C. Hallman, B. S. A. '02, visited the College recently. Mr. Hallman is well and favorably known at the College. He took a prominent part in Athletics, while taking his course here. He was one of the best long-distance runners the College has seen. He is ranching at Acadia Valley, Alta.

J. H. Stirling of 1907 class is at the College attending the Poultry Short Course this year.

E. W. Webber, '20 has gone home to take up business in real estate. Mr. Webber was suddenly called home, and he finds it necessary to remain out of College for some time. We regret to lose "Web;" as he was a right good fellow.

Mr. W. P. Shorey of Vineland visited the College recently. He is working in the entomological laboratory, with W. A. Ross, the Dominion Entomologist at Vineland.

Hugo Clark, B. S. A., '17 has taken a position on the Farm survey work at O. A. C.

Lieut. W. H. Wright, '12, who is home to Canada on furlough, visited the College recently.

Pte. H. F. Christie, '18 is reported killed in action at the battle of Paschendale.

W. G. Nixon, B. S. A., '14 visited the College recently. Mr. Nixon, who was formerly District Representative for the district of Temiskaming at New Liskeard, is now Farm Manager of the Provincial Demonstration Farm at Monteith, Ontario.

E. J. Salter, '20, who enlisted in July of 1917 with R. F. C. at Toronto as a cadet, went overseas last November. He has risen to the rank of 2nd Lieutenant. Lieut. Salter is on active service in France.

"Somewhere in France,"
Jan. 11, 1918.

Dear Mr. Hunt,—

I am rather ashamed to write you, as it is so long ago that I received your first letter. Now, however, I must get busy as I have just received another letter from you, a bundle of papers and your welcome Christmas parcel, all of which I want to thank you for.

Another reminder of you came the other day in a letter I had from Revell, '11. Amongst a number of snapshots he sent was one of the greenhouse with the mums in it, taken when we were students there. When we were working around there doing floriculture work, I never had any thought of being in Europe in such a short time and last of all, as a soldier. Those were certainly the good old days even if we did have to dig in twice a year and get ready for exams.

I was glad to hear that you had taken a holiday at Grimsby this year and had improved in health by it. Nothing like a holiday, Mr. Hunt, after trying to keep order all winter amongst a bunch of boys and girls, particularly if they are like those of '10 and '11.

At the present time everything is pretty quiet over here, but I suppose we shall make up for it in the spring and when the offensive does start it will be a case of nothing but work. Just now I am down at the horselines and except for a general routine you would hardly know there was a war on. Occasionally,

you hear the heavy firing in the distance and at night the flashes of the guns and the star shells let you know that there is a certain amount of activity up the line. But when up there, there are times, particularly at night when both sides seem to agree to a short truce. The silence then is wonderful and you wonder if it is really true that there is a war going on. However, at other times you are fully convinced that the war is very much so. Perhaps you have just been called out to answer an S. O. S. Your own guns will be barking away and to add to the din the eighteen pounders will start while in the rear the 9.2's will start and away up in the front the trench mortar Batteries will be doing their best to add to the din. At night it is really a wonderful sight and the noise is deafening.

So far our battery has been fortunate with few casualties and none of them serious. In the Review I notice the names of a number of the old boys who have done their bit for King and Country and "Gone West", to use the soldier's expression. I do not see many of the boys over here, although there are quite a few around. Occasionally, I do see Cameron and one or two of the boys who are in another Battery, but in the same village as we are. Jim Winslow, '15, I suppose you know, was killed a short time ago. He was certainly a fine lad and I could hardly believe that the report of his death was true, but have had it confirmed since from different sources.

By the way, Mr. Hunt, that was a most descriptive and interesting letter of yours about your home at Thursley, and the surrounding country. You would hardly recognize the country now as the part that has not had huts erected on it has been largely dug up to give the soldiers training in digging trenches, gun pits, etc., especially is that true of Hankley Common. Frensham, I know well as we camped for a week at Little Frensham Pond, and I think it was the most enjoyable week I ever spent in the army. Then we also spent about ten days camped at Petworth Park on Lord Leconfield's Estate. We all remember that spot as it was there we got a proper ducking. We went to bed one night under the trees and woke up about three in the morning to find it raining most gloriously and our blankets in pools of water. But England in spring and summer is certainly a fine place. The winter, particularly one like we had last year is about the worst I ever came across.

Well, as it is getting late I must close. Please remember me to my old friends in the Department.

Thanking you again for your kindness and best wishes for the coming year.

Yours sincerely,

Bob Robertson.

The following anonymous letter was received by the Review, and is interesting to us in that it was written somewhere in France by one of our boys, "Out There." It has a spirit of good cheer and is characteristic of all those of our number who are fighting our battles in Flanders.

Somewhere in France,
January 10, 1918.

I believe that I spent one of the most enjoyable Christmas seasons that I have ever spent. I'll never forget it. We (the Headquarters Party of the 55th) live in two dugouts. Well, it so happened that in one of the houses there were two cellars and only one was in use. We dug a passage from one to the other (I mean from one cellar to the other) and covered it with corrugated iron, chalk, and dirt so that Fritz wouldn't get too wise; if he should drop us a

"flying" visit some day. Then we built a grand fireplace in one end of it and put in tables and chairs, etc. We go there when off duty, which is very seldom, to write letters, etc. We decided to enjoy Christmas, and this is how we did it. We put in a long table the length of the cellar, which seated 22 men. We invited "Blondy" Wilson over to help celebrate. The first course served was tomato soup; then roast chicken (we had 10 of them) with dressing and gravy; green peas and creamed potatoes; nut salad, peaches, cherries, pineapples, cream, nuts and raisins, and also some Christmas cake, which we had saved from boxes we had received from overseas. We drank a few toasts; and had some speeches, and songs galore, with music all the time. We have a peach of a gramophone and about 30 or 40 double records. Every record is jake. We had the phone there and we had arranged to have all the fellows around. Our only duty was the office phone, and we took turns of half an hour on it. We played music over the phone to the fellow in the office, and he connected it through to our Bde. Headquarters, and he got all the batteries at Bde. there listening to it. The Colonel sent his compliments. We call the dugout "Iona," and Dan. McArthur composed a song about it. Here it is:

(Tune: Never forget that the singer is dry.)

