VOLUME XX. NUMBER 9.

# THE O·A·C REVIEW

June
1908

# OFFICIAL CALENDAR

## OF THE DEPARTMENT OF EDUCATION.

**June:**

1. Public and Separate School Boards to appoint representatives on the High School Entrance Boards of Examiners. (On or before 1st June).
   By-law to alter School boundaries —last day of passing. (Not later than 1st June.).
7. University Commencement. (Subject to appointment).
12. Senior Matriculation Examination in Arts, Toronto University, begins. (Subject to appointment).
19. Provincial Normal Schools close (Second term). (Third Friday in June).
22. Inspectors' Report on Legislative grant due. (Not later than 22nd June).
23. Model School Entrance and Public Graduation Examinations begin.
24. High School Entrance Examination begins. (Subject to appointment).
29. University Matriculation Examinations begin. (Subject to appointment).
30. High, Public and Separate Schools close. (End on 30th June).
    Protestant Separate School Trustees to transmit to County Inspectors names and attendance during the last preceding six months. (On or before 30th June).
    Trustees' Reports to Truant Officers, due. (Last week in June).

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## ADVERTISING.



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# The O.A.C. Review

*THE DIGNITY OF A CALLING IS ITS UTILITY.*

VOL. XX. JUNE, 1908. NO. 9.

## Electric Power and the Ontario Farmer.

By W. H. DAY, B.A., Department of Physics O. A. C.

IN these days of scarcity of laborers the farming community is turning more and more towards the utilizing of motor power of one kind or another in the performance of operations that in years gone by were done exclusively by man and his servant, the horse. To-day the more advanced farmer never thinks of wasting his time or that of his "hired man" in pumping water for his stock, for instance; that is done better and more cheaply by the windmill, hydraulic ram, or gravity. The windmill is also being employed in some other operations, notably sawing wood, cutting fodder and grinding feed, originally done by horse-power, but in each of these there is a drawback, viz.: The windmill, or rather the wind is master instead of servant—one must take advantage of it while it blows, and this is not always possible, and when it is not, then serious inconveniences and sometimes even loss must ensue. Some other kinds of work, for instance turning the cream separator, must be done at regular intervals, for which, of course, the windmill is in no way suitable. Hence all over the province we find men enquiring into the satisfaction being given by gasoline engines or the feasibility of installing an electric plant.

Until recently, electricity on the farms of Ontario has been only a dream, with little promise of fulfillment, a dream which at last under the cheap power policy of the Provincial Government seems about to be realized in a measure at least. Niagara Falls, which is capable of developing 7,500,000 electrical horse-power, is being harnessed to the extent of 850,000 H. P. or about one-ninth of its capacity, and the Ontario Government has contracted for 100,000 of this amount, which it proposes to distribute throughout the province. This, of course, means that beginning at Niagara trunk transmission lines will run in parallel to Hamilton and there radiate as far as Windsor on the west, Georgian Bay on the north, and the Trent district on the east. The pressure along these lines will be either 60,000 or 120,000 volts and at each town to be served on the way it will

be "transformed" by repeated "stepping down" processes to usable voltages of 2,000 volts or less according to the demands of the various services. From the trunk lines various branches will lead to either side to supply out-lying towns with the required power. This is the Government scheme in general outline.

The price to be charged for power at any point varies with the distance from Niagara, but even as far away as Windsor, 238 miles from the Falls, it will not be more than about one-quarter or one-third the present cost of electric energy manufactured there with steam as the motive power. To-day in spite of the high price of power, electric railways are springing up in various favored routes such as Galt, Hespeler, Preston and Waterloo; Hamilton and Grimsby; Toronto and Weston. Now if these lines justify their existence under present conditions, it is easy to see that with power reduced three-fourths or two-thirds in price their number must multiply rapidly, and that therefore an inevitable adjunct of the cheap power scheme is a vast net-work of rural electric railways, in time overspreading the whole province—the *whole* province because the abundant water-powers of eastern and northern Ontario are to be harnessed to supply cheap electricity to their territory, as Niagara does to its.

With such a net-work of transmission and trolley lines assured, and with this cheap power scheme being discussed editorally by almost every newspaper in the province, it is no wonder that Agriculture is beginning to demand her share of the benefits of such a scheme, it is no wonder that some of the townships have already applied to the Hydro-Electric Commission to supply Niagara power to the farmers residing within them. Whether a township distributing system is an economic possibility has yet to be solved, but certain it is that any farmer living beside a trolley line or adjacent to a town or village which has Niagara power, is in a position to enjoy the benefits of electricity on his farm; and it is further certain that farmers living back a distance of a mile or two from such line, town or village are also within reach of Niagara's sinews of power. Along the trolley lines of Ohio, Illinois, Indiana and Wisconsin electricity is quite extensively used for all stationary farm work, both light and heavy. As the government scheme devolps and trolley lines become general the same opportunities should be open to Ontario farmers.

As matters stand at the present time it rests entirely with a railway or other electric company whether or not they will supply power to any one applying for it. Should not the farmers as a class wait upon the Provincial and Dominion Governments by deputation and request that every charter hereafter granted to a railway or other electric company contain a clause binding the company to supply power to anyone applying for it, and at reasonable prices? I have reason to believe that such representation on the part of the agricultural class would receive favorable consideration from the Provincial Government, and probably from the Dominion as well.

With present day electrical machinery the conditions above mentioned, viz.: Proximity to trolley lines or town and village systems are the only ones in which it is economically possible for farmers to use electricity. Many have thought that those living

adjacent the high voltage transmission lines might be supplied with current therefrom, but it would cost from $3,500 to $4,000 to tap those lines at any given point, a figure which precludes the possibility of any individual or even small group of farmers being thus supplied with power. To generate electricity for farm purposes by using the wind, steam or gasoline for motive power would be almost equally expensive, hence until great reductions in the cost of machinery or transmission are made, or rural distribution systems are proven feasible we must be content with a narrow strip surrounding towns and villages or lying on either side of trolley lines. But even this is no small prospect. With cheap power assured it requires no sage to foresee in the future many thousands of miles of electric railway joining the important towns and villages. If each mile were to supply power to 25, 50 or 100 farmers, as might easily be, the total number would be a considerable proportion of the farming population of the province. Hence all possible steps should be taken to insure to them this boon; for what affects a large number of the people affects the whole people.

This raises a point sometimes overlooked, namely, that if only towns and villages received cheap power, which by the way was the primary purpose of the scheme, still the farmer is vitally interested, for he depends upon the town almost as the town upon him.

True, it is sometimes claimed that the farmer is independent, but while in the last analysis this may be true in the abstract, it is far from true in the concrete. He might exist alone, unaided, but in doing so, he must surrender all the conveniences, comforts and luxuries he now enjoys. If he is not willing to do this (and who is?) then the interest of the towns which supply him with those things he values so highly is his interest. If cheap power will enable them to manufacture more cheaply the commodities he needs, then it is his vital concern to aid them in their fight for power at the lowest possible cost.

