PAGES

MISSING

THE O. A. C. REVIEW

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

VOL. XXVIII. MAY, 1916 No. 9

Our Roll of Honor.

"I called in my need, and they came"
The words in letters of flame,
Are carved on the hearts of the Empire and
Shall to the end remain.

They went in their youth and their might,
Undaunted into the fight,
Eager only to strike a blow for the Land
That stands for the Right.

Gladly they gave their all,
Counting it honour to fall
For the great little Land with her silent
Scorn of the mean and the small.

Now all are enshrined the same,
Crowned with undying flame,
In words that blaze through the ages
"I called in my need and they came."

—*M. I. Pope.*

Names of Those Who Have Enlisted.

	Class		Class
√ Addis, G. T. (Lieut.)	'10	Boulton, O.	'17
Agar, Egan (Capt.)	'17	Bradley, C. A.	'17
Ames, G. O.	'18	Bramwell, K. Stanley	'14
Amos, L.	'16	Brooks, G. F.	'18
Anderson, Wm.	'19	Brown, Richard	'18
Armstrong, P. P.	'10	Brown, Ralph	'18
√ Atkins, J. H. P. (Lieut.)	'07	Brown, Wm. R.	'18
Atkinson, G. L.	'05	Brown, W. J. (Lt. Col.)	'94
Auld, J. (Lieut.)	'12	Brydon, Ronald (Lieut.)	'18
Austin, R.	'11	Burnam, J. W.	'17
Bagsley, H. E.	'17	Burnett, R. T.	'15
Baker, F. H. R. (Lieut.)	'16	Burrows, A. R.	'16
Barrett, H. H. G.	'16	Burrows, Leslie (Lieut.)	'15
Beatty, H. A.	'15	√ Caldwell, L. V. (Lieut.)	'17
Bell-Irving, A.	'12	Cameron, D. A. R. (Capt.)	'02
Bennett, W.	'16	Campbell, A. M.	'14
Bertram, L. (Lieut.)	'15	Campbell, H. M.	'17
Bethume, J. A. (Lieut,)	'17	Campbell, J. W. R.	'17
Bews, R.	'19	Campbell, W. M.	'12
Biggar	'13	Carncross, E. E.	'16
Bird, W. J.	'17	Carroll, J. A.	'14
Birdsall, F. E. (Capt.)	'11	Carpenter, G. H.	'04
Bissett, W.	'17	Carson, H. A.	'19
Blanchard, B. H. C.	'14	Cassels, H.	'19
Bland, Alan G. (Lieut.)	'13	Chaffey, W. F.	'13
Bond, K. H. M.	'17	Chamberlain, C.	'17
Boucher, W. H.	'15	Chauncey, R. J.	'16

	Class
Cherry, P. A. B. (Lieut.)	'12
Chesley, E. T.	'18
Chester, W. N.	'18
Christie, H. F.	'18
Clare, F.	'18
Clark, G. A.	'16
Clark, T. O.	'12
Clarke, J. B.	'18
Clarry, A. G.	'17
Cleeves, A. C.	'14
Cleverley, A. C.	'17
Cleverley, H. S.	'11
Cline, C. A.	'19
Cody, B.	'19
Coke, E. F. (Lieut.)	'09
Connon, P. C.	'16
Cook, G. V.	'13
Cook, W. O.	'19
Cooper, H. S.	'09
Copeland, R. C.	'18
Corbett, R. R.	'18
Cory, Andrew (Capt.)	'15
Cotsworth, F. B.	'16
Coulter, W. A.	'19
Cowan, A. H.	'17
Cox, C.	'17
Crawford, R. S.	'17
Crosley, C. R.	'17
Cudmore, H. J.	'17
Culham, G. J. (Lieut.)	'13
Cunningham, C.	'18
Curran, H.	'16
Curtis, N. (Lieut.)	'15
Cuthbertson, J. A.	'15
Davies, E. L. (Lieut.)	'13
Davis, Herb.	'12
Davis, H. R. L.	'18
Davison, Wilfred	'13
Delworth, C.	'18
Dickson, N. A.	'18
Donald, F. C.	'15
Donaldson, E. R.	'18
Donaldson, J. R.	'16
Donaldson, R. W.	'15
Dow, Norman D.	'16
Downie, G. A. (Lieut.)	'14
Duff, C. W.	'18
Duff, G. C.	'14
Duncan, C. C.	'16
Dunlop, J.	'14
DuToit, A. G. S.	'18
DuToit, A. M.	'19
Eakins, R. C.	'11
Eastham, A.	'09
Edwards, G. H.	'18
Edwards, H. S.	'17
Edye, H. K.	'16
Elliott, G. A.	'16
Ellis, G. C.	'13
Erb, J. H.	'18
Estabrooks, W. H.	'17
Everest, R. E.	'05
Fairclough, E. R.	'17
Fairles, W.	'18
Fenwick, F.	'17
Fidlar, D. G.	'18
Fisher, J.	'19
Fisher, M. W.	'18
Fitzgerald, E. J.	'16
Fitzgerald, A. C.	'17
Fleming, C.	'18
Foot, J. L.	'16
Forman, C. L.	'17
Fortier, T. H. N.	'15
Foyston, B. E.	'15
Fulton, A.	'17
Freeborn, S. G. (Lieut.)	'15
French, H. S.	'16
Gardhouse, M. W.	'19
Garlick, G. (Lieut.)	'16
Gautby, C.	'17
Gautby, L. B.	'17
Golding, N. S. (Lieut.)	'14
Goodall, G. M.	'17
Goodman, Leslie (Capt.)	'15
Graham, C. N. (Lieut.)	'17
Grange, J. B.	'13
Gregg, A. H.	'16
Grunder, N. A.	'19
Hall, E. R.	'15
Hallowes, Wm.	'14
Hamilton, F. W.	'19
Hammersley, A. S.	'19
Hammond, H. L. (Lieut.)	'17

	Class
Hammond, W. A.	'18
Hammond, W. S.	'17
Hancock, M. L.	'18
Hanna, D.	'19
Hare, W. E.	'16
Hare, H. R.	'14
Harkness, N. J. (Lieut.)	'19
Harrop, C.	'18
Hart, E. W. (Lieut.)	'15
Hartley, R. S.	'17
Hayles, N. A. D.	'10
Hearle, E.	'16
Hempson, J. A.	'17
Henderson, J. F. (Lieut.)	'18
Henry, Lew	'13
Herder, H. C. (Lieut.)	'17
Herridge, H.	'13
Hessel, E. C. (Lieut.)	'17
Heurtley, E. W.	'11
Hextall, L. J.	'13
Hiddleston, J.	'15
High, I. V.	'18
Hill, L.	'18
Hill, W. G.	'17
Hirst, Jerry	'14
Hockey, J. F. D.	'17
Hogarth, J. G.	'17
Holinden, R.	'17
Hoodless, J. R. (Lieut.)	'05
Horan, B. K. (Died Dec. 25, 1915.)	'15
Howarth, C. M.	'19
Huckett, H. C.	'16
Hudson, H. J.	'07
Ingraham, R. C. J.	'19
Ingram, F. H. (Killed in action.)	'09
Innes, Robt. (Major.)	'11
Irvine, D.	'14
Irwin, B.	'18
Jackson, G.	'16
Jensen, E. (Lieut.)	'16
Johnston, G. T.	'12
Johnston, J. T.	'16
Jones, Mel.	'16
Jordan, M. D.	'18
Jowsey, N. B.	'14
Kay, W. J. B.	'18
Kedey, W. M.	'15
Keegan, H. L. (Capt.)	'13
Kent, Henry (Lieut.)	'18
Ketchen, R. W.	'04
Keirstead, R. M.	'17
Kelso, M. W.	'12
Kennedy, S. (Killed in action.)	'10
King, V. (Lieut.)	'11
Kingsmill, G. F. (Lieut.)	'14
Kirkley, F. R.	'15
Knight, G. F.	'17
Knowles, F. G.	'17
Knox, R. G.	'17
Landels, B. H.	'11
Lane, A. C.	'17
La Pierre, L. A. (Capt.)	'03
Lattimer, E.	'14
Lawson, J. D. (Lieut.)	'11
Lawrence, C. A. (Capt.)	'09
Leach, W. B.	'18
Lee, G. D. (Capt.)	'16
Leggatt, C. W. (Lieut.)	'18
Lever, James (Lieut.)	'14
Lewis, Randal L.	'16
Leppan, H.	'14
Lindenburg, A.	'18
Lindesay, H. H.	'15
Loghrin, S. (Capt.)	'97
Long, L. C.	'18
Lord, Leslie (Lieut.)	'16
Lord, S. N. (Lieut.)	'16
Lund, T. H.	'12
Macdonald, R.	'12
Machlin, J. M.	'18
Maclaren, H. A.	'13
Magee, W. G.	'17
Main, C.	'19
Main, C.	'11
Malcolm, W. F. (Lieut.)	'17
Mallock, Edward	'15
Marshall, N. A.	'18
Martin, G. L.	'19
Martin, N. R.	'16
Matheson, O.	'18
Maybee, H. J.	'18
Merrick, R. C. (Capt.)	'18
Middleton, E.	'18
Millar, G. C.	'12

	Class
Mitchell, A. R. R.	'16
Mollison, R. W.	'14
Moore, J. A. C.	'14
Morse, T. W. (Lieut.)	'16
Morton, B. W.	'17
Moses, E. N. (Lieut.)	'17
Mosley, L. A.	'14
Murray, Husson G.	'13
Murray, Robt.	'16
Murray, R. H.	'12
Murray, W. J. R.	'17
McAdam, J. A.	'18
McArthur, D. C.	'18
McCharles, Malcolm	'16
McClymont, A. G. (Lieut.)	'16
McCormick, J. C.	'16
McDonald, G. C.	'13
McElroy, H. M. (Lieut.)	'14
McEwan, C. F. (Capt.)	'09
McGregor, D. G. (Lieut.)	'18
McGuire, M. E.	'18
McLaren, Q. (Lieut.)	'15
McLennan, D. M.	'16
McMullin, W. B. (Lieut.)	'17
McPhail, M. C.	'17
McWhinney, H. S.	'18
Neal, C. W. (Lieut.)	'17
Neal, A. R.	'14
Neilson, M. A. (Lieut.)	'17
Nind, P. W.	'15
Nixon, C. M.	'17
Nourse, C. B. (Major)	'14
Oldfield, H. G.	'16
Orlowski, A. J.	'17
Overholt, P.	'15
Packham, S.	'18
Parker, G. B.	'16
Patton, George, E.	'17
Pearson, H. W.	'18
Peart, R. M.	'16
Percival, S. E.	'17
Pereira, A. O. (Lieut.)	'17
Peren, G. S.	'15
Phillips, Harold	'12
Powys, B. C.	'17
Pratt, W. J. (Capt.)	'16
Pulleine, H.	'17
Raynor, G. T.	'15
Raymond, A. B. (Lieut.)	'18
Read, D. G.	'18
Renwick, H. L.	'19
Rettie, J. F. (Lieut.)	'12
Reeves, F. S.	'12
Riley, C. W.	'18
Robertson, R.	'11
Rogers, C. H. (Col.)	'97
Rogers, C.	'12
Roger, J. C.	'17
Rogers, S.	'12
Romyn, A. E.	'16
Ross, M. N. (Capt.)	'98
Rowland, H. F.	'16
Rowlands, W. A.	'17
Rowley, E. G. (Lieut.)	'17
Rumsby, R.	'15
Runnalls, P. L.	'17
Ryan, Ken (Lieut.)	'14
Ryrie, H. S. (Lieut.)	'13
Sampson, H.	'18
Sanderson, C. E.	'18
Sanderson, T. (Lieut.)	'15
Sand D. R.	'15
Sandford, P. L.	'17
Schwemann, D.	'17
Scott, W. M.	'17
Scott, H. Maxwell (Lieut.)	'15
Semon, Percy	'09
Seymour, C. N.	'18
Shaver, F. D.	'13
Shaw, C. F.	'18
Shaw, J. G.	'18
Shipton, J. C.	'15
Shutt, D. B.	'19
Shuttleworth, E. H. (Capt.)	'15
Silverthorn, G.	'18
Simonds, Richard	'17
Sloan, R. R. (Capt.)	'15
Smedley, G.	'18
Smith, D. M.	'15
Smith, G. L.	'17
Smith, M. T. (Lieut.)	
Smylie, J. S. (Lieut.)	'15
Spencer, G. J. (Capt.)	'14
Stairs, Kenneth	'13