The shells were a-making a horrible roar,
The splinters were falling all over the door,
When a guy at the top gave a terrible yell
"Iona, Iona, the line's shot to h—l."

Chorus:

I—turrell—I turrell—I turrell—I—te,
The linemen are pounding their ear night and day,
And wherever a line is shot out by the Hun,
It's "Iona, Iona, get out on the run."

Our dugout's the finest in Cite St. Pierre,
Each man has a double spring bed, I declare,
In the evening our grate throws a beautiful glare,
As we sit and play poker each man on a chair.

There's Colonel and Hammer and Lousy and Lew,
And George, and the Cherub, and MacAdam, too,
There's Daniel and Peter, whose blood is pure blue,
There was never so merry or crumley a crew.

Our food is delicious, nutritious and plain,
There's bully and hard-tack and bully again,
And on Sunday, Machonachie's stew for a treat,
And rum in a mess-tin is handed out neat.

Now here's to the army, and here's to the King,
And here's to Iona, the cock of the ring.
And here's hoping the very next shrapnel will bring,
A Blighty to those who are helping me sing.

France, January 14, 1918.

Dear Louie,—

I was sure glad to hear from you again, and what is left of the old year '18.? Things must be changed over there. They have here anyway. This is the third Christmas I have spent in France and Flanders. There are very

few of the O. A. C. boys I came out with that are left now to fight.

I suppose you heard H. F. Christie, '18 was killed several months ago.

I have lost track of most all the old boys as I am not with the Canadians now, having been transferred to an English 6" How. Battery, and the Germans make it hot for us at times. We are near that famous town, "Ypres" of which there is very little left now.

Thank you very much for that "Cinq." France, I will drink your health with it in "Fizz."

I suppose you will be blooming forth a full-fledged B. S. A. soon, and show the natives how to make two apples grow where there should only be one; also how to make the hens lay in winter.

I am glad to hear Fred Jones is with you again. The last time I saw him was in the Somme in 1916. Remember me to him and say I am still going strong, and that I would be very pleased if he would drop me a line.

How many of '18 are left now to graduate? Is Thomas Cooper still in existence?—And Norman James? Convey my best wishes to them all for the coming season; and don't forget to drop me a line when you get time. News is much appreciated by the boys out here.

Remember me to all the fair ones. I haven't forgotten them, though far away.

Well Louis, the very best of luck for yourself, and all of '18. May you all prove to be shining lights in the "Agricultural World" in the future. Remember me to all the boys.

Yours sincerely,

George Brooks.

2nd Lieut. G. F. Brooks,
113th Siege Battery,
R. G. A., B. E. F., France.

In a recent trip to the United States, Dr. Creelman met a number of old students of the O. A. C. and supplied the editor with the following notes:

G. I. Christie, B.S.A., who is head of the Extension Department at Purdue University, has come to be a very important man in the Agriculture of that State. Mr. Christie's name has been favorably mentioned for Governor of the State.

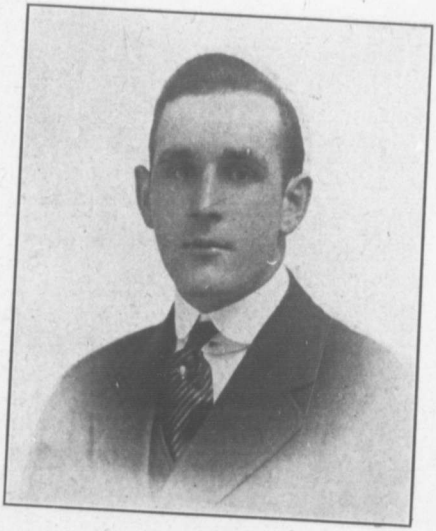
Professor A. T. Wiancko, B.S.A., of 1895, is also a very valued official at Purdue, being in charge of the Department of Agronomy.

G. M. Frier, B.S.A., our old Resident Master, is on the Purdue staff also, and making a name for himself.

W. R. M. Scott, of 1911, and Miss McNeill, a graduate of Macdonald Institute, are also on the staff, which makes a strong O. A. C. representation at Purdue.

At Columbia University, Missouri, Professor Sydney Calvert, has charge of the Department of Organic Chemistry. Professor Calvert has spent more than 20 years in this Institution, and has made an enviable reputation for himself, and is well known throughout the State. He was a two-year man at Guelph before our affiliation with the University of Toronto. After leaving Guelph, Mr. Calvert graduated from McGill, and from there went directly to Missouri. He has a son in the American Army preparing to go overseas.

At Starkville, Mississippi, E. Stafford, B.S.A., is Assistant in the Department of Entomology. Stafford will be remembered by students from 1905 to 1909, as a clever student, a good entertainer, and hard worker in his own specialty.