The cost of electric power to those who may be in a position to enjoy it will be very small. Speaking at Guelph on May 15th, 1908, the Hon. Adam Beck stated that the Hydro-Electric Commission will be able to deliver power at that city at $14 to $16 per year for 24-hour power! Which, allowing $4 per year for distribution, will make it cost the consumer $18 to $20. Allowing for additional expense in distributing to farmers in the vicinity, they should receive it at $25 or less. And since only the amount used will be paid for, one might use five-horse power for one-fifth of a year, i.e. 73 days, or ten-horse power for one-tenth of a year, i.e. 36.5 days, at a total cost of $25 for power. And these are excessive amounts for the average farm. The installation, i.e. the motors and the spur line from the trolley wires, would entail considerable initial cost, some idea of which may be gained from the following quotations, which have been given me by the Northern Electrical Manufacturing Co., of Madison, Wisc., who make a specialty of equipments for all farm purposes:

Half-horse power alternating motor, suitable for pumping water from a 20-foot well to a tank 20 feet high, running cream separator or doing other light work, $40 f.o.b. factory.

Three-horse power portable alternating motor, $72 f.o.b. factory.

Five-horse power portable alternating motor, $79 f.o.b. factory.

Ten-horse power portable alternating motor, $224 f.o.b. factory.

Truck in each case, approximately, $25 f.o.b. factory.

To these prices must be added duty at 25 per cent. and freight charged to point of use. The spur line would cost approximately $75 per quarter mile if the potential on the trolley wires was 500 volts or thereabout. Hence a person or group of persons living in the vicinity of a trolley line or low tension line of a town or village, and knowing the service they require, may calculate approximately the initial cost of installation, and knowing the cost of windmills for various purposes, as most farmers do, they will find that the cost of an electric outfit is not excessive when the quality of service is considered. And going still further they will find the cost of such installation compares most favorably with gasoline installations for the same purposes. But they will find in addition that under cheap power prices, current for the motors will cost only a small fraction as much as the gasoline for the engines. And the electric service is more clean and convenient. Then besides, for an additional capital cost of $100 to $150 electric light, the most convenient form of illumination, may be installed in both house and barn, the actual cost of lighting thereafter being not more than $10 or $12 per year. Hence, with all these advantages to be derived from the use of electric power, is it too much for the farmers of the province to demand of their governments, both Federal and Provincial, that in granting power charters they shall henceforth guard the interests of the agricultural class by stipulating that the companies receiving the charters shall on application supply to the farms along lines?

Photo by J. Buchanan, B.S.A.

# Highway Economics.

By A. W. CAMPBELL, Commissioner of Highways.

ALL food stuffs of the world pass over the common roads. That is a summary which suggests the magnitude of the road problem. It is a fact that will bear earnest reflection. Both producer and consumer are concerned and it is of world-wide consequence.

We are readily impressed with the larger and newer enterprises, and are inclined to regard the railways as the chief factor in transportation. It is not the massive root branches of the tree which abstract nourishment from the soil, but the diminutive thread-like off shoots from them. It is not the steam railway which is the active agent of a nation's growth; but like the root branches of the tree, the railway is secondary, subservient to the lesser avenues, to the net-work of which is deputed the task of first gathering the means of subsistence. In proportion to the excellence of the network of common roads will the country be occupied and productive. As the roads are good, the country occupied and therefore productive, so will the railways have employment. The activity of the railways is a certain index to the magnitude of the flow of commerce. And commerce is the life stream of national prosperity.

Good roads have not secondary place in the transportation problem of Ontario. The traffic of railways is the summing up of what has passed over the common roads. Railway traffic increases because of the increase of traffic over the common highways. The cost of railway transportation has been lessened to a degree from which little more in point of economy can be expected. There is much more to be hoped for in this regard, by lessening the cost of transportation over the country roads.

While the cost of wagon transportation has for many years been almost at a standstill, railways have been decreasing costs in many ways, not by spending less money, but by spending more. It has cost money to build larger and more powerful engines, to strengthen roadbeds and bridges, to cut down grades, relocate lines, and lay double tracks in the busier sections. But from this initial cost, economy and efficiency in operation have resulted.

In relation to the common roads there has been little consideration given to economical and efficient operation. The first cost has, in general, been the great consideration—the obstacle to a progressive improvement in keeping with modern advance in other ways. The economic aspect of the question is so common-place, the public has become so accustomed to the mud embargo, that they are blind to its very existence.

The impassible condition of country roads at certain seasons of the year tends to disorganize commerce and to throw the railway service into confusion. The demand for farm produce is constant throughout the year. The marketing is dependent not so much upon the demand as upon the condition

THE MUD EMBARGO.

Drains without outlets, are merely elongated ponds at the roadside. The water soaks into and is absorbed by the road, making in the spring, a bottomless river of mud.

of the roads. There is always a rush to market in the fall—before the roads get bad. The financial stringency in the fall is largely increased by the haste to move the crops, before the roads get bad. At other periods of the year railway traffic fluctuates as much as 50% as the direct result of the condition of the roads. Demands of this kind upon commerce and upon railway accommodation mean a waste of energy that is profitable to no one. It must be paid for in cash by the consumer and producer.

In France we find teamsters competing with railways in drawing goods two and three hundred miles over country roads. In Belgium there are instances, as between Liege and Brussels, or Antwerp and Brussels, in which teamsters commonly haul their loads sixty and seventy miles in competition with the railways. Similar examples could also be found in Germany and England.

That traffic over the common roads can compete with railway rates is regarded by many as an anomaly, a condemnation of freight rates, and a return to the primitive conditions of our grandfathers. Nevertheless for limited hauls, as great as three hundred miles in France the common roads provide a means of competing with the railways which we cannot afford to disregard. With good roads, farmers would equip themselves with better stock, journeys could be made more quickly, and double the present loads could be carried. There are no better means of regulating freight rates than to render ourselves largely independent of railways, by improving the common roads, a matter which European experience tells us, is not beyond our power to accomplish.

The vehicle and the roads are but parts of the one machine. The roads of to-day are not equal to their counterpart, the horse-drawn vehicle now

in use. Signs are not lacking that in the near future motor vehicles, adapted to the carrying of farm produce rapidly and long distances, will be available. With roads equal to the weight and speed of such a means of transportation, the possibilities as regards farming are tremendous. But a necessary condition to the efficiency of such a vehicle is better roads.

Ratepayers generally, are possessed of the idea that their roads are now built and maintained almost solely by statute labor, and that if this work is not performed in the most faithful manner no serious crime is committed. They fail to realize, however, that owing to the very imperfect manner of doing the work, municipal councils are obliged to impose a direct money tax. The amount of this tax, the indifference displayed in expending it, and the inferior results produced, comprise one serious phase of the question.

Road expenditure now forms the greatest outlay of the municipalities on any one public service, and is one which will constantly increase. It is estimated that the canal system of Canada, chiefly in Ontario, has cost since its inception about $90,000,000. The cost of the railway system within the Province has been about $200,000,000. The expenditure on country roads in money and labor has amounted to more than $2,000,000 annually.

This large sum is spent on roads in comparatively small amounts throughout the Province, and ratepayers see only these small sums, and in consequence do not realize the enormous total. The expenditure is made, too, with little or no attempt at careful supervision, with the result that a large proportion is actually wasted and much of the remainder turned to poor account. Much, of the expenditure is undoubtedly devoted to a very good purpose, but a careful examination of the methods pursued will disclose that owing to faulty administration, careless and inexperienced supervision, and the improper influences which are brought to bear upon those in charge, our system of road-making is incompetent, utterly unjust and extravagant, and is almost solely responsible for their poor condition.

That this vast expenditure should be made upon such an important public work, in so slipshod a manner, without rule or design, seems inexplainable; it is watched with the closest interest by the ratepayers, and the expenditure criticized to the most trifling item. Better roads and even good roads, do not necessarily mean an increased outlay, but a better administration of the present expenditure.