	Class		Class
Stansfield, N. (Lieut.)	'14	Watt, A. L.	'18
Steele, J. A.	'16	Watt, M. A.	'18
Steele, T. M.	'18	Watt, R. S. (Lieut.)	'17
Stevenson, H. E.	'18	Wearne, H.	'11
Stirrett, Geo. H.	'14	Wearne, G. A.	'17
Stoddart, T.	'18	Webster, C. A.	'13
Stokes, C (Lieut.)	'17	Weir, Douglas	'06
Stones, J. G. K.	'18	Weld, D. S.	'19
Story, H. M.	'19	Western, E. A.	'16
Thomas, B.	'19	Western H. W.	'19
Thompson, R.	'17	Westra, Harry	'17
Thompson, Stanley	'16	White, O. G.	'10
Thompson, G. A. (Lieut.)	'16	White, R. E.	'19
Tompkins, M. N. (Capt.)	'12	White, W. R.	'15
Townsend, D.	'16	Whitelock, J. E.	'19
Townsley, W. A. (Lieut.)	'15	Wilcox, C.	'18
Tregillus, C. A.	'13	Wilkinson, E. G.	'14
Twigg, Pat	'07	Wilson, J. R.	'16
Ure, R. D.	'17	Wilson, N. I. (Lieut.)	'15
Varey, J. M.	'16	Wiltshire, W. E.	'14
Walsh, F.W. (Lieut.)	'16	Wilson, S. C.	'17
Ware, Ben W.	'18	Wilson, Geo.	'13
Walker, W.	'18	Wiltshire, O. E.	'19
Waterfall, J. F.	'17	Woodgate, H. A.	'17
Waterhouse, Pat	'13	Wooley, H. H.	'18
Waterman, S.	'16	Wyatt, H. M.	'19
Waters, M. S.	'17		

Note:—If any of our readers know of an O. A. C. man who has enlisted, and whose name does not appear above, will they kindly notify us, giving name and college year, that we may publish a supplementary "*Honor Roll*" in a future issue.—*Ed.*

Facts and Problems Bearing on Successful Red Clover Growing in Canada.

By M. O. Malte, Ph. D., Dominion Agrostologist.

"A modern improvement in this country is the laying their lands down with clover and trefoile for two years, and keeping it well down with sheep, by which means many pernicious weeds which used to trouble them greatly are got under, and their lands kept clean and in good order."—*Arthur Young, A Six Month's Tour Through the North of England, 1769.*

Red Clover growing, as is well known, does not go very far back in the agricultural history of the world, as compared with the growing of cereals and leguminous plants of the pea and bean tribes. It is generally assumed that it was introduced into this continent at the end

of the eighteenth century. When it was first grown in Canada is not accurately known. It may be of interest, however, to learn that its growing was recommended officially as early as 1812. In that year, Charles Frederick Grece, in a memorandum addressed to "His Excellency the Governor in Chief" entitled "Considerations on the present state of Agriculture in the Province of Lower Canada, with remarks on the probable means to be pursued for its Improvement" says in part:—"Red Clover as well as Grass Seeds, should be admitted duty free, it being wanted, to introduce better feed for stock", and also, "..... recommend to the Canadian Farmers, to divide their Lands in four equal Parts, the one-half to be Seeded down for four Years, with Red Clover and Timothy or Fox Tail Grass, the remaining half to be divided into equal parts, the one to be Cropped, the other to be under Summer fallow..... ....."

The general importance that the modern farmer, especially the dairyman, attaches to Red Clover is, *ipso facto*, the best proof of its extraordinary value. Especially in Eastern Canada where the climatic conditions, on the whole, permit successful Red Clover growing and where short rotations are or, at least should be, generally practised, the importance of Red Clover can hardly be over-estimated.

It is not within the scope of this article to deal with its well known faculty to maintain and even increase the fertility of the soil, nor to dwell on its feeding value for different classes of live stock. Neither is it the object of the following paragraphs to discuss the external conditions which tend to make Red Clover growing most successful. The writer shall endeavour to discuss, rather briefly, some biological factors and problems, most intimately connected with the potential value of Red Clover and with the possibilities of its successful growing in districts where the climatic conditions are more or less adverse.

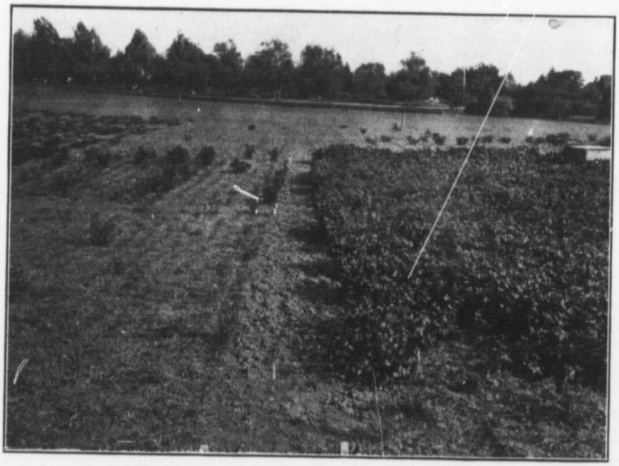
Yield as Affected by Hardiness.

It is generally stated, in the agricultural literature, that in northern countries the general value of Red Clover as a hay or pasture plant depends largely upon two factors viz:—yielding capacity and hardiness. But if we examine the relationship between these two factors, we will find that the yielding capacity to a very great extent is determined by the hardiness. The intimate connection, existing between yielding capacity and hardiness was demonstrated, in 1914, by an experiment carried out at the Central Experimental Farm, Ottawa.

A number of Red Clover plots were laid down and sown with seed from different sources in 1913. The same seed was also used to sow a corresponding number of rows, in which the actual number of plants was accurately determined by counting at the end of the season of 1913. In 1914, the different plots were harvested separately, and thus figures were obtained which gave an idea of the comparative yielding capacity of the different lots. In the spring of 1914, the number of surviving plants in the rows, corresponding to the plots just mentioned, was also determined by counting. By comparing the number of surviving plants in the rows with the number of plants on hand the preceding fall, the percentage of hardiness was roughly determined. The figures, obtained for 8 lots out of total of 9, are very interesting, as they clearly indicate that the relationship between yield and hardiness is very intimate. The following table emphasizes this:—

Plot No.	Yield per acre of plots		Per centage hardy plants in rows.
	Tons	Lbs.	
1	3	1100	53.6
2	3	200	51.7
3	3	100	34.5
4	2	1300	36.3
5	2	1300	23.7
6	2	1000	14.4
7		1200	5.8
8		200	2.1

The above table shows, among other things, that, roughly, the yields recorded from the hay plots are fairly proportionate with the percentage of hardiness as found in the corresponding rows. In other words, that the yield of a "variety" of Red Clover is, to a certain extent at least, associated with its hardiness. This being the case, it follows, not only that the Red Clover grown in Canada should be hardy to give the highest possible yields but also that hardiness most necessarily should characterize those "varieties" of Red Clover which are intended for those parts of the country where the winters are unusually severe. Hardiness in Red Clover, therefore, will not only mean higher yields, but also make possible the extension of Red Clover growing to districts where at present it is more or less of a failure.



Red Clover Plots, showing difference in hardiness. Plot to the right from seed grown in the Ottawa district: plot to the left from commercial seed.

ACCLIMATIZATION.

The biological process by which varieties particularly suited to certain environmental conditions and severe climate in particular may be developed is often termed acclimatization. When a certain variety is said to have been acclimatized to a certain external condition, changes have taken place in the biological constitution of the variety in question which makes it more suitable to the conditions prevailing than was the parent stock from which it was developed.

In order to arrive at a clear understanding of the nature of acclimatization in general and the ways by which acclimatized varieties of Red Clover in particular are developed, it is necessary

to distinguish sharply between *individual acclimatization* and *hereditary acclimatization*.

1. With *individual acclimatization*, also called modificative or somatic, is understood the modification of characters of individuals belonging to a constant form or a pure line, resulting from and influenced directly by the climate.

2. With *hereditary acclimatization*, also called genetic, is understood the fact that species or "varieties" occurring in a certain climate, possess qualities, making them especially well adapted to the climate in question, and differing from qualities of a similar nature characteristic to other species or "varieties" living in a different climate.

A few examples may serve to accentuate the essential difference between the two types of acclimatization just mentioned. First a few examples on *individual acclimatization:*—

It is a well known fact that low land plants, if moved to higher attitudes, develop much larger and more strikingly coloured flowers and also in other respects undergo considerable changes which, there is no doubt, are caused directly by the changes in climate. It is also well known that perfectly pure varieties of cereals—i.e. pure lines—in many cases develop much larger seeds in a northern climate than in a southern. As an example of individual acclimatization may also be mentioned the fact that, according to numerous observations, a perfectly pure and constant variety of winter wheat is able to withstand the winter most successfully when it has been developed in the fall, at a low temperature. In this case the variety, i. e. the individuals of which it is composed, have the faculty to adapt themselves, to a certain extent, to the winter temperature.

Briefly, there is no doubt as to the climate having a certain modifying influence on plants. For this reason we are quite justified to speak of acclimatization of the individual, only we remember that this kind of acclimatization is not necessarily of a hereditary nature.

As a matter of fact, there does not exist, so far, any evidence proving conclusively that individual acclimatization can become hereditary, i. e. that climatic modifications can be hereditarily fixed. Anyway, whether characters and qualities developed through the modifying influence of the climate on individuals or constant varieties are hereditarily transmissible or not, is at present of very little practical importance.

Of infinitely greater importance to agriculture is the *hereditary or genetic acclimatization* which, as hinted above, manifests itself in the existence of climatic varieties.

The study of the climatic varieties resulting from hereditary acclimatization is a subject so familiar to all students of agriculture that a lengthy discussion of its nature is hardly necessary. Suffice it to say that practically all the comparative tests of, for instance, different so called varieties of Alfalfa and Red Clover carried out at the Experimental Farms and Colleges of Canada, are nothing but a study of different climatic varieties, originated through a process of hereditary or genetic acclimatization. Samples of seed of certain species are secured from different sources and the resulting crops compared as to relative value. Thus results are obtained which bear on the suitability or non-suitability of climatic varieties for a certain district.

Many valuable results have been secured through these comparative tests.

With regards to Red Clover it has

thus been amply proven that there is a very considerable difference in the degree of hardiness between Red Clover originated in southern countries and Red Clover, originated farther north. The difference in hardiness, existing between different lots of Red Clover, is illustrated by the table on a previous page. The same table also shows, as has been explained above, the very intimate relationship between yield and hardiness, emphasizing the importance of hardiness. A clear understanding of the nature of the biological character called hardiness is therefore necessary for any student engaged in work aiming at the production of high yielding Red Clover crops.

Hardiness, Its Nature and Practical Importance.

When trying to determine the real nature of so called hardiness in Red Clover, we must necessarily analyze the morphological and biological nature of what we call Red Clover.

Such an analysis will immediately tell us that Red Clover is composed of a tremendously great number of distinct forms or, why not, "varieties." Anyone who has paid a little attention to field crops can not have failed to note the puzzling number of forms growing side by side, in exactly the same soil and under exactly the same external conditions in general.

Red Clover is thus not a pure variety, comparable for instance to pedigree varieties of wheat, pease or oats. It is a mixture of a great number of forms, differing as to morphological characters such as hairiness; shape and colouring of leaves; colour of flowers and stems; shape, size and colour of seed, etc.