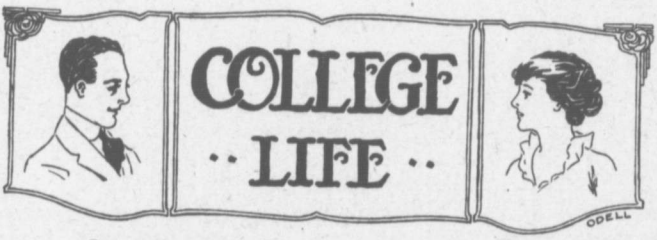


J. R. ALMEY, '19

Probably no O. A. C. student of recent years is more widely known than J. R. Almy, '19. He has had an opportunity of meeting with both regular and short-course students during the past three years while working in the Horticultural Department, and, as all "Bob's" acquaintances are friends, his range of friends is wide.

Before coming to the O. A. C. "Bob" was employed on the farm of D. Johnson, who has since become Dominion Fruit Commissioner. The experience he gained in his work there fitted him for special work at the College, and in the plant-breeding experiments, carried on here, he has proved his ability. There are few men in Ontario who understand the practice and theory of this work as thoroughly as he, and a more conscientious, accurate and methodical man has seldom been discovered among our students.

In January "Bob" enlisted with the Royal Flying Corps, in Toronto, and will, no doubt, put the same energy and thought into his new work as he always did in his former occupations. We are predicting a brilliant future for him, for we know that, no matter what the issue may be, "Bob" will be in the right place at the right time and his "Boss" can depend on him.



QUEEN ESTHER

The most successful production staged by the Philharmonic Society in recent years was the Cantata, "Esther," dramatized. This play was put on in the College Gymnasium on two evenings, Thursday and Friday, Feb. 14th and 15th, and was greatly appreciated by both audiences. The players excelled on the second evening before a crowded house.

A most gratifying feature in connection with this musical success was the fact that no outside voices were required for either solo or chorus parts, all characters and choristers being college men and women. Great credit is due Mr. W. L. Iveson and Mrs. Fuller for their able direction of the cantata and their untiring efforts in making it the success it was. They have both showed marked ability and discretion in the selection of characters and the training of the voices, and their efforts were appreciated by those who took part and those who heard the production.

The characters were admirably chosen for their parts and entered into the spirit of the play with all the energy and sincerity it demanded. Miss G. Totten as Queen Esther, thrilled the audience with her remarkably clear voice and her modest, unaffected dignity which was very becoming to her queenly position. She had the eager interest of all as she championed the doubtful cause of the Hebrew people and saved them from the treachery of Haman, the King's Counsellor, who was represented by Mr. C. F. MacKenzie. His great range and quality of voice and his artistic interpretation of Haman won highest tributes of applause. He was supported by Miss E. Aitken as Zerish, who acted her part with remarkable ability. Her voice was well suited to the part she played. The most discriminating critic could not but acknowledge the dramatic ability of these two artists.

Mr. J. R. Higgins took the part of King Ahasuerus and demonstrated that the head that wears the crown does not always rest uneasy. He was very kingly in his robes of state and his rich bass voice had the true ring of authority. His manner in the jovial scene was most pleasing and brought forth hearty applause.

The Jews were well represented in all their characters. The part of Mordecai was taken by Mr. W. L. Iveson whose musical ability is well known. Mordecai's sister was represented by Miss V. Springer whose soprano voice gave excellent expression to her part. Miss Springer's singing was much appreciated both in solo and quartette. The High Priest was one of the outstanding characters of the play and in this role Mr. E. C. Stillwell excelled. However, it was in the part of the Beggar that he won the highest praise and made the deepest impression. It is doubtful if the beggar of 2400 years ago could have

acted the part more perfectly and all were decided that his voice could not have been surpassed. Mr. Stillwell was encored on both evenings. Miss Annie Gow as Prophetess sang with the tenderness and expression her part required. She has a wonderfully sweet and well-trained voice and a personality that charms her audience.

The characters and choruses all did so well that it is difficult to do justice to the play without mentioning all who starred, but this is impossible for every actor and actress gave such true interpretation to their respective parts that a just criticism would require the individual mention of all who took part. Only the major characters are included in this report, but much of the success of the production was due to the co-operation of those who had minor parts.

Following is a list of the characters and choruses:

Characters:

Esther, the Queen—Miss Totten, Soprano

Ahasuerus, the King—J. R. Higgins, Bass

Haman, the King's Counsellor—C. F. MacKenzie, Baritone

Mordecai, a Jew—W. L. Iveson, Tenor

Zerish, Haman's Wife—Miss Aitkin, Contralto

Mordecai's Sister—Miss Springer, Soprano

Prophetess—Miss Gow, Soprano

A Median Princess—Miss Watts, Soprano

A Persian Princess—Miss Jackson, Alto

Scribe—H. C. Harris, Tenor

Beggar—E. C. Stillwell, Baritone

Herald—W. C. Hopper, Tenor

Persians, Jews, Pages, Guards and Maids

The Chorus:

Sopranos—Misses L. Beaman, M. Boyce, E. Casselman, M. Cole, I. Fairgreave, H. Graham, M. Krouse, E. Hamilton, E. Hodgins, D. Lewis, M. Martin, E. Montgomery, H. Moore, G. Rebbeck, A. Round, R. Sinclair, M. Sussex, A. Whillans, and D. White.

Altos—Misses J. Flatt, O. Lawson, H. Logie, E. McLean, L. Reed and Mrs. Smith.

Tenors—Messrs. N. S. Anderson, F. J. Greeney, R. Jukes, E. Snyder and S. White.

Basses—Messrs. W. C. Caldwell, C. A. Campbell, R. C. Gowland, A. B. Jackson, M. C. Jamieson, S. W. King, A. J. Munro and J. M. Waterman.

Queen's Maids—Misses L. Beaman, V. Cardwell and K. Hamilton.

King's Guards—Messrs. M. F. Cook, W. A. De Long, C. Lamont and J. R. Sweeney.