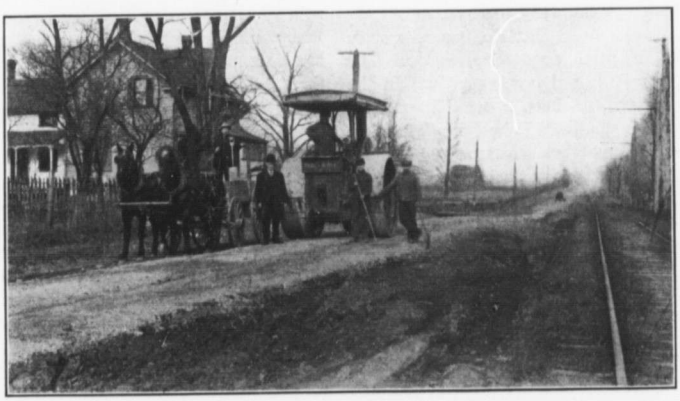
It has been said that there is no direct cash value to the farmer from a saving of time in driving over the roads; that it does not matter whether he can take one load or two to market in a day; that he has plenty of time to spend in driving over the roads, but has little money to spend in improving them. The day when that argument was effective has gone by. A farmer of to-day who realizes his opportunities, has no more time to waste than has any other business man. It is not an argument that can appeal to readers of the O. A. C. Review. The time that users of the road waste in driving through mud, if expended in road construction would do all the work necessary and we would have the benefit of good roads in addition.

Cities and towns, in their eagerness for great railway depots and terminals, have forgotten their interest in country

roads. The city is the product of the country; the country is not the product of the city. The first roads on the continent were country roads, not city streets. As country roads were first in origin, so they are first in importance. There is too great a tendency among townspeople to overlook the wider application of the question of roads in general. With city paving, there is certainly a greater demand for engineering skill, and the engineering difficulties appear to be farther from solution than is the case with country roads. At the same time, the simplicity of country road construction is not always so real as it appears, and the difficulties are greatly increased by the deficiency of funds with which to overcome them. The same obstacle, it is true, is met with in city paving, and the question becomes in each case, one of obtaining the best results with a minimum or within a limited cost. In view of the strict economy demanded, the construction of country roads, in selection of materials, location, drainage, grading, bridge and culvert building, and the various details, becomes a matter in which the greatest skill is not wasted.

The people in the cities are very apt to urge that, because their pavement cost so much per foot frontage more, because the farmer receives the reciprocal use of the city street in return for the city man's use of the country road, they have, therefore discharged their obligation with regard to roads. Contrasting an eighty-acre farm, however, with a fifty-foot town lot, and a farm road at $1,000 with a city road at $5,280, we find the cost to the individual farmer is $125, and to the city property owner $25.

Many of the streets, it may be said, cost much more than the amount named. The same is true of the country roads, almost the minimum has been named in each case, and if we double the cost in the one instance we must do so in the other, so that the proportions remain about constant. Then, too, a fifty-foot city lot is double



INTELLIGENT ROADMAKING.
Peel County steam roller, near Port Credit.

the frontage occupied by the majority of city houses. An eighty-acre farm is not uncommon in the country, and in levying it with one-eighth of a mile, there has not been included its proportion of flankage existing in every block.

Country road building is a matter of magnitude and expense, as compared with the number and wealth of those upon whom it now commonly rests. Wherever it is left solely to the farmer it will be years before the condition of the roads will be adequate to the complete development of the resources of any country. It is a great public work in which the entire citizenship must bear a part of the cost.

The sum of the matter is that, whether or not the towns and cities discharge their strict duty in the construction of streets within their limits, their prosperity is dependent upon the prosperity of the country districts, and it is but a matter of self-interest, of profitable investment, to assist in road building.

There is, first of all, the broader aspect of the question which regards the welfare of the nation as a whole. In this aspect of the question we are led to regard the relations which exist between the great metropolitan centres which have as territory upon which they depend for support, the nation as a whole, and which, whether for agricultural, mineral or forest wealth, are ultimately dependent upon the rural highways for the materials of manufacture and consumption.

There are again the towns and cities of lesser magnitude which draw their support largely from the agriculture of the immediate vicinity. From these latter there comes a more urgent demand for good roads, a demand which all urban communities have made of late years, for it is these lesser cities which would be more directly benefited by the improvement of roads in the immediate district. The benefits being more direct, the value of good roads becomes more apparent.

The larger cities less directly benefited, but benefited to no less, indeed to a such greater degree, appreciate less perfectly their value because, being less direct, the benefit is less apparent. They have usually many manufacturing industries, and therefore seem more self-supporting than do the towns more directly dependent upon the agriculture of the district. The more apparent independence is, however, deceptive. If the town is a manufacturing centre, it must have country roads over which to draw the material for manufacture; to a much greater degree, however, must it have a wealthy territory surrounding it to purchase its articles of manufacture. It is to the agricultural country that good roads are most beneficial, and no agricultural country can become wealthy and to the highest degree prosperous, without good roads. From greatest to smallest, towns and cities are dependent upon good rural roads.

There is no section of Ontario where farming, especially the production of garden stuffs, would be more profitable than in the immediate vicinity of Toronto. There is scarcely a district of Ontario where farming of this class is more sluggish and unprogressive. There is no similar area where the country roads are in a more neglected condition. The farming situation in this case is attributed by close observers directly to the inferior condition of the roads. To secure a larger and better supply of this class of food stuffs,

A HASTINGS COUNTY ROAD.

it would be a good business investment on the part of the city of Toronto to spend a million dollars on the roads of York County.

If the farmer must come over the roads to the centres of population and the railway station, to dispose of his farm produce, it is equally necessary to the townsman that he should use the roads to draw the merchant's goods back to the farm. It merely happens as a matter of convenience for obvious reasons that the farmer draws his produce to the town and his purchases back to the farm, instead of the merchant hauling his merchandise to the farmer and the produce of the farm back to the town. The country roads are of quite as much benefit to the townsman as to the farmer.

Without means of access, a country is valueless for production purposes. A farm of highest fertility within fifty miles of Toronto, if there were not roads by which it might be reached, would be as valueless as if situated in the heart of Africa. Distance is not measured by miles, but by rapidity and ease of travel and transportation. It naturally follows that with the opening of the first wagon track leading to it the value of a farm commences, and as the road improves the value of the farm advances, other conditions remaining constant. It is true that the more the country districts become filled with population the more rapidly the improvement of roads will advance, but it is equally true that the more rapidly the roads are improved the more rapidly will population advance. As population increases, the wealth of our cities will increase, and it therefore points forcibly to the conclusion that one of the potent means of improving and lengthening town and city streets is to provide at the distant end of the chain of transportation, good country roads.

# The Future Power of the Farm.

By JOHN EVANS, Professor of Manual Training O. A. C.

SCIENCE and invention have, within comparatively few years, completely revolutionized operations of factory and workshop, but on the farm though much has been accomplished the implements and machinery still used are largely modifications of earlier types. True mechanical power is used to a limited extent and has relieved the farmer of much drudgery, still there is considerable field for the extension and application of motor power to methods and operations of the farm. Compared with the changes in method in workshop and factory, in transportation and communication it cannot be said that farm processes have been subjected to as drastic a transformation as other pursuits of human activities. Whether this passivity in the application of modern methods to agriculture is due to lack of mechanical knowledge in the farmer or to prejudice, it is difficult to surmise; but certain it is that to meet the demand for agricultural products that is being created by the influx of new settlers and the rapid growth of the country, a more efficient power becomes a necessity to the farmer as he will be compelled to sow and harvest larger crops, to accomplish more in less time, and with less labor. In times past hand, water, wind and animal power served well their purpose, and to a certain extent each will continue in use, but the social and commercial interests of the community are exacting greater and better means of intercourse between town and country, and more up-to-date methods in dealing with farm and rural problems.