All these characters are hereditary and their transmission from parents to progeny governed by the Mendelian laws.

But besides the morphological variations, there is also, in any field of Red Clover, a variation as to biological characters such as earliness and hardiness. In other words, there exist, in Red Clover, strains, differing from each other with regards to the biological qualities mentioned.

The question is, however, this. Are those biological characters hereditary? Can for instance hardiness be hereditarily transmitted from the parent plants to their progeny? Does the character called hardiness, follow the Mendelian laws in transmission from one generation to another?

As our conception of the real nature of hardiness depends on the answers to these questions, it would, indeed, be tempting to discuss, at length, the observations on the nature of biological characters in general, made at different points of the genetic field of research. However, space does not permit it, and as a consequence, only the bare results of the investigations on the subject can be given.

The investigations with regard to the nature of biological characters indicate, very decisively, that it is not possible at all to distinguish, with regard to nature and hereditary behaviour, between morphological and biological characters. Earliness and hardiness behave like other characters and are made up of hereditary units transmissible according to the ordinary Mendelian laws.

* * *

When a so called "variety" of Red Clover is totally winter killed, it means that it is composed of biological types which all are too tender. When a "variety", on the other hand, is only partially winter killed, it means that some of the biological types, of which the variety is made up, are characterized by a certain degree of hardiness,

enabling them to survive. And when winter killing in a variety does not occur at all, it means that the variety is composed of biological types which all are hardy.

But as hardiness has to be regarded as an hereditary, Mendelian character, the biological types referred to are not merely individuals, but individuals representing biological races or varieties which when propagated maintain their characteristic degree of hardiness.

This fact is evidently of the utmost importance. It enables us to increase the hardiness of a certain so called "variety" simply by propagation of those plants in a Red Clover field which prove hardy to the conditions under which they live. It also explains why home grown seed gives better returns than imported seed, the explanation of course being that home grown seed represents races which, by virtue of their very existence, have proven themselves thoroughly adapted to the local conditions.

From the fact that hardiness is an hereditary, Mendelian character, it also follows that it will be possible to extend Red Clover growing to districts in the far north where, so far, it has been more or less of a failure, the methods to be followed simply being to propagate those odd plants which are able to survive.

One instance may be quoted to substantiate this statement.

Some years ago, the writer visited Mr. Seager Wheeler, the famous wheat grower, at Rosthern, Sask. Mr. Wheeler had then, for a number of years, tried to grow Red Clover, but without success, the chief reason being that all "varieties" tried were badly winter killed. At the time of the writer's visit Mr. Wheeler's Red Clover field was very patchy and, from a crop standpoint, practically worthless. However, instead of ploughing the whole field up and trying another "variety", Mr. Wheeler, after a discussion on the probable merits of the surviving plants, managed to secure some seed from some of his clover patches. This seed was sown the following year. The results? Simply that last year, Mr. Wheeler could boast of having a perfectly hardy Red Clover variety, showing not the slightest sign of winter killing and yielding magnificent crops.

And, what has been accomplished by Mr. Wheeler, is also within reach of any intelligent farmer in Canada, only "he must not only think about planting, but do it." (Cato, 95-46, B. C.).

Agricultural Leadership.

A Great Need, For Which O. A. C. Students May, With Great Satisfaction and Profit, Fit Themselves.

By Chas. C. Nixon, B.S.A.

A year or two ago at one of the Dairymen's conventions Professor Dean pointed out the need for a species of "Agricultural Moses" to lead us farmers into what is really our own—"the promised land", which is really so near us, yet,—as things have been and are likely to continue,—is very, very far away from our present ability to realize upon.

One noted leader in thought and action in the world of American busi-

ness has said that "one great, enlightened soul in every community would actually reform the world." Certainly the right kind of leaders in any farming community will do wonders for agriculture and for all of the citizens of the country in general!

We expect leaders from amongst the students going through our colleges and from the various schools of learning. Since "knowledge is power" any leader must be short on power unless he have the knowledge.

For real leadership there is one great branch of knowledge required—knowledge that is not taught in colleges. It is "common sense" or "horse sense" growing out of experience of self and others, and based on clearly defined laws of human nature,—a science of psychology and of business.

Sir Horace Plunkett, the great agricultural leader of Ireland, in making his address at the Marketing and Farm Credits conference in Chicago last November, put his finger on the weakest spot in our agricultural economy,—a lack of business organization on the part of our farmers.

Any organization cannot well be organized to advance above the level of its leaders—its officers or directors. Therefore should we not give serious thought first of all and immediately, to qualifying leaders for this special field of need? Sir Horace advises that "only by use of the townsmen's methods can the countrymen come into their own." He qualifies this statement, but essentially he affirms that we must become businessmen—farm businessmen with a knowledge of business principles and practice.

We can hardly expect to learn business in college, for professors are not as a rule inclined that way,—as one noted business writer has very well said: "Naturally, the university could not give us a science of business. Professors have never been in touch with the business world. They have never properly appreciated and respected business. They have had the hallucination that business was not a proper subject for professors to investigate."

Nor can our farm papers give us much to satisfy this vital need; for are they not manned by college graduates on the editorial divisions? And what can we expect of them relating to business unless they advance well beyond their college training?—in which case you will find them generally in business for themselves! The business men know naught of farming; they do not understand the farmers' problems and needs. Even if they did, we find them too selfishly busy and pre-occupied with their own affairs to help along the farmers' cause; they could not if they would, and, in all probability they would not if they could!

Our salvation here, it would seem, is to get this knowledge for ourselves. It can be gotten even as most successful individuals in business have been pleased and obliged to get it.

There is a science of business; not complete, to be sure, and any one will agree that no science is complete. "As soon as we can predict what will happen in any given cause our knowledge has become scientific."

"Science is Precision and Prevision. It is the power to predict based upon the careful study and classification of the facts."

One noted writer on business science allows that he would not presume to say at this early stage that we will some day be able to predict a bankruptcy as well as an eclipse. But what he does claim is that astronomy has been carefully studied for centuries by skilled specialists; hence our marvellous power to predict eclipses. Business, on the

other hand, has not been studied in the same way. Its motto has been—"You Never Can Tell."

Is it not high time that we specialize a little more on the science of business? Shouldn't we know something of practical psychology? Shouldn't we study human nature and phrenology?

This latter subject fits in so well with the training of the live-stock specialist!

Perhaps it may be that "knowledge is power" because the man of knowledge becomes self-reliant and a man of poise and confidence—prime essentials in any leader. Why should farmers not have this power and have it abundantly? There is no reason why they should not have it. But they do not know,—they do not know that they do not know,—and if they did know they still would not know where to go to get the knowledge!

Why should any farmer—a college graduate at any rate—be ill-at-ease when with his brothers in public places? Why should he not take his place in Parliament and readily in all places, even as he should? Why should he ever hesitate, or ever have any reason to be different?

Would it be otherwise *if he knew*, and realized that after all, as Carlyle has put it, the best of men are only "belly, breath and brains". One business man has put it well when he said, "Some men are only empty suits of clothes"! Why should we fear any man?

I would recommend to the students of the O. A. C. and to all ex-students, (including especially my old classmates and college chums of the days that used to be), that they pay some special attention to reading and studying business.

The science of business is as yet so young and undeveloped that only a score or so of books are in any way standard and worth while relating to the use we agriculturists could make of them. These ought to be in the O.A.C. library and be read by every ambitious individual who would progress and ensure for himself the inexpressible joy of all joys, "the joy of going on" or advancing. There are several business magazines, too, that are to be recommended.

First amongst the magazines I would recommend "System", a monthly published in Chicago, and to be had at 20c a copy on almost any news stand. "Agricultural Advertising", also of Chicago, will prove interesting and helpful. Mr. Gus Langelier, Superintendent of the Cap Rouge Experimental Farm, P. Q., told me last summer that he had taken this magazine for years and had gotten from it exceedingly much of value.

As to books on business, I would recommend "The Axioms of Business" by Casson; "The Knack of Selling" (six little booklets put out by the A. M. Shaw Co., of Chicago); "The New Business" by Harry Tipper.

Relating to Psychology and Human Nature,—"The Psychology of Salesmanship", by W. W. Atkinson; "How the Mind Works" by C. D. Larson; "Human Nature, its inward traits and outward forms", by Atkinson; "Human Nature Explained", "The Job, The Man, The Boss", by Dr. Katherine Blackford;—and an additional list of perhaps another twenty volumes, which I should be pleased to give to any one interested.

It has been well said that "we are a part of all that we have met", assuredly we become much of what we read, for thought must always precede action. How careful we should be of thought and to see that our minds are fed on the right material to stimulate the growth and action desired!

I was astounded, last summer, (while

on a C. P. R. train coming east from Winnipeg) to learn, on meeting in with an old O. A. C. boy, who took the associate course only, that he is holding down the big job he is and making from his commissions on sales, close to $4,000.00 per year net for himself. He had, through reading business literature, developed his ability to do his special work. He had learned business and human nature. He had mastered the art of getting the other fellows to do the things he wanted them to do!—truly a wonderful and fascinating art and necessarily required by every leader.

This subject is altogether too large to cover in a limited article. At this writing I can merely suggest the means to the important end desired. To those who read these lines, as written, and feel any special response within themselves, I would give special encouragement in those words of Emerson: "The Law of Nature is, do the thing and ye shall have the power. But they who do not the thing have not the power".

Who would be so rash as to attempt to estimate the great value of the accomplishments of students and graduates of the O. A. C. who have gone out from its halls and have "done the thing" and found it worth while! He would be rash indeed who would attempt to estimate the yet greater accomplishments in better service to be rendered by better leaders who will yet be trained in the ways of business and in agricultural leadership.

Note:—Mr. Nixon is an O. A. C. graduate of '07, and is now Vice-President of the Continental Publishing Co., Limited, Toronto.—*Ed.*

Where 300-Egg Hens Are Bred.

By A. C. McCulloch, B.S.A.

THIS is not an advertisement. No offer of eggs from 300 egg stock or the stock itself, at bargain prices, will be made. There are, however, some 300-egg hens and the intention of this article is to give an idea of the conditions under which these birds are produced. Fortunately, or otherwise, they seem to segregate somewhat on a Mendlian plan. One 300-egg record was made at a Delaware contest during the past season, but before the Mendelian ratio can be completed it is necessary for the breeder of this bird, perhaps some other, to produce another. Five with records of more than 300 eggs each have been produced byProf. James Dryden of the Oregon Agricultural College. Another came within one egg of this record. Possibly she laid once on the floor.

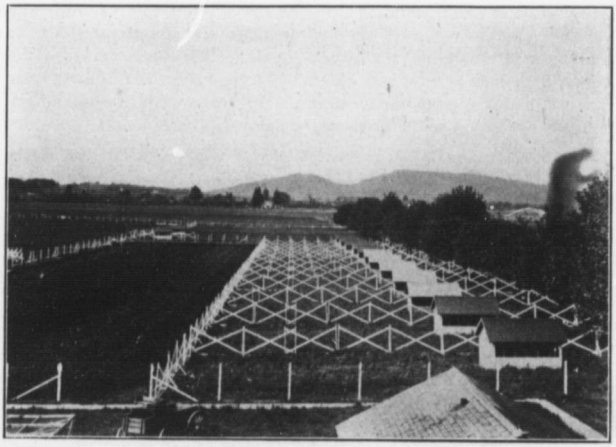
The Oregon Agricultural College is located at Corvallis, about sixty miles from the Pacific coast, and in the heart of the Willamette Valley. The Willamette Valley is about forty miles wide and one hundred and fifty miles long, and extending north and south, is bounded on the west by the coast range and on the east by a higher and more extensive range, the Cascades. These control to a great extent the climatic conditions at all seasons of the year not only of the valley, but of practically the entire state.