Cupbearers—G. S. Grant and A. M. Porter.

The College Orchestra was in attendance and furnished very excellent musical numbers besides supplying the music for the Cantata. Mr. J. Reilly is to be congratulated on the ability of the Orchestra and the work of every member is appreciated. Mr. E. J. Quail acted as stage manager and contributed largely to the success of both evenings by his energy and skill in directing the changing of scenery and manipulating the lights. —J. B. M.

Union Literary Society

On Saturday evening, February 2, a motley crowd of boys might have been seen making their way to the second floor in Mac. Hall. There they sought out, some shyly, some eagerly, their respective partners for the evening and lead them to the gym, where they occupied either the chairs along the walls or the cushions on the floor. The occasion was the joint meeting of the Union Literary Society and the R. T. F.

Rally. The gym was decorated for the event with R. T. F. banners, flags, a miniature biplane and the College Honor Roll.

The meeting opened with Mr. Wilson in the chair. The minutes were read by Mr. Patterson followed by a much appreciated vocal solo by Mr.MacKenzie The main feature on the program was then introduced, namely the debate between the First and Second years upon the subject of: "Resolved that a policy of excluding Chinese laborers from Canada should be established."

The Second Year was represented by Messrs. Frey and Murdock supporting the Affirmative, while the First Year was represented by Messrs Jukes and Frith supporting the Negative. The subject was well handled by the speakers of both sides. All had a very good flow of language and seemed quite at home on the platform.

During the judging we were favored with a reading by Miss Mary Martin. Following this was an instrumental trio by the Misses Boyce and Mr. Musgrave.

The judges' decision, given by Dr. Reed was in favor of the Negative. Dr. Reed gave as the reason for the decision, the fact that the Affirmative dealt with the subject from a social stand-point while the Negative took a labor standpoint.

The remainder of the evening was in the hands of the R. T. F. executive. After explaining the object of the occasion, intermission was declared. Coffee was served on the first floor while the gym was given over to dancing and the singing of patriotic songs. The most interesting event of the evening then took place in which the results of the R. T. F. campaign were announced by means of the "Mahontacol" which moved forward as the sum grew.

The biplane having done such good work was now auctioned by Mr. Stillwell who certainly proved his fittingness for the character of the "Jewish Beggar." His inherited talent commanded the attention of all, while one almost felt it a duty to respond to his commanding "an'—a—half." A. M. Stewart, however, succeeded in holding out the longest and is now the envied owner of the "Mahontacol."

To celebrate the success of the campaign a bombing attack upon a German camp was demonstrated by Mr. Weston. The bombs were dropped from the biplane and the German camp was completely destroyed by fire. We hope the bombs in France do not make much more noise nor cause much more excitement than was caused by these.

The boys left the Hall with a feeling in their hearts that it would be a saving of fuel to hold succeeding Lits. in Mac. Hall.—E. MacL.

LIVE STOCK CLUB MEETING

The Live Stock Club had a very interesting meeting on Tuesday evening, February 12. An illustrated address on "Ayrshire cattle," was given by W. F. Stephen, Huntingdon, Que., Secretary of the Dominion Ayrshire Breeders' Association.

Mr. Stephen is well qualified to speak on this well-known breed of dairy cattle, as he has had a life-long experience in breeding and exhibiting them. At six years of age he held one of his father's Ayrshires in a show-ring. He acted as judge for the first time when eighteen years old and has since judged dairy cattle at most of the leading fairs and exhibitions in U. S. and Canada

The speaker gave a brief outline of the breed. The Ayrshire originated along the west coast of Scotland, where the land varied from rough hills to low-lying, fertile valleys. Climatic conditions varied from the rather severe storms of the higher altitudes, to the

more moderate weather of the lowlands. These varying conditions of land and climate gave the Ayrshire a rugged constitution which enables it to adapt itself to almost any land or climate. It seems especially adapted to giving fair production on rough land with scanty pastures. The Ayrshire is not as old a breed as some of the other leading breeds of cattle, the improvement of the wild white cattle of Scotland dating from about 1700. Some Shorthorn blood was used in the improvement of the breed, which may account for the spotted and red cattle.

Mr. Stephen showed a number of lantern slides which illustrated very plainly some of the main characteristics of the breed. Ayrshire breeders have succeeded in establishing and maintaining a uniformity of type to a much greater extent than some of the other cattle breeders. The Ayrshire is especially noted for its stylish bearing, straightness of its topline, and a neat compact udder with a level floor and extending well up behind and carried well forward. The teats are generally exceptionally well placed. These points were clearly pointed out by the speaker from the slides shown. A mature class of cows at a leading exhibition was shown which clearly illustrated the uniformity of type. The many times champion cow, "Achenbrain Fanny," owned by R. R. Ness, Howick, Quebec, and the former holder of the world's Ayrshire record of milk production, "Jean Armour," bred by John McKee, Norwich, illustrated clearly the possibility of having high production with show-yard type. The noted champion bull, "Hobsland Masterpiece," owned by R. R. Ness, Howick, Que. was shown. All members of the audience were especially interested in the picture of "Burnside," the home of America's largest and best Ayrshire herd, owned by R. R. Ness, Howick, Que., the best-known breeder and exhibitor of Ayrshire cattle in America.

The Ayrshire is continuing to grow in popularity among dairy farmers. The milk of the Ayrshire is particularly adapted for the production of certified milk for infants, having a high average percentage of butter fat, rarely below 4%. The small size of the fat globules in the milk, makes it particularly adapted for cheese-making.