Of the forces of nature, wind and water, that have been harnessed to produce power for the farmer, wind has been of greater service by far, and, the horse excepted, was the first kind of motor used to relieve "Giles" of physical exertion or to increase his capacity to do work, and probably is still the most extensively used. But at best wind power is unreliable and usually unavailable when required—it comes and goes without any regard for the farmers' needs.

Of what is called prime movers there is probably no other having so many conditions for consideration so as to develop efficient power. At one time the wind wheel was considered to be the most important post in the consruction of a windmill, but from results of tests and experiments this belief is now exploded and the gearing is said to be the essential and vital parts. It is also difficult to compute the amount of power produced owing, in a large measure, to the great number of varying conditions — variable velocity of wind, velocity of sails, their number and lenght, width and thickness; velocity greater on one side of the wheel than on the other; angle of weather of the sails; diameter of wheel; variation of load, location and height of tower. The efficiency of a windwheel is very greatly affected by the diameter. This is due to the fact

that wind is not the same at any two places on the wheel. The smaller the wheel, the greater the efficiency.

The waterwheel, except in a few favorable locations and conditions, has long since disappeared.

Animal power has always been the mainstay of the farmer and of those used the horse is essentially a draft-animal rather than a beast of burden. It is able to draw a load many times its own weight while it is unable to carry a burden more than about one-third. The amount of resistence a horse is able to overcome depends on its own weight, its height and length, its grip, direction of trace and muscular development. The heavier the horse the more adhesion he has to the ground, and the better able he is to use his weight to advantage, as the tendency of the pull is to lift the fore feet of the horse off the ground. Hence the heavier a horse is in the shoulder the greater is its capacity as a draft horse; so that a low, rather long-bodied horse has much the advantage over a tall one, for heavy draft work; as the effect of the pull, in the latter case, is to draw his weight over the rear feet as a fulcrum. Grip is the hold a horse has upon the road surface, so that weight adds to the grip of a draft animal. So long as the trace is horizontal it has to depend upon its grip and its weight only, to overcome the resistance of the load; on the other hand if the trace be lower than horizontal, then, the direction of the pull is to draw the horse on to the ground, giving it greater adhesion, but should it possess sufficient adhesion to overcome the load without lowering the trace it is to its advantage, since the draft is often less in this position than any other. The conditions under which a horse has to work are frequently such that 50 per cent. of its energy is lost. Speaking generally, the pull a draft horse exerts is thrown upon its hind legs, and for this reason the form and strength of this part must be considered in selecting a horse for draft purposes. If the projection of the heel bone beyond the joint is large, the muscles are better able to straighten the limb under greater pull than if this projection were small, and so increase the capacity of the horse to overcome resistance.

Of the contrivances utilizing animal power, perhaps, in point of history the sweep horse-power is the earliest, and was considered at the time remarkably efficient. The power is transmitted from the master wheel through suitable gearing to the tumbling rod transmitting the power to the machinery. Owing to the horses travelling in a circle considerable amount of draft is expended in exerting pressure towards the center of power producing greater friction, but the larger the circle in which the horses travel the more nearly will the line of draft be at right angles to the radius of the circle forming the sweep, and so the efficiency of the machine.

The treadmill consists of an endless apron or movable platform in an inclined position passing over a cylinder at each end and carried along by rollers. As the horse treads on the apron it sets it in motion, and the power is conveyed by a pulley placed upon a shaft passing through one of the cylinders. On account of the large number of bearings, lubrication is an important feature in the operation of this power, and should be as nearly perfect as it well can be, so that the minimum of work is lost in friction. A horse will develope much more power

when working a treadmill than in operating a sweep, and it frequently happens that a horse is overworked in the former without the owner knowing it, or even suspecting it to be so.

The inadequacy of the forms of power thus far considered, and the growing scarcity of farm help emphasizes the necessity for a more convenient and adaptable farm power.

The new power agencies which are going to transform oldtime methods on the farm are the electric power and the internal combustion engine using as fuel either gasoline, alcohol or kerosene.

The scope of electric lighting and power for use in country homes and isolated industries has had great extension since the perfecting of the internal combustion engine. A dynamo attached to such an engine can be made to generate the requisite electric current, or a small stream might be utilized. An interesting article in The Rural New Yorker gives a good account of what may be done along this line, from which the following extract is taken:

"The work on the average farm requires but little power, and a small stream might become most profitable, if harnessed to carry out the light work of the farm. . . . By a simple installation consisting of a turbine governor and dynamo, this water power now lights the buildings on two farms, and does three-fourths of the work, and all this at the expense of but a few hundred dollars, probably less than the cost of two horses—one for each farm. The cost of running the plant is practically nothing; but slight attention is needed, and a little oil and small allowance for depreciation and repairs make up the charge. In exchange for this, there is ever-ready power, ample light, cleanliness, safety, and the saving of the care and feed of horses. These features, it is said, have added about 25 per cent. to the value of the farms."

Let me cite another instance, and give facts and figures in regard to what has actually been accomplished in farming with electricity. The following is an excerpt from De Kalg (Ill.) Chronicle, Sept. 2, 1904.:

"A dozen or more responsible farmers, of Kane County, have been experimenting for a year past with electricity. Their purpose is to make the electric motor supplant nearly all human and horse power on the farm.

"The electric current used for power is taken from the copper conductors which supply current to the two interurban railways extending from Elgin to Chicago and Aurora.

"The success attendant on the farm by the use of electricity has been due to the close proximity of third-rail and trolley electric systems to farms. The necessary power is secured from electric railways themselves over feed wires that are poled by short distances from the main line to the houses and barns of the farms. The voltage of the main lines is 500, far more than sufficient to operate all cars.

"The price paid by the Kane County farmers averages about $500 for the fifteen horse-power moderate speed motor. . . . As to just what the Kane County farmers have discovered they save by the use of electricity, the following table will show:

| | |
|---|---|
| Cost of installation of electric motor | $500 00 |
| Cost of power during six farm working months of the year, about | 26 00 |

Total cost of system, first six months ..... 526 00
Cost subsequent use of power, repairs, etc., per month.... 5 00

Comparison with former methods:

Cost one farm hand, wages, six months at $25.00 .....$150 00
Cost board and lodging same, six months, average $1 per day ..... 180 00
Cost team of horses, at $125.00 each ..... 250 00
Cost of feed for same, 5 acres of land production for 6 months, valued at ..... 100 00
Cost shoeing, veterinary, repairs to harness, etc., six months. 12 00
Total cost one man and two horses, six months ..... 692 00
Saving with electricity over man and horse power, first six months ..... 166 00

Of course, for the second six months and all subsequent periods, the farmer's saving is still much greater."

I am bold enough to predict that the day is not far distant when the average farmer will be a motorist "cussing" bad roads and not automobiles off the highways. The "auto" will take the farmer and his family to market, church or on a pleasure trip. The wife starting soon after dinner can run into the city, do her shopping, make a few social calls and be home again by teatime; so the auto is going to make the country life not only tolerable, but pleasurable as well.