The work of the Poultry Department of the college is divided into three separate branches—station, resident instruction, and extension. The station work includes all experimental and investigational work and has up to the present time received the most atten-

tion. The resident instruction includes all instructional work given at the college, to regular students, winter short course students and summer classes. This phase of departmental activity, has not been developed to the extent that experimental work has, but it is hoped that within the next few years it will be given more consideration. The extension service comes in direct contact with the farmers and renders them practical assistance in many ways. The work of this branch consists largely of lectures to Farmer's Institutes and Granges and the operation of Co-operative Egg Circles. These have been in operation but a few months and though they have suffered the usual opposition most of them are in successful operation.

When the Poultry Department was first created, about eight years ago, one hundred birds each of Barred Plymouth Rocks and Single Comb White Leghorns were purchased from breeders in various places. These birds were trap-nested and formed the nucleus of the famous bred-to-lay strains of these varieties now on the plant. The first year the average production was less than one hundred eggs and by the fifth year it had increased nearly one hundred per cent. No new blood was used and inbreeding was always avoided. One Leghorn A 27, produced 819 eggs in her first four years.

Until 1914 the Poultry Department comprised five acres of land at the edge of the campus, but this was found wholly inadequate and as the land adjoining this tract was low and wet it became necessary to obtain additional space about a mile distant from the college. The new plant consists of about twenty acres of moderately dry, rich land across one corner of which is a small wooded knoll, and past this a small, perpetual creek runs. This is very convenient for the growing of young stock. Both plants are well equipped with an underground water



Poultry Plant Oregon Agricultural College, Corvallis, Oregon.

system which provides a drip faucet in each yard.

The aim has always been to specialize on one or two branches of experimental work and the breeding for egg production offered the best inducements, so this phase was made of primary importance. General enviromental conditions have been made as nearly similar as possible from year to year so that any increase in egg production which might be obtained would be due to the system of breeding or selection. Practically only one kind of portable colony house has been used for growing stock and only one kind, also portable, is used for adult stock. The heavy nature of the soil makes a double yarding system necessary. The colony house for growing chickens is eight feet wide, six feet deep, seven feet high in front, and five feet in the rear. The only opening is a door about three feet wide in the centre of the front. This is covered with netting and a cotton frame when necessary. No glass is used. The house for mature stock is twelve feet wide, eight feet deep, and about five feet high with a double pitch roof. The lower half of the front is boarded, the upper half covered with wire netting. The door is in one end, towards the front and half of the end including the door is of wire netting.

As in other points, one system is followed in the feeding each kind of stock—young and adult. Both systems have given good results and it was thought best not to alter them materially when heavy egg production was the object of experimental work. The system of feeding growing stock is as follows:

Starting Food—

Bran mixed crumbly with raw egg; or bread squeezed dry out of milk.

Grain Mixture—

1 pint of cracked wheat.

1 pint cracked corn.

Mash Mixture—

3 lbs. wheat bran.

1 lb. wheat middlings or shorts.

1 lb. corn meal.

Pinch of salt added in mixing.

First feeding time at 24 to 36 hours of age.

First Week—

Starting food twice a day; grain mixture three times a day on clean sand; after two or three days, grain in litter.

One to three Weeks—

One feed moist mash daily, what they will clean up in an hour; grain mixture in litter two or three times a day.

Three to Six Weeks—

Moist mash in morning; two feeds grain mixture daily; dry middlings in hopper if diarrhea appears.

After Six Weeks or on Range—

Moist mash in morning; two feeds grain mixture daily.

Water, grit, charcoal, cracked bone and green food are always available, also beef scrap after first week, and milk after the third week.

The ration for breeding and laying stock is simple and yet very satisfactory. Local conditions make it a little different than what might be used in Ontario in that corn is comparatively high in price and wheat and oats comparatively low. The ration is as follows:

Early Morning—

Moist mash composed of the following and fed slightly moist:

Bran—4 parts by weight.

Shorts—2 parts by weight.

Cornmeal—1 part by weight.

Barley meal—1 part by weight.

Linseed meal—1 part by weight.

To 100 pounds of mash is added one-half pound of salt.

Ten o'clock—

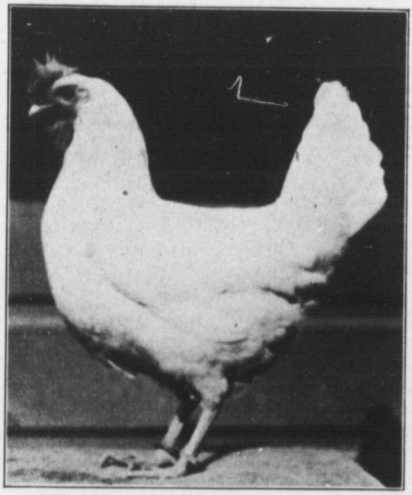
Whole oats thrown in litter.

Two-thirty to four o'clock—

depending on season. Whole wheat thrown in litter.

Grit, oyster shell, beef scrap, and charcoal in a hopper are always available. Kale is fed for green food and is before the birds all the time.

The climate conditions of the valley are quite different than those of Ontario, in some ways more suitable for poultry and in others less so. Really cold weather is unknown in Corvallis; it freezes occasionally during the winter months. This, however, is in a protected section and would not hold good of Eastern Oregon which is the major portion of the State and which resembles Ontario very much climatically but is considerably drier. In the valley from about September to June it rains almost continuously and the sun usually shines once during that time—that is February 2nd. The lack of sunshine is not conducive to high egg yield but cold weather is not an inhibiting factor. During the summer months, from June to September, there is practically no precipitation and the ground becomes very dry, plant food tough, and insect life scarce. This is a serious consideration in the growing of the young stock. Though the Station strains of Plymouth Rocks and Leghorns lay exceedingly well throughout the year they do not, in the writer's opinion, mature as early as bred-to-lay strains of these varieties in Ontario. This possibly is due partly to climatic conditions.



C. 521. Oregon hen with a record of 303 eggs in 1 year; 512 eggs in 2 years.

The basis of selection of breeding stock as to laying ability, is largely the annual record. This begins the day the pullet lays her first egg and concludes one year afterwards, and not at any particular day of a certain calendar month which is the case in many institutions. From the breeding results obtained thus far, the extent to which the male bird influences winter production has not been determined. Con-

siderable emphasis is placed on early maturity—the earlier the better. It is, however, advisable to not hatch too early as the growing season is comparatively long and the pullets are apt to moult late in November or in December. Most of the hatching is done in March and April.

In addition to the breeding of White Leghorns and Barred Rocks, pure, these varieties have been crossed and the resultant new breed, Oregons, have given better results in egg production than either. They are medium in size between Leghorns and Plymouth Rocks, but otherwise resemble Leghorns rather closely. All of the birds with records of 300 eggs and over, except one, are Oregons. One of these C521, laid 303 eggs in her pullet year and 512 eggs in the first two years. Others have equally as good records for certain periods of time.

EVENING

Evening comes; far o'er these western hills,
Bathed in the golden glow that softly steals,
Creeping slowly north and southward on,
Glimmers the dying rays of twilight's dawn.

In purpling spaces eastward lying,
Appear faint crimson echoes of the dying
Glories of the sunset, in valleys far below,
The dusky shadows gather, spread and softly glow.

Twilight falls; the western glories fade,
And die to mystic colorings of light and shade.
And now through hazy spaces from afar
'Mid eastern depths, peeps out the Evening Star.

Twilight lingers, toying with the balmy winds
Of night; darkness falls, it's vastness binds
The earth with charms that break with dawn.
Twilight deepens; silence comes; the night is on.

—*W. C. Jakes, '18.*

Sod in Orchards.

By H. S. Fry, B.S.A.

THIS is a part of fruit growing practice which has been and is now, a subject for a large amount of experimental work.

By far the greater number of fruit growers practice some form of clean cultivation. In fact, in peach, plum, or cherry orchards, a good fruit-man will hardly give any kind of sod treatment the barest consideration. With pears and apples, however, the case is somewhat different, although clean cultivation is far more generally practised and recommended.

There have, however, been sufficient instances of success with sod culture among apple and pear growers to warrant the expenditure of money and time by Experiment Stations and individual growers, in order to test the efficiency of the sod system and its modifications. Growers would no doubt welcome any proof of the value of this method of culture, since it stands to reason that, given equal quantity and quality of crop from either method, the fruit grown in sod could be produced more cheaply and cost of production is a vital factor in the fruit growing of to-day.

Will trees yield as much in sod as under clean cultivation? Is there any difference in the quality of the crop? Will the tree itself do as well in sod as under cultivation? By which method is soil mositure best conserved? What are the relative effects of the two systems on size, color, maturity, and keeping quality of the fruit? Is pear blight less prevalent or more easily controlled in sod than where the soil is constantly stirred? These and many other pertinent queries must be answered satisfactorily before it is safe to recommend or condemn either practice.

In Ontario and in fact, in Canada, no experimental results are available beyond the results obtained and opinions held by individual growers. In England, however, at the Woburn Experimental Farm, reliable experiments have been conducted to show the effect of grass on the trees and the results indicated the presence of a toxic action of some sort on the part of the grass roots which is inimical to the welfare of the trees, and which generally results, if unchecked, in serious injury or death to the tree.

The remarkable success in New York State of the Hitching's sod orchard led the Geneva Experiment Station to undertake a ten year experiment, now concluded, in which sod and cultivation were tested thoroughly in this orchard and in another large orchard near Rochester, the latter having been selected as being typical of the apple orchards in the great apple producing section of Western New York. Ten year's work with these orchards showed apparently beyond all doubt that the excellent fruit from the Hitching's orchard was due to a peculiar location and that sod was productive of greater success in the orchard almost, if not entirely as a result of this peculiar location, which is far from being typical of the average orchard in the state.

Results from the Rochester orchard gave splendid proof of the superior worth of clean cultivation in every respect save one, and that one, color of fruit.

In Pennsylvania a very comprehensive set of experiments has been running for a number of years covering many different types of soil and several

cultural treatments. Regarding sod alone as compared with clean cultivation, results are very similar to those secured in the Rochester orchard in New York State, but neither sod alone nor clean cultivation have so far given best results in Pennsylvania.

The method which is most successful, especially in non bearing orchards and in orchards which have not yet reached full bearing, is a sod mulch system in which the orchard is seeded down at planting time and all grass and herbage allowed to grow. This growth is cut down once or twice during the season and drawn up over the whole root system of the trees, so as to form a very heavy mulch. This natural mulch is supplemented when necessary by the addition of from one to three tons per acre of straw or other outside material spread very thickly over the root system. Ordinarily, sod alone will not conserve soil moisture nearly as well as frequent cultivation, but the Pennsylvania experiments have shown that by mulching heavily enough, moisture is conserved even better than by the intensive stirring of the soil.

The most important point in this connection is the cost. Does it pay to mulch so heavily? Will the increased yield be sufficient to warrant it? Apparently it will, if the mulching materials can be obtained very cheaply. In Ontario three tons per acre of extra mulch each year would probably not pay, since we have no material suitable which can be applied at a sufficiently low cost.

Color seems to be the only point in which sod culture definitely excels. This increase in color seems to be caused by the fact that when grown in sod fruit matures earlier and the crop can ripen on the tree more fully. Figures from the Pennsylvania results show about 20 per cent. more color on sodded than cultivated fruit.

While color is very desirable in fruit, other considerations outweigh it in this case. In the Geneva experiments it was found that there was a difference in yield between the tilled and untilled trees of 47½ barrels per acre, in favor of clean cultivation. It was also found that the keeping quality of the cultivated fruit was greater than that of the sodded fruit, the former keeping as much as from two to four weeks longer than the latter. The growth of the trees was in every respect more satisfactory where they were given cultivation. Leaves were healthier, dead limbs were less frequent, and the length of time that the leaves were out was several days longer.

The cost of growing apples in sod was $51.73 per acre, under tillage, $83.48. But the balance per acre showed up quite differently, due to the heavier yield on the tilled area. Briefly, for every dollar of profit shown by trees in sod, $1.89 profit was shown by trees which had been given cultivation.