Ayrshire breeders are uniting and forming Breeders Clubs for to "boost" the breed. There are nine of these clubs in Canada, and any farmer who may have an opportunity of attending a field day of one of these clubs, will be amply repaid. Mr. Stephen pointed out the value that a Live Stock Club might be to agricultural students. He stated that Canada would be a source of supply to replenish the flocks and herds devastated by the war. The Live Stock Club should receive the hearty co-operation and support of every O. A. C. student.—R. E. B.

HORTICULTURE CLUB MEETING

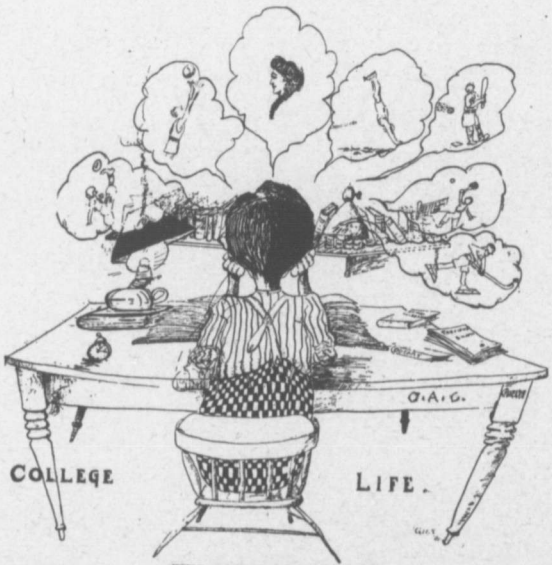
At a meeting of the Horticulture Society on February 14th, Prof. L. G. Schermerhorn of New Jersey Agricultural College gave an instructive, illustrated lecture on "Vegetable Growing in New Jersey." The "Hort." classroom was crowded however, although the meeting was to be over before 8 o'clock, many others were prevented from attending on account of the production of the sacred cantata, "Esther" on the same evening.

Prof. Schermerhorn had with him a large assortment of splendid illustrative slides and used these freely throughout his lecture. He emphasized the economic importance to gardeners of companion and inter-cropping and

showed examples of how onions are grown in rows one foot apart and how every fifth row is removed as soon as fit for green onions and then celery is planted in its place. Pictures of young asparagus fields were also used to illustrate inter-cropping. Asparagus requires four years of growth before a full crop is harvested, but the New Jersey growers sow early peppers, beans, cabbage, etc., between the asparagus rows for the first three years. To permit this the asparagus roots must be planted six inches below the surface so that disking the soil may be done without injury to them.

Interesting pictures and very practical explanations were also given of the methods of cultivation, irrigation, marketing, etc., of a large variety of crops including sweet corn, egg plants, garden beans, tomatoes, etc. The labor situation in New Jersey also is serious, but this is being overcome to some extent by planting rows far enough apart for horse cultivation and by the use of special machinery. Many women, mostly Polish and Italian, are being employed. Owing to the scarcity of barn-yard manure the gardeners use soy beans as a green fertilizer which furnishes plenty of nitrogen and humus. The beans are sown in August and disked in just before frost.

The entire meeting was most instructive and practical besides having the added interest of showing us the conditions under which this important industry is carried on in what is probably the greatest market-gardening district of our neighboring republic.



WHO COULD CONCENTRATE

Inter-Year Hockey

Jan. 22nd, 1918

Juniors defeated Seniors, 9—1 in a game which was closer than the score indicates. Both teams showed some high-class hockey.

Seniors—Goal, McBeath; Defence, Michael and Wilson; Forwards, Newton, De Long and Graham.

Juniors—Goal, Begg; Defence, Higgins and Musgrave; Forwards, Allan, Stillwell and Shales.

Mr. Moffat handled the game perfectly and missed very little.

Basketball

O. A. C. vs. 64th Battery

The game was played on the O. A. C. floor on Saturday afternoon, February 16 at 4:00 p.m. The Battery had lost two of their best men in the recent draft and O. A. C. was weakened by the absence of Weber and Matheson. Odell drew first blood, scoring on a free shot. Soon after, he scored again on a pass from Smallfield. Then Smith scored for the Battery. Then Michael, Smallfield and Odell scored in turn and Harry scored two more for good measure and the half ended 13—7 in favor of the College.

The second half was more strenuous and Weston of O. A. C. and Smith and Pequegnat of the Battery received minor injuries. Grant replaced Weston for the latter part of the period. Smallfield covered himself with glory by netting the ball seven times, one being a free-shot. Odell worked hard as usual and played an unselfish game. Michael at center covered the floor splendidly and his work helped out the guards. Smith of the Battery is a Senior O. B. A. man and hails from Hamilton. His playing was the mainstay of the soldier's team. Carroll of the Collegiate team, played center for the Battery and scored several clever baskets.

Though the game was not particularly spectacular, there was a good attendance of fans from both sides of the campus.

Lineup—Center, Michael (4); R. F., Odell (10); L. F., Smallfield (19); R. G., Musgrave; L. G., Weston. Spare, Grant.

O. A. C. Athletic Concert

The annual concert was held in the College gymnasium on Friday evening, February 1st. Owing to the coal shortage, it was impossible to have the gymnasium heated thoroughly. Besides this, the concert was staged three weeks earlier than usual which meant that the gym team was lacking in training. Also, owing to the lack of heat, it was impossible to have a rehearsal. Taking these facts into consideration, the work done was of a high order. The high bar work was done by Weber and Musgrave. Then a violin duet was rendered by Misses Bishop and English. The parallel bar exhibition was given by Weber, Way and

Musgrave. Anderson as a tough tramp and Malyon as a clown, did some clever work and drew loud applause.