The gasoline traction engine will draw the plough, hoe-drill, and selfbinder. It will saw the wood, pump the water, cut the feed, churn the butter, and do many other chores.

It requires only an occasional attention and adjustment, provided it is well cleaned and oiled. All this can be effected with greater efficiency and economy. Horse power is a continued source of expense; a horse must eat even though it does not work, and requires constant care and attention. The engine consumes no fuel when not at work and experimental tests have been made proving conclusively that it will

Grind 6 bushels corn at cost of 2 cents.
Pump 3,000 gals. of water (50-ft. lift) ..... 2 cents.
Cut 1½ tons of ensilage ..... 2 cents.
Threshes 13 bushels grain ... 2 cents.
Shells 40 bushels corn ..... 2 cents.
Husks 13 bushels corn and shreds stalk ..... 2 cents.
Separates 800 pounds of milk.. 2 cents.

Such is the possible reformation in farm methods and operations.

# Concrete on the Farm.

By HENRY POGOCK, of the London Concrete Machinery Co.

CONCRETE for many years has been in use in Canada and other countries fo large structures, such as bridge abutments, piers, breakwaters, arches, etc., but only within the last few years has it been used extensively for construction work on the farm. The scarcity of wood and other building materials makes building on the farm to-day a different proposition than that of twenty years ago. In many localities, where, twenty-five years ago, timber was abundant, to-day there only remains a few straggling trees which adorn the lane-ways and groves on now well-cultivated farms. In those days the progressive farmer could always get pine, hemlock, or other suitable material within a few miles of the place where the same was required for use and number one pine could be purchased for at from $8.00 to $10.00 per thousand, which now would sell for from $40.00 to $60.00 per thousand.

Within the last fifteen years the manufacture of cement within our own Province has become an extensive industry. Production on a large scale and competition have been the means of placing cement within easy reach of every farmer in Canada and at a cost which would warrant its use, in every class of work where it would be practical to use concrete in place of wood or other building materials.

Cement Blocks Make Beautiful Homes.

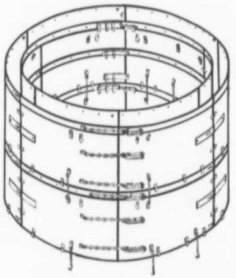
The term concrete might apply to any kind of plastic materials which have been hardened together in one solid mass, but in treating on concrete under this head, we refer to what is known as cement concrete, which may be made from or by the use of several different materials for coarse aggregates, the same having a proper amount of cement added to form a perfect mixture, and cause the whole to set into one solid crystalized mass.

Use only Portland cements. The term Portland applies to cements which have been placed through a certain process of manufacture, and at the same time have been treated chemically or otherwise, according to a specification. All cement which has been treated under this specification may be termed Portland cements. We could specify for use no one certain brand of Portlands, as where all have been treated under practically the same process, there cannot be any great

Cement Silo near Aylmer, Ont., built with Hodgert Silo Curbs.

difference in the quality of cement produced by different makers.

In the making of concrete any of the following coarse aggregates may be used: Sand, gravel, broken stone, slag, cinder. Different classes of work call for the use of different kinds of coarse aggregates, but speaking of concrete as



Hodgert Silo Curbs.

that generally used on the farm, we would apply to concrete made from cement, sand or gravel properly mixed together.

1st. Build a platform about 12 feet square, of 1 inch matched lumber. This 1 inch lumber should be securely nailed to 2x4 scantling 12 feet long, placed about 2 feet 6 inches apart, at right angles with the boards.

2nd. Place the mixing board on the level ground.

3rd. Prepare a square frame. The size of this frame depends on the amount of concrete to be mixed at one batch. For example, we would presume that we desired to make a 1 to 8 mixture. This frame should be made in size to hold 8 cubic feet of sand, which will be mixed with one bag of cement representing 1 cubic foot. For this size of batch the most convenient size of frame would be 3x4 and 8 inches deep. Should it be desired to mix larger batches, the frame might be made wider, but it is not advisable to have the frame in any case more than 10 inches deep.

4th. Lay the frame on the center of

the mixing board, the long way of the frame to lie at right angles with the lumber in the mixing board, this will prevent the shovel from tearing slivers from the mixing board.

5th. Fill the frame half full of sand and level the same with a shovel.

6th. Add one-half bag of cement, spread the same evenly over the sand.

7th. Fill the frame full of sand or other coarse aggregates to be used, and once more level the top of the same.

A COSY COUNTRY HOME.
The blocks are made on a London Face Down.

8th. Add the remaining half bag of cement. Spread evenly over the top of sand.

9th. Remove the frame, which will leave the ingredients lying in a long pile on the mixing board.

10th. Start at one end of the pile and turn the same over completely three times, each time the same should be turned into a pile of conical shape.

11th. Spread out on a board about 8 inches deep and sprinkle with a watering can, then turn over two or three times more and the concrete is ready for use.

The amount of water required for concrete depends upon what the concrete is to be used for. It is generally admitted that concrete having sufficient water to make the same thoroughly moist is better than that made from a very dry mixture, and on that account it is always well to use wet concrete in every kind of work where the same is practicable or for such work as cement silos, stable floors, abutments, retaining walls, watering troughs, or any class of work where the mould has not to be removed immediately.

In speaking of wet concrete, we would refer to concrete having sufficient water added that after the same

has been tamped into the mould the water will just begin to rise to the surface. An excessive amount of water will cause the cement to rise to the surface and thus injure the concrete.

In speaking of dry concrete, the term applies to concrete having only sufficient water added to moisten the surface of all particles. This mixture in appearance will resemble wet earth, or if a quantity of dry mixture is squeezed in the palm of the hand the same will compress into one solid mass but will not adhere to or moisten the palm of the hand. This kind of concrete is used for such work as the manufacture of concrete block, concrete brick, concrete tile, or any class of work where it is necessary to remove the mould immediately.

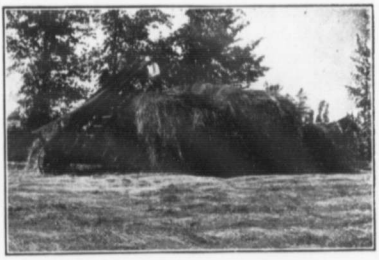
Concrete is used extensively on the farm for such work as building cement cisterns, cement walks, cement floors for stables, barns, barn walls, foundations, and is always used very extensively for building dwelling houses in the form of cement brick and block. The cut shown above represents a drawing of a silo mould. With this mould a silo can be built in one week by three men or at the rate of 5 feet per day. This mould is so constructed as to make the inner walls perpendicular, but the outer walls taper, allowing a silo to be built, having thick walls at the bottom and thin walls at the top, where less tensile strength is required. The above illustration shows a cement silo built from rings of this description.

Concrete blocks are now being used extensively for building barn foundation walls, and for dwelling houses throughout. Many improvements have been made in machines for manufacturing blocks in this last few years. The latest machine is that which might be termed the Face-Down Machine. The face down principal allows the block to be faced with richer material or colored. The face of a block is usually made of a mixture of one part cement to two parts of sand, then the body of the block is made of coarser material of poorer proportions. This method of manufacture makes an absolutely water proof block. This type of machine also provides for the stone to be made in any size or design and thus meet every architectural requirement. On account of sand and gravel being plentiful in most localities, the manufacture of concrete blocks on the farm is becoming an extensive business. The illustration on the previous page of a dwelling house is that of a Western Ontario farm home, built from cement blocks, made on a London Face Down machine, and is a fair type of dwelling house which is fast supplanting dwellings built from wood, stone and brick.