The root system of trees growing in sod was found to be very irregular, whereas under normal conditions where plant food is plentiful, and mositure is sufficient, the root system of a tree is approximately circular, showing that it had been more difficult for the roots of the trees growing in sod to secure a sufficient amount of food and moisture and they had necessarily been forced to reach out farther for this material and perhaps also to escape the evil effects of the grass roots. The moisture supply in the tilled orchard was greater than in the sodded orchard, and this difference in moisture supply was thought to account very largely for the differences in quantity and quality of the crop borne, as well as the lack of vigor shown by the trees in sod.

This would appear to be a very striking and sweeping condemnation of sod culture in orchards, leaving for this system of orchard management only one benefit, namely, increase in color.

It might seem then, useless to ask the question, is sod culture in orchards ever advisable? Under certain peculiar conditions such as were found to exist in New York State, sod culture is undoubtedly the better system, but so far as present knowledge relative to the two systems is concerned, it would appear that these conditions are very seldom met with.

We might enumerate circumstances which would seem to require the use of the sod system as follows: First, when orchards are situated on hillsides which are too steep to cultivate profitably. Second, when the orchard is situated on land which is very stony. Third, where the orchard is planted on extremely light soil such as blow sand, which requires some crop to hold it in place. Fourth, where orchards are planted on land which is springy, particularly on hillsides where the moisture would be quite sufficient to take care of the water supply for the trees. These conditions might require the use of a permanent sod in the orchard, but it is very seldom that a discerning fruit grower would plant on such sites.

With regard to the question of sod in pear orchards for the prevention and better control of pear blight, there is no definite statement which may be made so far as I am aware regarding the value of sod. Some of our Ontario growers prefer sod in pear orchards for this reason, but on the other hand, it is not unheard of to find growers who claim to be able to combat this disease most successfully when they manure heavily and cultivate thoroughly. It is the common opinion, however, that sod lessens the spread of pear blight by lessening the vigor of growth. Blight seems to spread most rapidly among young succulent shoots. Whether or not there is very much value in sod for this purpose has not been definitely determined as yet.

Lime and Lime Requirements of Ontario Soils

Results From Soil Survey Work—Value of Lime In Soils—How to Apply Lime.

By Prof. R. Harcourt.

THE two most variable factors affecting the composition of our soils are lime and organic matter; they are also the two most important factors affecting the productive capacity of the soil. A soil rich in lime is almost invariably strong and productive, and the animals consuming the crops it produces are usually thrifty, with plenty of bone. A soil rich in decaying organic matter is rich in nitrogen, carries a fair amount of available mineral plant food, has a good physical condition, and does not so readily suffer from drought.

But, while an abundance of organic matter is desirable, the acids formed in its decay render the lime soluble and thus convert it into a form readily leached from the soil. Consequently

the better the land is farmed the faster will it lose its supply of lime. For this reason we find that, generally speaking, the longer the land has been farmed the poorer it will be in lime, and, when the lime is exhausted, the most active substance in neutralizing the acids of the soil is gone, and the soil becomes sour or acid.

During the past season's work on the soil survey, we have had abundance of evidence that in many districts these changes have progressed far enough to render the application of lime necessary. In the course of the summer's work, thousands of borings were made in the soils of the counties studied. In most cases the surface soil was acid to litmus paper, and there was not enough carbonate of lime present to cause any apparent effervescence when treated with acid until a depth of 20 to 24 inches was reached; in some cases there was none even at 40 inches. Our soils are apparently following the same general changes of those in the older lands, and our farmers will have to follow the practice long in vogue in these countries of returning lime to the land to replace that which has been carried away in the drainage water.

Value of Lime

But soils that are deficient in lime not only become sour; they also change in their physical condition. The clays become sticky, waxy, and difficult to work, and the sands become too loose and readily dry out. Lime improves the clays by rendering them more open and friable, and the sands more firm and compact. Lime also sets in motion many chemical reactions whereby insoluble forms of potash and phosphoric acid are rendered available as plant food. Lime is essential to the life of the organisms that bring about the decay of organic matter, as these cannot live and work in the presence of acid. Many domestic plants, particularly the legumes, cannot grow in an acid soil, nor can the organisms that live in the nodules on their roots multiply, and gather nitrogen from the air, neither can the various classes of bacteria that are now recognized as nitrogen-gatherers carry on their work in a soil that is sour or acid. In these and many other ways lime is valuable in a soil, and when we remember that lime is one of the least costly of the materials that we may add to the soil, we have another reason why its use should not be overlooked.

Lime Compounds.

As the term "lime" is generally used, it may mean any one of a number of different compounds of calcium. It may not be out of place to describe some of the compounds that are being offered for sale. Lime, meaning the fresh lime, or quick lime, air-slaked lime, hydrated lime, and ground limestone, are common forms of lime offered for sale. Quick lime must be slaked before it can be evenly distributed over the ground. The best plan is to distribute it over the field in small heaps, much as is done with stable manure. Forty heaps of fifty pounds each, two rods apart is an application of one ton per acre. If water amounting to one-third the weight of the lime be added and the heap covered with about an inch of soil, the lime will soon slake, when it may be spread with a shovel. This latter operation is not a pleasant one, but if the slaked lime is mixed with earth and a damp day chosen for the work, it may be accomplished without any great inconvenience.

Hydrated lime is simply the quick lime slaked, screened and bagged. It is consequently more expensive, but its action in the soil will be the same as the quick lime slaked in the field.

Air-slaked lime is quick lime that has been allowed to slake without the direct addition of water. It differs from the freshly-slaked lime in that it has taken up some carbon dioxide from the air, and part of the lime has passed back into the carbonate condition. The amount that has been thus changed will depend upon the length of time the lime has been exposed to the air.

Ground limestone is simply the limestone rock, similar to that which is burned in the preparation of quick lime, finely pulverized. Naturally the more finely it is ground the quicker it will react in the soil. The coarser-ground material will remain an active agent for a longer time in the soil. Consequently it is not essential that the whole of the material be very fine. Generally speaking, if the rock is so pulverized that the larger particles are no bigger than flax seed, and all the fine material that would naturally be formed in the process of grinding remain in it, will be fine enough. The very finely pulverized material costs more to prepare and is more difficult to handle, and does not serve the purpose any better; for applications of ground limestone only need be made at intervals of four or five years. The finest materials will come into use first and the coarsest later. At the same time, it may prevent a too rapid leaching away of the material. Marl is also a carbonate of lime.

Gypsum, or sulphate of lime, is found in beds or deposits in various parts of the Dominion. When pulverized, it is very commonly called land plaster. It is a valuable source of lime, as the compound is more soluble in water than the carbonate of lime, but it does not neutralize the acid of sour soils, and cannot therefore take the place of the above mentioned forms of lime for this purpose. In other respects, gypsum or land plaster may substitute lime, and being more soluble, may be applied at a much less rate per acre. It also contains some sulphur, which some authorities now think may have a special value in the soil.

How Applied.

Ground limestone may be applied at almost any time of the year. Freshly-slaked lime, especially if the soil is very sour and a heavy application required, is perhaps best applied in the fall. It is the surface soil that needs the lime most; consequently it should not be plowed down.

In considering the amount of the various forms of lime that should be applied, it is well to remember that 56 pounds of pure quick lime is the equivalent of 100 pounds of pure carbonate of lime. That is, 56 pounds of fresh lime or 74 pounds of slaked lime will have the same amount of metal calcium and the same general effect in the soil as 100 pounds of ground limestone. While not quite accurate, one ton of quick lime may be considered equal to two tons of the carbonate. However, the character of the soil should be taken into consideration in deciding which material to use. Carbonate of lime, that is, ground limestone and marl, is much milder in its action than the freshly-slaked lime, and is therefore the better material to apply where rapid action is not an important point, and especially on light, sandy, and gravelly soils. These soils are usually poor in organic matter, due to the free oxidation induced by their porous nature. Freshly-slaked lime is generally credited with hastening this oxidation, and on light soils would thus cause too rapid a dissipation of this valuable material. On heavy clays, freshly-slaked lime may be used to advantage. There is not the same fear

of unduly hastening the decay of the organic matter, and its action in causing flocculation of the clay particles will be more rapid and the improvement in the physical condition of the soil more quickly obtained. On soils between the sands and clays, experiments in other countries indicate that the carbonate of lime will probably give the best results through a term of years, although the returns for the first year or two may be in favor of fresh-burned lime.

For mucks and peaty soils that may be decidedly acid, the fresh-slaked lime is to be preferred. Quite frequently it is found that the organic matter in these soils has not decayed sufficiently to give the best results in crop production, consequently, if the lime hastens the decay, an improvement in texture will be effected as well as the acid neutralized.

The amount of lime that should be applied naturally varies with the nature of the soil and the degree of acidity. We have generally recommended one ton of fresh lime, or two tons of ground limestone, per acre. This is probably enough for light soils that are not very acid, but experience is showing us that much heavier applications may be made on clays that show acid with litmus paper. Too heavy dressings with fresh lime tend to sterilize the soil for a time, that is, the lime checks the life process of the organisms within the soil. There is, however, no fear of this with the carbonate of lime. On light soils, it is safe to apply from one to two tons of the ground limestone, and on clay the same amount of the fresh lime. But in some cases the clays may be so sour that much heavier applications are required to neutralize the acid present and give the maximum results.

Where we realize something of the vastness of the Universe.

Bookkeeping for Farmers

Public Schools Could Assist in Creating Much Needed Interest in this Matter.

FARMERS take too little interest in farm accounting. During the summer of 1915, four hundred farmers in Ontario were visited by a representative of the Commission of Conservation. Among this number one claimed to keep a systematic set of farm accounts. Several claimed to do bookkeeping, but the system was far from complete. Many farmers stated that they knew how their business was going without keeping books. These men have only an estimate, and it is impossible to depend on estimates, or to consider any one phase of their business of farming independent of its relations to the rest of it.

In Tazewell Co., Ill., U. S. A., a series of meetings was held in March, 1915, which resolved themselves into farm bookkeeping classes. The County Agent supplied each member of the classes with a booklet especially designed to fit the conditions of the county. The work is stripped of bookkeeping technicalities and made easy for all who are disposed to carry on the work. It is noteworthy that the classes for studying system in bookkeeping were attended largely by successful farmers, who were bent on making their business still larger and more successful.

This very important subject might well engage the attention of district representatives and college demonstrators when arranging their short course classes.

Another way in which systematic farm accounting could be brought into more general practice would be to arrange the arithmetic lessons in the public school in such a way that the keeping of farm accounts would be an easy and simple matter to those who wished to undertake it. If the school work could be projected into the home and detailed records kept by the scholars of time, cost, and income, it would enlist the interest of parents and educate them in the subject, thus affecting the work on farms in the district.

—F.C.N.—Conservation.

Forest Protection in Canada

ACCORDING to press reports, Sweden proposes to cut off the export of chemical pulp to Great Britain. Naturally, all eyes are immediately turned to Canada to supply the threatened deficiency.

The Commission of Conservation has just issued a report on "Forest Protection in Canada, 1913-1914", which is of particular interest in this connection. It contains much information respecting the work of the provincial forest services and of the federal departments intrusted with the care of our forests.

Forest fire protection is assuming a large place in public attention. It is obvious that, if Canada is to continue as a wood-producing country, she must conserve her resources of this natural product. The report treats exhaustively of the fire protection of forest lands along railway rights-of-way. Through co-operative action, great headway has been made in securing the reduction of forest losses through fires traceable to railway causes.

The forests of British Columbia and on Dominion lands in the West have been dealt with in reports containing

the results of special studies conducted by Dr. C. D. Howe and Mr. J. H. White. The Trent watershed in Ontario, has also received especial attention, in a report of an investigation by Dr. C. D. Howe in the townships of Burleigh and Methuen. This district is important in that, while of very little value as an agricultural area, it is being repeatedly overrun by forest fires and the little remaining merchantable timber destroyed. It is suggested that the area be placed under the control of the Dominion Forestry Branch for protection from fires and for reforestation.