The dancing team presented the Scotch Reel and the Irish Jig and were enthusiastically received. Mr. Maclaren deserves credit for the finished manner in which these dances were performed. The ever popular College quartette improved their already stellar reputation and the new, but no less popular Mac Hall quartette were roundly encored after their rendering "The Fairy Pipers." The gym. team built themselves into wonderful shapes in their pyramid work. Their neat white tights gave this part of the program quite a professional air. Seven Mac girls gave an illustration of how clubs should be swung. This exercise was very pleasing to watch and was done with definiteness and precision. In their shadow-graphs, the Senior Normals depicted some of the amusing incidents of College life. Fraser and Eidt showed themselves no mean exponents of the art of fencing; Maxwell and Ross illustrated the approved method of making the hands guard the head, and Musgrave and Lindala put on a two-minute wrestling bout. The third year gave their traditional stunt which was a fanciful prophecy of the evolution of the O. A. C. during the next thirty years. Altogether, the Athletic Concert was a success, and the large crowd which was present enjoyed immensely the wide variety of the program.

Freshman Indoor Meet

The Freshman Indoor Meet was held in the gym. Saturday afternoon, February 9th. The meet was conducted under a new system. Points were awarded to all who took part in every event, and the total number of points, divided by the number from each division who took part, determined the winning division. Owing to the unexplained absence of one member of A Division, and the fact that every B Division man was on the job, B Division won the meet by a fair margin. Geo. Lindala, an A Division man, won the Grand Championship. Lindala won several firsts, including the 60-yard potato race. This was a feature. Credit must be given to Messrs. Matheson and Maclaren who planned the meet, and to the members of the first year, who by their enthusiastic work, helped to make the meet a success.

The results were announced to the whole student body in the parlor at 10 p.m. A barrel of apples was provided, songs were sung and a pleasant hour was spent. Altogether, the Freshman Indoor Meet this year was a decided success. The Freshmen will make their presence known when the Inter-year Indoor Meet comes round.

HOCKEY

Juniors vs. Freshmen

The fastest, cleanest game of the season was played on Tuesday afternoon, February 5 when the 3rd Year Hockey Team met the speedy sextette from the First Year. The score was a tie, which just about indicates the play. Stillwell scored first on a shot from the side which savored of flukiness. In the same period he scored again, beating Rice fairly. Shoemaker scored for the Freshmen on a shot from outside the defence. The period ended 2—1 in favor of 3rd Year.

In the second period Shoemaker scored the only goal and as the game was late in starting it was decided not to play overtime.

In goal, it was hard to chose between Rice and Allan. Both robbed opposing players of what looked like sure goals, and both cleared well. Allan was still suffering from the remains of a charley

(*Continued on page* xxiii.)

On Criticism

The mission of the critic is to help people to improve. The aim of criticism is to increase efficiency. Too often criticism is confused with cynicism, and is supposed to be mere fault-finding and grumbling.

The critic should be the physician who diagnoses the trouble and indicates the remedy. The doctor, however, does not walk up to the man in the street, inform him that he is obviously suffering from certain disorders, and prescribe suitable treatment. His advice is too precious to be given away for nothing. It is worth money, because **he knows**.

Paradoxical as it may sound, gratuitous criticism is not always received gratefully, and this is not altogether surprising. It is natural to resent the so-called criticism of the inexperienced, of those who have not sufficient grasp of the subject to judge of the quality of the performance. The attitude of the would-be critic is sometimes that of the Pharisee: he thanks the Lord that he knows so much and is not as other men whose ignorance he pities and condemns.

To be of real use, criticism must be sympathetic: he who speaks should have struggled with difficulties himself and, having climbed a little higher on the rugged path, should stretch out a hand to aid and raise his fellow traveller. His duty is to encourage, not to depress; to heal, not to wound. Ability to criticize involves experience, discrimination, comparison and tact. Criticism must be candid if it is to be serviceable. Indiscriminate praise is mischievous, but praise should be given where it is due. On the other hand, imperfections must not be glossed over. The first step towards improvement is to know one's faults, and no human being should feel aggrieved if it is suggested that he or she is not absolutely flawless. If a patient informed a doctor that he was suffering from a sore throat, he would be rather annoyed if he were told that his throat was not sore at all, but in a very healthy condition.

Yet when a singer (sometimes honestly) asserts that she sang something **dreadfully,** her friends hasten to assure her that she is quite mistaken and that, on the contrary, she did splendidly. And probably she would feel hurt if they agreed with her statement. She might be like the penitent lady who went for consolation to John Wesley telling him that she felt the burden of her sins, but who, when he agreed that she was no doubt a great sinner, flew into a passion of indignation.

The pointing out of some weakness in execution is sometimes met with the retort, "Could you do it any better yourself?" This reveals an untrue conception of the function of the critic which is to know, not to perform. A cripple might criticize dancing, and a dumb man might criticize singing, if they had the requisite knowledge. But that is the point. When may a man assume that he possesses that knowledge? Probably it is really wiser not to offer criticism until it is sought, though when the desire truly is to help, it is often hard to keep silence.

AN INCIDENT ON A STREET CAR

A few days ago I was the unintentional spectator of a very interesting incident. I had boarded an Avenue car and was homeward bound, tired and uninclined to notice anything about me.

At a street corner the car stopped and a man got in—a returned soldier I concluded, as one sleeve hung empty. Otherwise, he was as fine a specimen of Canadian manhood as one would meet anywhere in the Dominion. He sat in the seat across from me with his empty sleeve to the wall and began to read a newspaper he had brought with him.

At the next stop two young girls entered the car. Both were very well-dressed, and were really pretty in a "curls-and-eyes" sort of way. They arranged themselves in the seat in front of me and began to talk in an animated way of some very commonplace subjects that could have been dismissed in a few words. "A trifle too self-conscious," I thought, as I watched them.