# The Utility of the Hay Loader.

By PROFESSOR G. E. DAY.

THE saving of the hay crop is one of the most laborious operations of the farm. Much has been done during recent years to lessen the labor, and, no doubt, further improvements in hay-making implements will appear as time goes on, but there still remains a good deal of hard labor in connection with this important branch of farm work. Unfortunately it seems difficult to secure the very finest quality of hay when methods which entail a minimum amount of labor are employed, and the present seems an appropriate time to discuss a few points in connection with this phase of the question.



A HAY LOADER AT WORK.

The advent of the hay-loader has caused a very marked change in methods of hay-making. Under the older system, practically all hay was made into cocks, and allowed to stand for a time before it was drawn to the barn, but when the loader is used, cocking the hay is out of the question, because the loaders in use at present will not handle hay that is in cocks. In one sense, this is a marked advantage, because there is a great deal of labor in cocking hay, and the loader saves all this labor, as well as the labor of pitching; but the question arises whether as good hay can be made without cocking, as under the older method, and to discuss this question, we must take other haying implements into consideration.

The hay-loader is a very incomplete implement unless accompanied by the side-delivery rake. There are two reasons for this: first, the dump rake leaves the windrows running in the wrong direction to be conveniently handled by the hay-loader; and second, it makes a heavy, tightly pressed windrow which does not readily dry out. The side-delivery rake, on the other hand, leaves a continuous windrow, which runs in the direction in which the rake is driven, and it makes a light, loose windrow which dries out very rapidly. The dump rake will be found necessary for the second raking, but for the first raking it is very unsatisfactory.

The side-delivery rake is also a substitute for the tedder in many cases. In making timothy hay, the tedder will be found quite unnecessary where a side-delivery rake is used. If the driver uses judgement and makes light windrows where the hay is very heavy, the rake will leave the hay in ideal shape

for drying. In a heavy crop of red clover, especially in the beginning of haying when the clover is very green and full of sap, it is more difficult to get along without the tedder, and the tedder will do excellent work in helping to cure this class of hay. Later in the season, when the clover has become more mature, there is less need for the tedder, and in a moderate crop of clover, it can be dispensed with altogether.

Alfafa presents the hardest problem to those who wish to use a hay-loader. This is especially true of the first cutting. As nearly everybody knows, the first cutting of Alfafa contains a great deal of sap, the stalks are very rank, and the leaves are apt to scorch with the sun and crumble off, so that great care must be exercised or the hay will consist of very little but stalks. With this kind of crop, the tedder becomes almost indispensable, and requires to be started very soon after the Alfafa is cut to prevent the leaves from becoming scorched. To prevent scorching of the leaves, and to ensure thorough curing, it is customary to practice early cocking, and to leave the hay in cocks for several days before drawing. This plan puts the hay-loader out of the question, and if it is absolutely necessary, it is one of the greatest objections to Alfafa as a hay crop.

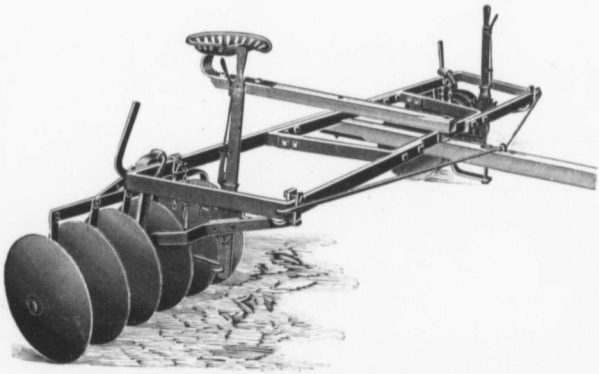
This brings us back to the first question: Can the best quality of hay be made without cocking? On the college farm, we have had seven years' experience with the hay-loader and side-delivery rake, but our experience is confined to handling timothy and red clover. In the case of timothy: we think we can make practically as good hay without cocking, as we can under any other method. Very sappy red clover, we find more difficult to handle, and we do not think that our hay is quite equal to what we used to make when we put it up into cocks; but towards the close of the clover harvest, we find the clover hay made under our present methods, very little inferior to that which we used to make. We are satisfied that the great saving in labor effected by the side-delivery rake and hay-loader more then compensates for any slight deterioration in the quality of the hay, and we would not think of dispensing with our hay-loader.

Next year, we expect to experiment with the hay-loader on Alfafa, but we have little hope of being able to use it successfully upon the first cutting. The second and third cuttings can be handled quite satisfactorily with the loader, but the first cutting is so rank and sappy that cocking seems necessary to effect proper curing. This is a matter which is open for further investigation, and it is to be hoped that labor-saving methods may be devised for handling this important crop. There is no doubt that the hay-loader has come to stay, and it is worth while to investigate its utility, and to make its work as effective as possible.

# Up-to-Date Orchard Implements.

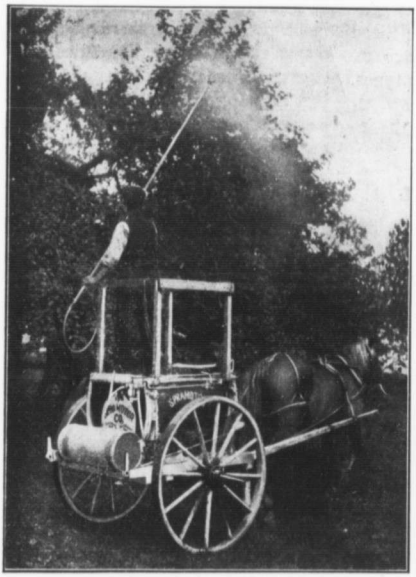
By J. W. GROW, B. S. A.

THE improvement of agricultural implements keeps pace with and is an excellent measure of the development of agricultural practice. Special tools are evolved for special purposes, and the subdivision of general agriculture into many specialized branches has resulted in the production of implements of many different types. This is true, in the general sense, of all industries, and it is also true of the individual case. A general farmer uses implements of general adaptation, and in many cases prefers to modify his methods rather than to invest in implements intended for special—and consequently limited—use. An excellen example is to be found within the scope of this article in the case of tools used for orchard cultivation. As long as orcharding remains a side line on any farm ,ordinary plows and harrows will be used for whatever cultivation the orchard receives. This fact has probably determined almost altogether the common practice of heading trees at from four to six feet or even more in height. When orcharding becomes a specialty, however, the difficulty and expense connected with pruning, spraying, thinning and picking tall trees become apparent. Comparison of the relative advantages of both types of trees results in favor of the low headed tree, and we have, in consequence, a growing demand for implements suited to the culture of trees of that kind. Another result of the lack of implements suitable for orchard tillage is the presence of sod in a very large percentage of Ontario orchards. Any farmer knows that most crops must be



THE BISSELL EXTENSION DISK HARROW.
A new type of orchard implement.

tilled in order to give best results, but orchard practice in this respect has in far too many cases become modified to the point of absolute neglect largely through the want of implements designed especially for the purpose. Better realization of the benefit of tillage must likewise result in an increased demand, for new and up-to-date tools. These remarks apply, of course, only to those cases in which the degree of specialization warrants the purchase of special machinery, but in any case the principle remains the same.