The Omega-Alpha

THE graduating class of nineteen sixteen are following in the steps of their predecessors in publishing a handsome volume containing portraits and biographies and other matter in connection with their class and with the college in general. They are making an innovation, however, in giving to this volume a new name, which they hope will commend itself to the College community and be used by future graduating classes for other similar publications. This name is "The Omega-Alpha", a title composed of the last and the first letters of the Greek alphabet.

The committee of the senior year having this matter in hand have various reasons for adopting this title for their book. The employment of Greek letters is already an established usage in college life for giving names to student societies and publications; and the two characters here adopted happen to correspond with the initials of our own institution. Moreover the phrase is an unconscious echo of a saying quoted from a famous piece of literature with which all students are familiar.

The chief significance, however, of this legend, for such a publication lies in the fact that "Omega" stands for an end and "Alpha" for a beginning, graduating students are both ending and beginning. They are completing one career and setting out upon another They have learned one alphabet, that of college life, lectures, studies, examinations, college societies, debates, friendships, hilarities, solemnities, and are setting out to learn the spelling of the larger life for which their college apprenticeship has prepared them.

"They look before and after
And pine for what is not."

By the time these words are printed the members of the senior year will have written almost as many examination papers as there are letters in the alphabet. They will have filled sheet after sheet with every alphabet they know, in all manner of styles, rhetorical, oratorical, diabolical; and at the conclusion of it all they will write down Omega; ended. The next morning they will be off to fresh fields and pastures new; Alpha.

But of all the mysterious symbolism of this title and superscription which the graduation class is adopting for its book, the best is yet to be told. In it there is a true note of consolation for those who fail, for those who are at the bottom of the class. It reminds them that not always the men at the top of examination lists are the most successful. It comforts them with visions of great men who did not take degrees or shine in colleges, and it expands itself into that most comforting of aphorisms that "the first shall be last and the last shall be first." —*L.*

A Few Reflections

By L. E. O'Neill, '18.

BY the time this article appears in print our examinations will be over. Success or failure will be the result, and to many of us will determine the course we are to follow in future life.

But does success in examinations count for so much as is often supposed? A high standing in a class is something of which to be proud but is not necessarily indicative of a man's true worth. This is especially true this year. At present there are serious thoughts, other than those pertaining to examinations, occupying the minds of the students. Canada is at war and never have we been brought to realize this more clearly than during the last few weeks when our college battery was being formed. Our studies have perhaps in many cases been neglected but is it any wonder when from every side we hear the call from King and Country to guard and maintain the priceless freedom which we now enjoy. Then there is also the question of increased production so we may safely say that never in the history of the college have studies been so affected by outside influence.

Leaving aside all these conditions, there is something far more important to be gained from our college course than the mere passing of examinations. We should now be laying the foundation upon which to build a successful life. Let us consider what success in life means. It may be divided into two parts i.e. financial success or the gaining of wealth and moral success or the upbuilding of character. The time we spend at this institution may have some thing to do with the former division but it plays an infinitely greater part in the latter.

In the accumulation of wealth each person must choose that method which gives the greatest remuneration for the energy expended but this is not so in moral success. It is a common and true expression that a man lives by what he is; what he is depends upon his character and character may truly be said to be a bundle of habits. Habits depend upon actions, actions depend upon motives, and motives depend upon our thoughts. This being so, we may readily see that the functional value of many subjects lies not alone in our ability to obtain a high percentage of the total marks but in the thoughts left in our minds.

The question which naturally presents itself is—where do we get our thoughts or impressions? We get them from two great sources, first, from people with whom we daily mingle, and secondly from people whose lives do not immediately touch ours but are interpreted to us by literature, history, and the press. Tennyson's quotation, "I am a part of all that I have met", still holds good.

Let us take for example the mental and moral development which results from the study of biography or human lives. Great men are usually representative men, that is they embody within themselves the needs of whole parties, classes or nations. In short they are almost social products and to understand them is to understand the classes to which they belong or represent, and so far as biographies are typical or representative they give us insight into the common interests of society. Such study reveals to us that there is a broad arena of possible action to be yet done and at the same time

gives an impulse to the stretch of our own and best powers.

The study of history produces a kind of mental discipline peculiar to historical materials, as distinguished from the exact method of natural sciences or mathematics. A careful study of history will lead to a careful weighing of arguments pro and con and a survey of both sides of the question so as to reach a reasonable conclusion. These conclusions are not mathematical deductions; they are rather inferences based upon a careful weighing of probabilities, whereas mathematics begins with certain data and proceeds by certain inferences to inevitable conclusions. It is just as important for a person to acquire this habit of carefully reasoning upon probabilities and reaching approximately the correct results as to be trained in mathematical reasoning.

As to the moral effect of the study of history there are two great lessons to be learned: first, that on the whole and in the long run public esteem is given to character and moral greatness, not to wealth and financial success; second, that the world is more than a place where we sleep and eat and endure work for the sake of a few cheap animal pleasures. We must realize that to the great judge, the future, and to the best people of the present, character far outweighs material success. Many examples may be easily called to mind showing that, in many cases, the rich of the past are scarcely worthy of mention; that the powerful are judged by the way they gain and the way they use their power; that what men do for others is the true measure of success.

Perhaps a word of warning is here necessary. To give something beyond the commonplace is not to demean the commonplace. The honest day's work of the laborer, the cleanliness and thrift of the housewife and many other duties of every day life are as valuable morally as the martyr's choice of death. If learning the greatness of the few were to weaken the respect for the steadfast virtues of the many, it had far better remain unknown because the character acquired in every day conduct is the character that conquers in great emergencies.

The great value of general truths lies in the freedom of application to actual life, and knowledge is only valuable to the extent to which it can be applied to useful service. While writing examinations is an event in actual life, we must never lose sight of the fact that it is not a sure test of a man's knowledge and worth. Let us hope as time goes a change may be brought about whereby, notwithstanding the fact that written examinations are useful and necessary, a man may be judged by what he is as well as his ability to obtain a high percentage of the total marks.

Why So Much Slang?

By H. J. Sullivan, '18.

(From Speech delivered during the Public Speaking Course).

IN America we find the English language has acquired many phases and words which are not found in Webster. We, who are used to these sayings, do not find them hard to understand, but turn your attention to the Englishman who speaks English, and think of him stepping ashore at New York. From the moment he steps from the boat, he hears all kinds of queer

phrases which cause him to wonder at and, I must admit, in some cases to curse the English language, at least the Americanized English.

Whether slang is a bane or a boon is hard to say. It allows the person of small education in that line to get completely muddled up regarding what another person is saying to him. His friend begins to talk about "The niftiest little bunch of feathers I've piped in the old burg since Heck was a pup, and believe me Steve, she's class. Why Percy, she'll make Ethel Barrymore, and Annette Kellerman look like thirty cents worth of dog meat after its been through a meat grinder." After having heard this burst of eloquence, the Englishman collapses.

Do you wonder? Yet you hear it every day. It may be that I have exaggerated, but not much. I will admit that slang is worse in the States than in Canada, but that is not saying much for Canada.

Why do we use slang? You say, "Because everybody else does". Then why does everybody else do it? Because it appeals to our sense of humor? I think it is because we are too lazy to use correct English, and slang is easier and quicker to express.

The Englishman coming to America is assailed by our language from the time he leaves the pier.

The first person he meets is an undersized boy who says to him, "Smash your baggage?" Now no gentleman wants to have his baggage smashed, so he politely refuses.

He is met at the curb by a youth, who announces very confidently in a tone loud enough to be heard a mile, "Piper, World, Globe, Press, Star, Post, T'ree cents". Consider the new comer's feelings. He buys a paper, and sees on the first page "Ty Cobb steals third, and brings home the bacon." He reads further and sees where "Cravath picked a greasy one out of the ozone," and where so and so "slid into second on his eyebrows."

He begins to wonder if he is in America or not. At home he speaks all right, and here he finds that no one understands his smallest wish. He goes into the cigar store, and asks for a package of fags; the clerk politely gives him a bunch of pipe cleaners. Finally in disgust he steps into a bar-room, and asks for a glass of ale. He is informed that he should go to the drug-store for ale. He looks pale and worn out and the bartender thinks to do him a service so he leans confidentially across the bar, and asks him if he would "like a snort". Our English friend is now entirely convinced that he is not in America. He has not heard two words that he could understand and is tired, hungry and worn out. He spies a dairy lunch, walks in, and goes to the counter and says, "I would like a cup of tea and some buttered toast." His order is yelled out "Bucket o' slop, bread burnt, grease it." He does not like the sound of this, so orders fried eggs and bacon.

"Eyes open?" asks the waiter.

"I don't understand," he falters.

"Do you want them fried on both sides?"

"No, one side will do." His order goes back, "Adam and Eve on a raft, one eye open."

A pleasant faced young fellow sits down next to him and says, "Have a pill." Our friend has to apologize, saying that he may look ill, but he is not sick, whereupon the new comer informs him that he meant a cigarette, and informs him confidentially that it is a "tailor made." He tells his new found friend how lonesome he is, and is told to "wipe his chin." Stepping outside, he hears a vendor calling "Hot dogs, two for five" and wonders what

sort of place he has floundered into. He stops a pedestrian and asks him the way to a hotel, and is told that the quickest way to get there is to "jump a road louse and tell the cook where he wants to go."

As I mentioned before I may have exaggerated a little, but the object of this speech has been to try and enable you to see more clearly the need of pure English. What is the good of having a language if we do not use it. I ask you all to help make the English language what it ought to be, to eradicate the obnoxious phrases which are crowded into our every day speech, and so help make the English language in America excel that which we find in England.

A Plain Country Woman

IN childhood I suffered from the rude ridicule of people who accused me and my sisters of "putting on" because we used good English and read good literature, and because my aunt and my mother, who lived together, had an unmistakable air of culture not understood by certain neighbors. Not that we lived in an uncultured community. Indeed, our village was one of very rare atmosphere, in which dwelt more really cultured people than I imagine ever got together in a small inland town before. But most of these people were quite well to do financially, and we were very poor; so this constantly exposed us to the accusation of trying to imitate the aristocracy.

We were not people with company manners, and we never made pretenses as to knowledge. We never waited to hear what other people thought about a book or a sermon. Many of our friends took their cue from the best writers and thinkers of the day—as they do still; but we took ours from our own heads; we indulged in our own thoughts and impressions and criticisms and I believe to this day that my mother was the most clever literary critic I ever knew, although fifty miles of Middle West territory bounded the horizon of her whole life.

A peculiar era of culture followed the Civil War. We may hope from this that history may repeat itself and that a great forward and upward movement may follow the fearful slump that civilization has taken in the last few years.

I am not one of those shallow optimists who argue that there is more culture, more goodness, more personal fineness in the world today than there ever was. It is my belief that we proceed in waves of progress and ebb tides of civilization that carry us again out to turbulent seas of unrest and seeming chaos; but I have the hope that each incoming wave marks a higher mark—we gain something by the impetus our backward wave gives to the next forward surge of high and noble impulse.

Now it may be a form of senile homesickness on my part, but I recall with longing the atmosphere of cultured homes I knew in my childhood; it was a culture of J. G. Holland, O. W. Holmes, Henry W. Longfellow, Tennyson, Dickens, Jane Austen, Bronte, Charles Lamb, Wordsworth; a time of wonder and discussion, of reconciliation over great misunderstandings; a time of forgiveness and healing, of repairing broken fortunes and of entertaining bright thoughts and reading fine poetry, seeing great drama and hearing great preachers.

It was a time when genteel dressing

was appreciated, and loud, foolish fashions were taboo. It meant so much to be a lady then—to have a refined home, to stand with the people who were patrons of all refining influences. The church was the center of society; and society, like everything else, goes to destruction when it lacks a center.

The coming regime of genuine culture, which must follow the carnival of death and horror now rampant in the world—this unhappy era which marks a great transition in the affairs of the human race—must find its center again either in a redeemed, rejuvenated church or in a new temple of community spirit. We must rally around some central idea, else we are purposeless and open to demoralizing and decadent influences.