"My dear," began one, "I have been simply rushed to death. I'm due at an afternoon tea to-morrow, and Grace and I are going to the theatre on Friday—Marguerite Clark, you know. She's pretty, don't you think?"

"Charming," agreed the other. "I am as busy as you are, dear, I am going to Stella's little dance on Wednesday, and then Thursday I am going tobogganning. Friday, I also am going to the theatre. Saturday, I wanted to go out, but you know it is Red Cross day and I have to do my monthly collecting. Really, it's an awful nuisance. You may be thankful you aren't in for it every month."

"It must take up a lot of time," sympathized the other.

Then both drifted to other subjects, and I went on reading my paper.

Soon, however, their conversation again interested me and once more I found myself listening.

"Oh yes," one was saying, "Art went over at the very first. He's no slacker. He has been over there ever since, and really sometimes I'm so worried about him I hardly have heart to drag through the days."

She did not look that way to me, but of course I knew nothing about her. Her companion looked sympathetic and said something in a low voice, whereupon the patriotic one—she who monthly dragged herself through the wearisome collecting of Red Cross money said, "Yes, that's just how I feel about it too. It makes me sick"—here she raised her voice and glanced back at my soldier friend—"to see young boys, strong and able to fight sticking around just as if there were no war. It's a shame, I think." "That's just what I have often said," agreed the other, with a most expressive look right into the soldier's eyes. I glanced at him. He was looking at the girls with a rather amused look on his face. They continued their conversation on the war until they left the car a few blocks further on and as they left they could not resist throwing a glance of scorn at the, to them, slacker.

Catching my eye, he smiled and I moved over into the seat with him. "So they think you ought to be at the front," I said. The boy smiled and looked rather wistfully down at his empty sleeve. "As you see," he said, "I have been there."

"Didn't you think," I went on, "that they were rather inconsistent? They evidently did not consider the doing of their bit important."

"They are thoughtless," he replied rather wearily, "I have seen plenty of their kind in Canada. I wouldn't mind going back in a way." He went on dreamily. "The French women are

rather fine you know, and the English women are real bricks."

"There are surely some Canadian heroines over there," I suggested.

"Well, I should rather guess so!" was his forceful reply. "When they wake up they are the real thing. All I am saying is that you don't find many of them here, and that is why I wouldn't mind going back. After passing through a thing like this war, a fellow hasn't much time or use for superficialities. It's the real people he wants to know, and," he added, "I'll admit that it makes me rather sore to see the other people neglecting to do their bit."

With that he rose, the car having reached his corner, and the last I saw of him he was swinging down the street with that pathetic empty sleeve of his draped across his breast telling the world that regardless of the cost he at least had done his duty.

THE I. O. D. E. DANCE

The Valentine Dance given by the O. A. C. Chapter of the I. O. D. E. was one of the most successful events of the season. Mrs. Fuller and the officers of the Society received the guests as they came in. The gymnasium was artistically decorated with hearts, flags and the I. O. D. E. shield. The music, which was furnished by a five-piece orchestra from Guelph, played an important part in the enjoyment and success of the evening. In addition to the O. A. C. and Mac Hall students, there were several ex-students and out-of-town guests present.

The net proceeds amounted to one hundred and thirty dollars, the greater part of which is to be given to the Red Cross Society in Guelph, the rest to be used to furnish supplies for the Red Cross work which is being carried on by the I. O. D. E. in the Hall.

This first attempt of our newly-organized chapter to raise funds in this manner has proved such a decided success that we trust it will be the first of many other such joyous occasions.

The following interesting article was received by one of our girls from a member of Class '15 who is somewhere in France. We are taking the liberty of placing it in the Mac Hall columns as it would seem to have special bearing on subjects that might be learned at the Hall. In our April number we will publish a companion article, "More Rabbit Stew" which will give fuller information regarding the place of these household pets in the rations of both soldiers and peasants in France and Belgium.—Editor.

TOMMY' RABBIT STEW

The scale of rations authorized for the B. A. in France is more liberal in its allowance of animal protein than would meet with the approval of the dietitians who rule intelligent opinion at Macdonald Institute. Thomas Atkins' "Field Ration," as balanced by G. H. Q., includes two ounces of cheese and four ounces of bacon besides a meat ration of one pound of frozen meat (usually Argentine beef or New Zealand mutton) or an equivalent of nine ounces of preserved meat (civvy "corned beef," army "bully," or "Fray Bentos," when the cook feels pleased with himself). An authorized substitute for this frozen or preserved meat ration is rabbit when available, one one-ninth pounds (including allowance for skins).

During the four last months of the year, when cool weather permits ship ments, great numbers (no figures are available) of English Wild Rabbits are supplied to the troops on the Western Front. Whether or not this is an econical meat ration substitute it serves the useful purpose of assisting to vary a diet that is apt to be become unin-

teresting, monotonous, and unappetizing. Variety in army rations is highly desirable. Variety is the spice of life any time, and any place, and particularly is it true out here where we are apt to be "fed up" in more ways than one.

There is some loss of weight from the paunched rabbits in transit and when they reach the cook they will not average more than 2¼ pounds apiece. On the meat equivalent basis, this should mean an issue of about 50 rabbits per 100 men in the field.

In this war game the army cook's long suit is "stew." It is trumps when "rabbit stew." No apologies are demanded for the mid-day dinner menu persisting as "stew" when it means "rabbit stew."

The official recipe is good and furnishes a delectable mess which never fails to waken a little latent enthusiasm in the dinner parade.