A USEFUL OUTFIT FOR THE SMALL FRUIT GROWER.

Low headed trees are very slowly gaining in popularity, but some of our enterprising manufacturers are already catering to the growing demand for implements adapted to their cultivation.

Still greater improvements are needed, however, and it is probable that the introduction of satisfactory implements for this kind of work would have a greater influence in popularizing clean cultivation and low headed trees than months of preaching through institutes and newspapers.

Many modifications of "old-fashioned" tillage implements are in use by fruit growers, and some are decidedly useful. An ordinary plow may be used around trees to excellent advantage by placing two or three feet of chain between the single tree and the clevis. This allows plowing considerably to one side of the usual line of drift. Some advocates of the low headed tree accomplish the necessary harrowing by inserting several feet of chain between the double-trees and the cross-bar and driving zig-zag through the row. The harrow is thus drawn close under the branches on opposite sides of alternate trees. An ordinary two-section drag harrow may be extended simply by separating the sections and lengthening the cross-bar.

Spraying machinery has been greatly improved in recent years, and no up-to-date fruit grower need neglect this fundamental orchard operation through the lack of satisfactory appliances for the purpose. Increased efficiency, large capacity and durability have been combined to a highly satisfactory degree with low cost, but perfection has not

yet been reached in any machine. We have implements of many types, each adapted to a special purpose, and their careful and intelligent use has in very many cases given marked results. A very great deal of the unpleasantness


A GOOD WORKING NOZZLE.

and dissatisfaction experienced in spraying has been undoubtedly due to imperfections in the apparatus used. Our manufacturers deserve credit, however, for the manner in which they have attacked this problem and for the success which they have attained in placing efficient spraying implements within easy reach of the fruit grower. Although it is not without good reason that the inexperienced man hesitates to purchase a spraying outfit, experienced men do not hestitate to advise the purchase of some of the excellent machines now on the market. We have nearly all conceivable sizes and types of spraying machines, from the hand "squirt-gun" or the "knapsack," carried on the shoulders, to the two hundred and fifty gallon power outfit mounted on a wagon and provided with an elevated platform for use in spraying tall trees. Gasoline engines of various degrees of excellence furnish the motive power for some large machines. Some are wheel driven, while others use liquid carbonic acid gas. A great many large capacity machines are operated by hand power alone, and it must be admitted that they have proven decidedly popular. Many power machines have given and are giving excellent satisfaction, but, all things considered, there is probably a larger percentage of hand power ma-

AN UP-TO-DATE SPRAYING OUTFIT.

chines doing satisfactory work than there is of any of the other types. At any rate, the testimony offered at present by many of our foremost fruit growers seems to indicate that such is the case.

There is no more disagreeable and exasperating job on the farm than spraying with a poor outfit. Particular attention should be paid to strainers, agitators, pumps, shut-offs, and nozzles, because slight defects in any of these are likely to seriously retard progress or lessen the efficiency of the work done. The only objection to some of the more recently perfected devices is their high price, but this will doubtless be remedied as soon as they are sufficiently in demand to warrant manufacture in large quantities.

Fruit growers themselves, by giving some study to the strong and weak points of the implements they are using, can hasten very materially the introduction of improved orchard machinery. Large manufacturers are not warranted at present in undertaking the production of such implements because the demand for them is not sufficiently general. It would seem that new types of implements are needed for some phases of orchard work, and that new tools will require to be evolved and thoroughly tested before any manufacturer would be justified in manufacturing them in large quantities for the general market. Some years ago a prominent Ontario implement firm made up a stock of new orchard plows at the instance of a leading orchardist. The implement had not been thoroughly tested and failed to give satisfaction. As a result, almost the entire lot is still in the hands of the manufacturer and constitutes a dead loss of no insignificant proportions. Fruit growers would do well, therefore, to have improvements added by local mechanics and thoroughly tested in their own orchards. An observant operator is often in a better position than any one else to point out the direction in which improvement may be made, and the users of the special machinery which orcharding demands would be amply repaid for any slight expense incurred in making their tools more up-to-date.

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## SENSE AND SPIRIT.

The bloom of the roses, the youth of the fair,
  The voice of the lover, the love-lighted eye,
The music of birds as they move through the air,
  The bright glow of sunshine that tinges the sky,
And scintillant dewdrops, the green of the grass—
  They will pass, they will pass, they will pass.

But, glory of honor, the freedom of truth,
  The might of the spirit, the breath of our call,
The soul of essentials, eternity's youth,
  The essence of beauty, the pith of them all,
The that which did make them the powers unto me,—
  They shall be, they shall be, they shall be!

*G. F. W.*

# Engineering a Farm Drain.

By C. C. THOM, B.S. A.

IN the more recent discussion of topics pertaining to general farming, the subject of soil drainage takes a very prominent place. Like every other operation in which the management of the soil is concerned, there is a right way and wrong way of performing it. Some soils require no artificial drainage, some a little and some a great deal in order to yield the best results. The progressive farmer realizes the benefits to be derived from thorough drainage, and would give more time and attention to the practice of surface and underdrainage, had he a more sufficient knowledge of drainage operations.

In general practice drainage operations are but three, viz.:

(1.) The location of the drain and its outlet;

(2.) Ascertaining the total fall, from source to outlet, and the determination of the grade;

(3.) The digging of the drain to the grade previously determined.

The first problem, viz: the location of the drain and its outlet, is seldom a very difficult one as, in most cases, this has been fixed by nature. The second and third problems are more difficult, however, and in solving these the use of some simple levelling machine is required if accurate results are to be obtained. Fig. 1 represents a home-made drainage level which is now being used by many farmers with very satisfactory results. It consists of:

(1.) An upright piece of wood 5.5 feet high, 3 inches wide, and 1.5 inches thick, and sharpened at the bottom and with a slot 2.5 feet long, beginning within six inches of the top.

(2.) A cross-piece bolted to the upright by a bolt through the slot; washers at head and nut. The cross-piece may be rotated about its centre.

(3.) A long carpenter's level with *straight* top sitting on the cross-piece, held loosely in position by two buttons.

(4.) Two wood screws with thumb-head, passing through the cross-piece and touching the bottom of the level.

When the location of the drain has been decided on the next work is to stake it out. Stakes should be prepared before hand. A good material for stakes is common plastering lath, as they are most easily carried. Set the first stake at the outlet and about four feet to one side of the centre of the proposed drain. This stake is marked 0. Measure up the drain 100 feet and set another stake about four feet to one side as before. This second stake is marked 100, meaning 100 feet from the outlet. Another hundred feet is measured off and a third stake set. This one is marked 200, being 200 feet from the outlet. This process of measuring off one hundred feet each time is repeated until the whole drain has been staked. The figures marked on the last stake will give the total length

of the drain in feet and the figures on any intermediate stake will give the distance in feet of that stake from the outlet.

When the drain is staked, we are ready to determine the fall. The home-made drainage level is set up about half way between stake 0 and stake 100 with the cross-piece in line with the stakes. In setting up the instrument the upright is sunk firmly into the ground as nearly perpendicular as possible. The level is levelled roughly by tilting the cross-piece and then the thumb-screws are used for more accurate adjustment. The photograph shows the level in use. It requires two men to operate it, A to sight, B to carry the measuring pole or staff and note the fall or rise from one place to another.