The culture of Christendom, whether consciously or not, has for its central idea the salvation of the human soul. There have been many highly educated people who haven't quite known this; people who have known all about books and music and art and social graces, who have shrugged their shoulders secretly perhaps at the idea of religion, but who, nevertheless, have owed all that they had and all they were to the central idea of personal salvation, just as we learn about it in our Christian religious teaching. All our erudition harks back to the first chapter of Genesis, no matter how the modern philosopher may smile at the words, "In the beginning."

There is a fearful hole in your culture if you do not understand this; and it makes no difference what you may believe or disbelieve, culture is founded first upon religion. Your denial of this does not in the least affect the fact. You may deny having any religion, but all you know or have acquired had its origin primarily in religious thought and impulse. Even though your thought may be reactionary, may be by way of denial or even of ridicule, there stands the stubborn first idea—and it is an idea of God and of man's relation to Him.

And so I declare that all culture must revolve around a central idea, and that the reason why some of us seem to see in our immediate environment evidences of a lack of culture is simply that people have drifted away from the church and its authority, and that they now have no organized society demanding their support and their presence.

Some years ago the idea that a man must "make good" in a financial way or he'd better be dead took firm hold upon the American people. This idea is grossly noncultural. It is hideously ugly and inartistic, and very unhealthy for the community.

The man who is intent upon "making his pile" is a bad citizen from every point of view. He is so utterly engrossed in his own affairs that he has no time to share the life and thought of the community. He owns no allegiance to the things that count for general culture. He builds a fine house, perhaps, sends his children away to a school which is maintained on a scale of luxury out of all keeping with the home town, furnishes them with a lot of ambitions which he hopes will take them away from the place they were born in and maybe carry them into a new sphere where money is necessarily the key and the standard.

All of this is most ungracious and noncultural. The humblest and poorest citizen who is trying to keep up a church or a Sunday School, or who is planting a shrub or mowing his dooryard or doing any little thing for the community life of a town or village, is infinitely more in tune with culture than the man who is striving to get up

and out and away to the top of the ladder over the bodies of his fellows—to the top of the ladder where there is no need of him or his—deserting the very place down close to the ground where all culture begins and where workers and helpers are so badly needed.

It is by reason of this great fact that any family or clique or club, which narrows itself to certain definite boundaries of associations and friends, cannot be really cultural.

Some people are naturally cultured, just as some are instinctively educated. But the longer I live the more forcibly the truth is impressed upon me that such people are very rare, and that the need of conscious culture, although it is but a poor substitute for the natural variety, is very great, and growing greater day by day. We have had our attention fixed on success, and success has meant money. Anything short of money success has meant failure.

This is most discouraging to the beautiful ideas of real culture, and the fact that dishonest men and rude, crude women have been admitted to places once sacred to people of taste and breeding, displacing those to the manner born, has given our young people a distaste for the sweet refinements of life, and made barren many lovely, little unpretentious forms of entertainment and sources of gentle content with life which we used so heartily to enjoy.

I have said of certain people I used to know that it was what they lacked that made them fine. I heartily believe this. Our houses were very bare; we had little outlet or scope for observation or travel. We were obliged to do work, ordinary housework and farmwork, for our daily bread. But this spurred us to greater spiritual activity, and we made the desert rejoice and blossom with fine, high thoughts and brilliant appreciations.

What is culture? Is it a way of living, denoting advantages and elegance? No. For the most unscrupulous of our social highwaymen cultivate luxuries and study "taste," if you please, in the appointments of their environments.

No. Culture is a way of feeling on the inside; it is an attitude toward life. True culture involves the idea of rest; of serenity and stability in one's environment. A restless, turbulent, fidgety person can scarcely be called cultured. We must cure people of the incessant-motion habit.

The most noticeable habit of the American people today is restlessness. This is the surest indication of discontent. People who are happy at home do not wish to be constantly going. It is some barrenness in their lives that makes people always moving about. We need a new perspective to cure this unhappy quest for something to occupy or amuse. Happily we are going to find it. Occupation is the watchword of our new education as service is to be the doctrine of our new religion.

You, man, whose parents gave you culture, education and money, you must not say: "I don't have to be worried over municipal affairs. I have plenty to live on and I do not care." You must serve. If it is only on a town board in a country town where there will be no distinction and much fault-finding, there is all the more need. The thankless jobs which we perform are the most necessary of all.

Somebody asked a friend of mine why she was good to a disagreeable, ungrateful old woman. "Because she is a disagreeable and ungrateful old woman," my friend replied. It seemed a strange thing to say, but I soon perceived that my friend was clothing this disagreeable and unhappy old woman with some of her own gracious person-

ality; she was making her seem to deserve love and consideration.

How greatly we raise our home community when we make it appear worthy of our service! How infinitely we lower it when, with curling lip, we declare that we do not propose to demean ourselves by mixing in its dirty work! It is this indifference and selfishness of the citizen that has left the way open for the grafter and the politician.

It is this loftiness of society people, who consider themselves cultured, that has made the white slave and the unmoral, uncultured class that finds its entertainment in the low atmosphere of cheap theaters and sensational "movies."

You, who have swept your own doorstep and shut the door on your own narrow "culture," are nourishing the cheap and pitifully noncultural entertainments so popular just now—not the young and the poor and the common folks.

But, very fortunately for us all, people are thoroughly awake to this phase of our civilization. Entertainment—that great need of young and old—is yearly becoming more under the supervision of cultured people. People are consciously fighting loneliness and poverty, the two greatest agents of immorality. They are sharing their culture with homeless girls and hungry-hearted boys, giving them something to cry over that is not sensational and something to laugh over that is not ribald; teaching them the difference between fun and rudeness, between self-respect and false pride. This is the only culture worth studying. It must be taught in every institution of learning, or that institution must cease to exist.

People like to declare that there must be no looking back, that everything must be forward. But I say, no. Let us have less plunging. There was a time when practically every home in America felt the culture of the religious life. Our great men were born under this regime. We have lost some of this culture through money madness and its accompanying degeneracy. The thing we shall replace in our homes and our schools and our national culture is as old as the Decalogue and the Sermon on the Mount; and we must replace it and enforce it, lest we spell our culture with a "k" and repudiate our claim upon Christendom.

—*The County Contributor.*
Ladies' Home Journal.

But words are things; and a small drop of ink
Falling, like dew upon a thought produces
That which makes thousands perhaps millions think.
'Tis strange the shortest letter which man uses
Instead of speech may form a lasting link
Of ages, to what straits old Time reduces
Frail man when paper—even a rag like this—
Survives himself, his tomb, and all that's his.

—*Byron.*

THE O.A.C. REVIEW

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EDITORIAL:

"OUR HONOR ROLL."

In this issue, we publish a list of the names of the O. A. C. men who have answered the call "To Arms" and have signified their readiness to sacrifice their all for the sake of King and Country, and to the general good of Humanity. They are men to whom Canada may truly point with pride and especially may we be proud to think of them as our brothers,—the sons of *our* Alma Mater.

Some of them have returned to us, having withstood the "test of fire" upon the European battlefields but having suffered sufficiently to receive their honorable discharge; others have laid down their lives in the fulfilment of their duty ,and all are prepared to do so, should it be required of them. To all those thus bereft of dear ones, the Review extends most sincere sympathy while to those who so anxiously scan the daily casualty reports, we express the earnest hope that the names of none other of these men may appear therein.

We have noticed on the part of some civilians, a tendency to speak lightly of our soldiers and to greatly magnify even their minor faults. Is this a just attitude towards these men who are fighting or preparing to fight for our liberty and honor as well as their own? They may have their faults as have the rest of us; we are all human. But they are proving that they are men and that they are *big* enough men to place duty ahead of self interest. Why then cannot this side of their characters be enlarged upon as greatly as their minor short comings? All honor to our Boys in Khaki!

EXIT—YEAR *1915-16.*

The college year of 1915-16 has passed into history. It has been an exceptional year in many ways. The afore-mentioned "Honor Roll" will

explain to a great extent why it has been exceptional. Also, in these columns, mention has previously been made of the spirit of unrest which has dominated the student life throughout the whole year. College spirit has been decidedly lacking and interyear rivalry has almost ceased to exist. We believe that it has been the same in all the colleges and universities of the Dominion. But now it is over and we are going out as graduates or undergraduates to endeavor to do our part to "Keep the Home Fires Burning." Let us see that we put all of our ability into this endeavor. Our work lies in the field of Agriculture which is the backbone of Canada's financial prosperity. We can do much to "Turn the dark clouds inside out, till the boys come home,"—and after.

To The Graduating Class

The members of year '16 are now at the end of their College Career. As they look back upon the past four years, there must be many happy recollections which crowd upon them. How much shorter those four years seem now than when they stood as Freshmen and looked forward. They have passed through their initiation, their first homesickness, their athetic competitions, their interyear rivalries, their "fights, feeds and fusses" and—last, though we hope not least—their studies and examinations, and now they stand ready to pass through the doorway which leads from college life to the bigger, broader life of the world, for which they have been perfecting themselves.

To each graduate, the Review extends most sincere wishes for immediate and continued success in the work which he has chosen to make his life-work.

Alumni

The following interesting letter was received recently from an old O.A.C. rugby player, now "playing the game" somewhere in Belgium, as optimistically as ever.—

Belgium, (In Spring), Mar. 16, '16.

Have not much to write about but will drop you a few lines to let you know I am still in the land of the living. The Canadian mails are held up, quarantined on account of smallpox. We have had no Canadian mail for two weeks now, and do not know how much longer it will be.

The first part of this month we had awful weather, snowy and cold. The Belgians assure us that it was the most snow they have had for twelve years. The last five days have been beautiful, the finest spring weather one could imagine, warm and sunshiny. It makes one forget the war to a great extent to have weather that one feels comfortable in.

The aeroplanes, especially the Germans, have been very active these fine days, consequently our artillery has been busy shooting at them, firing thousands of shots a day at them, but not hitting one that we know of. A couple of days ago one of our aeroplanes was brought down by a German plane; the pilot was alone and was shot through the legs and through the head. However he brought his machine down in our lines in a spiral until within about fifty feet of the ground and then he must have collapsed for his machine

fell, breaking up quite a bit. The pilot only lived a few moments after he hit the ground.

The German artillery has been very active too, but most of the damage done has been to the open fields and already ruined buildings.

We have moved further left on our line than we were. The trenches are pretty old and not much good for defensive purposes, the only decent thing about them being that there is a strong thick parapet. We had to go to work and build up emplacements, dugouts, etc., so that between working and doing guards, we were on the go about 17 hours a day, and that in the worst weather we have had. The infantry had to put out a great deal of wire in front of the trench and we lost some men every night, most of them being hit in the head.

When we first went into these trenches, we had a great time shooting at Germans. The men who were in them before us must have been rather slow, for we saw Germans walking all about the place for the first three days. The first two days we put our machine gun up on the parapet in the afternoon and shot at Germans who were crossing an open field 1750 yards away. It did us good to see them run or duck for cover, for we still have a vivid recollection of the times they have made us drop to the ground when in the open at night.

All leave has been cancelled indefinitely, which means I guess until next fall. Also our 21 days of rest back from the firing line seems to be only a myth. However, if the weather continues fine we will not mind so much. Do you know it is fearfully hard to settle down to write this nice weather for we all have the spring fever.

I met Lieut. Bill. Townsley in the trenches the other day. Was rather surprised to see him as I did not know he was even around here. Had a chat with him, and he said I would see him often as his battery was covering our front.

Kindest regards to all,

Yours truly,

Harry Westra '17 (56067),

Machine Gun Transports,

19th Battalion,

4th Brigade, 2nd C. E. F.

A Freshette's First Impressions of Life at Mac. Hall.

Mac. Hall, April 25, 1916.

Dear Glad:—

Now that I am settled I can tell you more about the life here. O! I wish you could be with me, you would love it so.