Cook finds, when he has peeled the skins and removed the heads and feet from fifty rabbits, that he has about seventy-five pounds more or less of rabbit carcasses. These must be soaked in cold, salt water for half an hour before jointing small and washing in fresh water. One-quarter of the bacon ration has been saved from breakfast and "Tommy" has never missed it. Cut this six pounds of bacon into slices. Peel and cut into small pieces four or five pounds of onions.

Cook, if he is the right kind, has got the habit of simmering cracked bones and lean meat scraps in the stock pot, and has plenty of stock on hand for his gravies, soups, and bully-beef hashes and stews.

Put rabbit, bacon and onions into "dixies," cover with stock, keep the lid on but stir occasionally as it simmers for two hours.

Flour is a less frequent issue now than formerly, but when next fall and rabbit-stewtime comes 'round again cook or his successor—cooks do "go West," you know, or else they would be missed beyond the sun-set—will be able to find three pounds of flour for this rabbit-stew. Mixed with three ounces of salt and half an ounce of pepper, the flour is added as a thickening, well-stirred, and cooking continued for half an hour or more.

A vegetable ration for one hundred men, if potatoes, would be about fifty pounds. If flour is obtainable for thickening the stew most cooks prefer to cook the potatoes separately boiling in the jackets as usual. Without flour, the dixies are only half-filled to start and simmered for an hour and a half. Then the potatoes, peeled and cut in uniform pieces are added, the dixies filled with stock, stirred occasionally, lids kept on, and boiling continued for at least an hour. Seasoning is added shortly before the call, "Dinner Up! Rabbit Stoo—oo—oo!!!"

—Fads, '15.

A Parody on Life at Mac

"Mac," it's just a bubble,
Don't you know?
Just a painted heap of trouble,
Don't you know?
You come up here to cry,
You stay awhile and sigh,
Later—you wish to die,
Don't you know?

It's a horrid game of chance,
Don't you know?
Skates and chemistry, and dance,
Don't you know?
Clubs and parties, cliques and sets,
Fashions, follies, board, regrets,
Struggles, strife and little frets,
Don't you know?

Chemistry? Oh just a lark,
Don't you know?

Just a night-mare in the dark,
Don't you know?
Yes, you study day and night (?)
And then after all the fight,
Why, perhaps the wrong thing's right,
Don't you know?

Board? Oh when your bill is paid,
Don't you know?
And your home at "Mac" you've made,
Don't you know?
You just worry and you mope,
And you hang your highest hope
On a cake, perhaps, of soap,
Don't you know?

Dances are just style and dress,
Don't you know?
And a source of much distress,
Don't you know?
To determine what to wear,
And how best to part your hair,
When to go, and likewise, where,
Don't you know?

So we worry through each day,
Don't you know?
In a "Macish" kind of way,
Don't you know?
We are hungry—are not fed,
Foolish things are done and said,
We are tired and go to bed,
Don't you know?

You've two years and that is all
Don't you know?
To get acquainted with Mac Hall,
Don't you know?
You can only clean stoves once,
Caloryate a few odd months,
Then out you'll go again—a dunce,
Don't you know?

—M. Krouse.

Good wishes are not worth much anyway. They sang, "Long live Haman," until they were hoarse for five consecutive nights, but that didn't keep him from the gallows.

MACDONALD LOCALS

Sun? or Son?

The emblem of the Australian Forces evidently reminded one of our students of the rising sun. Curiosity overcoming her while sitting by Miss Fraser and her escort, she leaned forward eagerly exclaiming, "I do like your rising sun, Miss Fraser."

To what she was referring was rather doubtful, judging by the pained expression in Webster's face.

Preparations for the dance were plainly in evidence at Mac weeks before the event arrived.

Short Course Student—"I wonder if I will ever learn to dance."

Eloie—"Why, you are doing fine, in this one-step."

Miss Robertson—"I used to know how to do it, but I am getting rather 'Rusty' now."

Since the principal part of the battery have gone overseas, a certain young lady at the Hall has to be fed on Bleeding Hearts. The following recipe may be found useful:

Bread cut in heart shapes varying in size according to the symptoms. Spread with butter and jam. Sugar may be sprinkled over the top if the case in hand has been developed sufficiently. Serve with kisses.

This makes a splendid dish for those suffering from an affliction of the heart.

It has been asked why one of the girls sits continually with her hands in her lap. The following conversation may solve the difficulty.

Dr. Ross in psychology class—"With your hands, how would you express love, Miss B?"

Dorothy—"Why, folded in my lap, Dr. Ross."

Seniors in the blues! They have passed in their Rink Ticket. Why? Well reports from over the campus say that this is the time of year the Senior's popularity wanes. Never mind, Seniors, the boys are getting a good start for next year.

Welsh—When are you moving down town, Dorothy?

Dorothy—About the first of April, I think.

Welsh—That will mean some long walks for me.

AT DINNER ON SUNDAY

Muriel—"I'm glad they give us lots of cabbage."

2nd Girl—"Why?"

Muriel—"Because cabbage contains a considerable amount of sulphur, and sulphur makes matches."

Junior—"Miss Roddick, how much would one of these salmon weigh?"

Miss Roddick—"Well, I can't say exactly."

Junior—"What? Not with the scales right on them?

Libys Ecyob—"I had such a grand sleep last night. I went to bed at eight and slept through 'till eight, and didn't hear a sound, and the noise in the corridor was frantic."

Reminds one of Falstaff.

WHEN THE CURTAIN WENT DOWN

Elderly lady—"Well, I enjoyed that very much. I used to read about the Hanging Gardens of Babylon, and wonder what they looked like! I'm so glad I've seen them at last! Just fancy those trees growing upside down! It's like the mirage in the desert of Sahara. I wonder how often people were hanged there!"