The college is on a high hill overlooking the city and on the highest point of the campus, are the two buildings for the girls,—The Institute and Hall. Both are large buildings, the Institute very imposing, but for its large size the Hall has a very homey

look, though how any girl can call it home as I heard a senior do today, is beyond me. At first I wondered how I would ever fill the long days but there is no doubt left now. The worry is—How will I get an extra minute?

The one thing that worries me most of all is the rules. Of course the calendar says "Every resident must comply with the rules and regulations" and believe me there is no opportunity to do anything else. Those rules are hung on the back of every door and there seems to be nothing you can do, but after careful reading we all found there were a few things left out and the others we could get around somehow. We get only one night out every week. What would you do if you got out only once. Of course it wouldn't make much difference now that "Blessed Jack" is in France. Say what do you think,—they guessed I was engaged and I've never worn my ring and never even brought out Dick's picture. It was hard not to tell for he is such a dear. He is in Belgium now and he says,—O! but I'm off the track I must tell you about the Hall. Last year there was no council and you could slide out through the laundry or fire escape or even boldly walk out the front door but now there are those unlucky thirteen who seem to bob up in every corner to keep things straight. The old girls say it is better than last year and from the stories they tell it must have been dreadful last spring.

The gong goes at all hours. It begins at a quarter to seven in the morning and there isn't a "Big Ben" on earth half as bad. At first we would jump right up and get nicely dressed but no one else did it so there is no use losing good sleep. Now we lie until about seven twenty-five then slip into a middy suit and make a wild rush for the dining room. Sometimes we get in but often we just hear the click of the latch. You feel like breaking the latch but even if you did get in there is that fine to think about. "Your contingency has been charged fifty cents" and after all it isn't worth it.

After breakfast it takes all your time to finish dressing and get the room in respectable order in case Mrs. Fuller should be around to inspect it. For no one wants to come back at noon to find a ticket pinned on the door, "Please make bed before going to class" or "Please tidy room before two o'clock."

Roll call is at eight-thirty and everybody must be there. We have a hymn and prayers and then Miss Watson produces a pink ticket with some announcement and we "govern ourselves accordingly." After that classes until twelve but they are of no importance. There are several courses. Diamond Ringers, Homeseekers', Hopeless, as the housekeepers are called, but from the look of this year's class they have not given up all hope yet. Then there are the normals and associates.

Dinner is at twelve fifteen. Of course we get properly balanced meals. Even the very lankiest expand and Dr. Creelman says the girls have been known to gain a ton in one term. I'm at a table with mostly old girls. Four of them are seniors and they talk Institute all the time and Biology, Chemistry and Diatetics. They call us "Only Homemakers" with utmost disgust and seem to think us quite brainless. After dinner there are dozens of things to do,—write letters, attend meetings, do scraps of class work or sewing or go for a walk.

Most people think we do nothing here but cook, and perhaps a little sewing but I wish they could see the housepractice, laundry, horticulture, foods or sanitation classes, their eyes would be opened. Some of the girls

know positively nothing. One girl asked today if a cow's rib went to its tail. Another asked if they put egg yolks in butter, but the majority know more than that.

After school we do various things—Wash—Wash day is any day you can get a tub and then a stopper for it. After a wild rush all the clothes are in the drier. They get the worst dirty grey color after a few weeks but with lots of soda and a good boiling they are fairly clean.

Sometimes we have sewing to do for class and the Juniors have educational sewing. Just think of sewing with white thread on bright red material so Miss Watson can't see the stitches with a microscope. Then of course we often go for walks, and call at "tuck" for something to eat and we're always hungry enough to eat anything on earth. Captain ball, baseball and tennis are beginning now so they help take up time and of course the basket ball. They have the best teams but they are old girls.

After tea comes "study hour" until ten. We are supposed to work but no one thinks of that, evidently, until exam time tables are posted. But at least we have to keep quiet or some Senior comes along.

Friday is "night off." Sometimes there are social affairs in the gym but usually you mope around the halls waiting for something to happen when suddenly the door bell rings and everybody rushes to the well. The man, (for of course it is always a man), if he has been there before knows well how many heads there are at the well to see how large his box of candy is this time and watch who goes down to get it, so he slides quickly into the library.

On other nights we wait patiently for ten o'clock and for once the everlasting gong is a welcome sound. One joyous shout goes up and someone says, "We're having a feed. Get your cup and spoon, and if you have any butter bring it along". Everything is going beautifully when just as you're getting the hat pin well into an olive, out go the lights and in two seconds some one begins to "shish" and we creep to bed.

Just as I get asleep Mae is sure to shriek, "O! there's a mouse in the waste basket. O! I'm sure it's in that box under my bed. O! did you shut the cupboard door and pick up those crusts. O! I know it is on top of this bed." I am always glad she has a good list of things for it takes me that long to get my voice calm enough to say, "No, silly, go to sleep. It's only the paper blowing on the table," even though I am quite sure it is a mouse. While she calmly goes off to sleep again I bounce around for hours from one hard bump of the mattress to another listening to that horrible gnawing and before my eyes are properly closed that dreadful gong goes and here is another day.

I haven't told you about initiation or the dance last week or anything else. I will save it until next time.

There's the tea gong.

Heaps of love,

Dora.

Junior Chemistry

We are sorry to say that the poor juniors of Mac. Hall met their Waterloo Friday afternoon, April 7th, in the form of a chemistry examination. When they discovered they were unable to answer any of the questions they decided to appeal to Prof. Harcourt's sense of humor through quotations. Here are a few of them:—

Edith Elliott—

"There are more things in heaven and earth than this world dreams of."

Christine McIntyre—
"It is better to give than to receive."
Rona Fraser—
"'Tis but a tale told by an idiot—— signifying nothing."
Mabel Geddes—
"She hath done what she could."
Laura Nixon—
"For what we are about to receive may the Lord make us truly thankful."
Dorothy Chown—
"The Lord loveth a cheerful giver."
Helen Winlow—thinking she had the last question right—
"All's well that ends well."
Jean Grant—who knew only the formula for water—
"A little learning is a dangerous thing."
Helen Healey—who wrote till the very last moment—
"Much ado about nothing."

MACDONALD LOCALS

Doreen Bright's brilliant answer to the Chemistry question,—Distinguish between Temporary and Permanently hard water.

"Temporary hard water is that which is found in the O.A.C. rink.

"Permanently hard water is that which is found in the region of the North Pole."

Betty Wallace—"Was your cooking exam. hard, Kathleen?

Kathleen Gilbert—"No—Miss Roddick gave me all the ingredients."

Madeline Houston—"I think that's mean. She didn't give me any."

Betty Wallace—"What did you have to make?"

Madeline—"I had to make a cup of tea and bake a potato."

Jean Grant—"Would you rather sit in the gallery with a man or down stairs in a good seat with a girl?"

Gwen Ramage—"I would rather sit with a man if I had to sit on the steps."

Oris Pratt—"Did you take Chemistry last term?"

Edith O'Flynn—"No, I was exposed to it but I did not take it."

How Would the Truth Sound.

Miss Watson—

Please excuse my absence from classes Tuesday afternoon. I stayed home to read "Snappy Stories."

Mabel Rumball.

Come in. It's the funniest thing but you always come just when I don't want you.

Jerry Balkwell—"I like this room because I can always see Binkley go by.'

Miss Watson—

I hereby certify that Florence Reek was forced to remain at home to attend a dance and was therefore unable to be present at the opening exercises on April 4th.

Signed—Dr. Langford.

Bright Junior, just before the exam. in Home Nursing—"Is it cynical or clinical thermometer?"

Prof. Harcourt—"What is the use of nitro-glycerine?"

Freshie—"Nitro-glycerine is used in the manufacture of musicians."

OF COURSE

Prof. Jones—2nd year bacteriology—

The pig is treated with the anti-tetano serum and also the virulent virus. To inoculate other animals, the tip of the immune animal's tail is cut off and the blood is used to inject into the other pigs.

Sullivan—"What happens when it's tail is all gone?"

Prof. Jones—"Why, that's the end of the pig."

A pretty girl, a diamond ring,
A trip to Toronto is just the thing.

We sat together in the moonlight,
My arm did her enfold
And I said, "What will happen, sweetheart?
When you and I are old."

And she answered as soft as the zepher;
"Dear heart, pray do not quibble,
When you are old and I am old
We'll both say, "*Ichcabibble.*"

EXACTLY AS WE EXPECTED

Smart Freshman—"How much are your four-dollar shoes?"

"Two dollars a foot," replied the salesman wearily.

EVERYBODY NOSE

Lackner—"What do you mean by telling Prof. Dean that I was a blockhead?"

Wallace—"It isn't a secret, is it?"

"STRANGER THINGS——"

Old Lady—"So, William, you've come back to us wounded, I hear. How did it happen?"

William—"Shell, Mum."

Old Lady—"A shell! Oh, dear dear! And did it explode?"

William—"Explode, mum? Not likely. It just crept softly up behind—and bit me!"

SURE TO HAVE HEARD OF IT

O'Brien, (seeing a load of bricks lying on the street)—"Hulloa, Murphy! Had a spill?"

Murphy—"My oath! Won't th' old man kick up a dust!"

O'Brien—"Ah, be jabers, he need niver know!"

Murphy—"Oh, won't 'e! 'E's under the bricks!"

Bill Geddes confidentially told Hugo Clark that he thought just about three quarters of the Mac Hall girls were engaged. There's nothing like being in at the start, even if you can't see the finish.

NOT INTERESTED

"I wish, Mrs. Nurich, you would come over some time and see my apiary."

"Thank you, Mr. Kingsmill, but really monkeys never interested me."

A STICKER

Moore—"As I was saying Miss—— when I start out to do a thing, I stay on the job. I'm no quitter."

Miss——,(with a weary yawn),—"Don't I know it?"

Down on the Dear Old Farm.

By Earl H. Emmons

THE CAT

THE cat is a sad package of grief and woe, and malady, who gets a job on the farm as a cure for the rat that ate the malt that lay in the granary the hired man built, but the cat is so pestered by her various ailments that she has practically no time to devote to her supposed occupation. Besides the cat finds it much easier to capture young and innocent chickens than sinhardened old rats, and somehow she likes the taste of poultry much better.

A peculiar thing about the cat's diseases is that she is never troubled during the day, but unfortunately she can accomplish nothing at this time, as the light hurts her eyes, and besides, she needs this time to sleep. But as the golden orb of day slowly fades into the western cornfield, the cat is seized by a spasm, or something, and without waiting to wash, comb her hair, polish her nails, or anything, she gives forth a wild untrammeled yowl, knocks a can of cream over as she aviates through the pantry window, and climbs upon the back fence, where she may give vent to her grief and get the aching misery out of her sorrowing system.

When the cat is in the throes of such attacks she is not to be trifled with, as she is not responsible for her actions. If, at such times, she met a rat and could not avoid him, the cat would inflate her tail, elevate her spine, and spit in his face, she would be so mad, because her sufferings are greater than she can bear with convenience.

Her sufferings are more, also, than some other people can stand, and these tender-hearted philanthropists do what they can to put the cat out of her misery by the aid of any household remedies which happen to be convenient.

After the cat has mounted the fence and freed herself of a few passages of operatic melody she feels some better, but she does not obtain any real relief until along about five o'clock in the morning, and incidentally, neither do the neighbors.

But the cat is well taken care of. She always has a host of friends willing to sit up with her while she is sick, and when she emits her weird refrains they all join in the chorus and do the best they can to help her, though they sometimes mumble the words and forget the tune.

After such a night as this the cat cannot be blamed for retiring to some quiet spot where she can rest and recuperate so that she may get her strength back and endure the next attack.

In the cat family, besides the common or garden fence cat, there are wildcats, catfish, cat-o'-nine-tails, catamounts, polecats, cattails, catnaps, catcalls, catnip, and kittens—con-siderable kittens. Also in the cat family are fleas to a large extent.

The Farming Business.