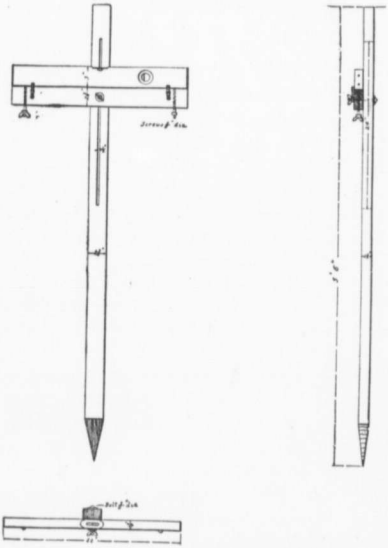


FIG. 1—A HOME-MADE DRAINAGE LEVEL.

When the instrument has been properly levelled, B stands the staff at stake 0 and places his pencil across it (as shown in photograph), and A sights over the level directing B to raise or lower the pencil until it is in line with the level. B notes the height of the pencil on the staff, say 4 feet 10 inches, for illlstration, and then moves the staff to the next stake, number 100, *the level remaining in the same position.* A now sights forward to the staff and B places the pencil the proper height, as before, say 4 feet 1 inch.

It is easily seen from Fig. 2 that the difference of nine inches between the two readings, 4 feet 10 inches and 4 feet 1 inch, is the rise from stake 0 to stake 100.

B, with the staff, now remains at stake 100 while A moves the level to about half way between stake 100 and stake 200, and the fall from 100 to 200 determined as in the first section. This is continued the full length of the drain.

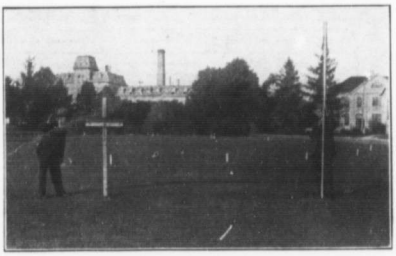
It will be observed that if the fall or rise between two points is to be found, the level is set up about half way between them and the readings taken back to one and forward to the other. The readings are recorded in a note-book ruled specially for the purpose and the fall or rise between any two succeeding stations is found by simply subtracting the back-sight of one station from the fore-sight of the next station or vice versa. Some beginners get the idea that the height of the level should be known, but a little study of the figures will show that this is unnecessary and of no use. The following is a suitable form for the notes:

**Notes on Drain No. 1.**

| Stake. | Back Sight. Ft. | In. | Fore Sight. Ft. | In. | Fall. Ft. | In. | Rise. Ft. | In. | Elevation. Ft | In. |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4 | 10 | .... | | ..... | | ..... | | 10 | 0 |
| 100 | 5 | 2 | 4 | 1 | ..... | | 0 | 9 | 10 | 9 |
| 200 | 5 | 3 | 3 | 11 | ..... | | 1 | 3 | 12 | 0 |
| 300 | 5 | 0 | 3 | 9 | ..... | | 1 | 6 | 13 | 6 |
| 400 | 4 | 6 | 4 | 0 | ..... | | 1 | 0 | 14 | 6 |
| 500 | 4 | 7 | 4 | 3 | ..... | | 0 | 3 | 14 | 9 |
| 600 | 4 | 5 | 4 | 5 | ..... | | 0 | 2 | 14 | 11 |
| 700 | 4 | 7 | 4 | 8 | 0 | 3 | ..... | | 14 | 8 |
| 800 | .... | | 5 | 3 | 0 | 8 | ..... | | 14 | 0 |

Note that in six out of the eight hundred feet sections there were rises, in the other two there were falls. The six rises total 4 feet 11 inches, and the two falls total 11 inches, hence on the whole there was a rise from stake 0 to stake 800 of 4 feet 11 inches, minus 11 inches, equaling 4 feet.

The last column "elevation" needs a word of explanation. Elevation, in the sense in which it is used here, means "height above." Opposite stake 0, in the notes given, we find 10 feet written in the column headed elevation, which means that the surface of the ground at stake 0 is 10 feet above a certain level or datum. Here at Guelph the Ontario Agricultural College has an elevation of 1,150 feet, or in other words it is 1,150 feet above sea level. The sea level then is the datum from which we reckon the elevation of the Ontario Agricultural College. In surveying a ditch we cannot use the sea as a datum because we do not know how much stake 0 is above the sea, hence we choose an arbitrary datum. In the example given we have chosen the datum to be 10 feet below the ground surface at stake 0. Then the elevation of stake 0 above this chosen datum is 10 feet. Since there is a rise of 9 inches from stake 0 to stake 100, the elevation of stake 100 above our chosen datum is 10 feet plus 9 inches, or 10 feet 9 inches. From stake 100 to stake 200 there is a rise of 1 foot 3 inches; then the elevation of stake 200 must be 10 feet 9 inches plus 1 foot 3 inches or 12 feet, as given in the notes. Knowing the elevation of one station, then to find the elevation of another station above the same datum we must know the rise or fall between these stations and add



DETERMINING THE FALL OVER THE DITCH.

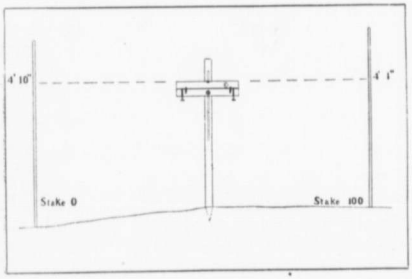



FIG. 2.

the rise or subtract the fall as the case may be. In this way the elevations of all the stakes along the drain can be determined.

This last column is the most convenient method of comparing one station with another. To find the fall from any one stake to any other we have only to subtract the elevation of the one from the other. Taking the elevation of stake 0, which is 10 feet, from the elevation of stake 800, which is 14 feet, we find the total fall in the ditch to be 4 feet.

Even when knowing the total fall, it is often rather difficult to determine the proper grade or grades to which the ditch should be dug that it may have a fairly uniform depth and still have sufficient fall throughout. The following is a simple and yet accurate method of determining the grade:

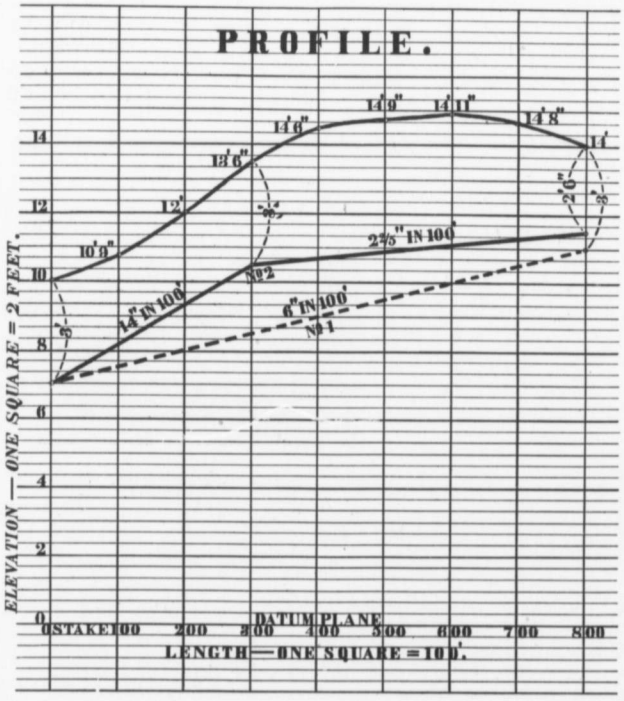



Fig. 3—Illustrating Method of Determining the Grade or Grades for Ditch Bottom.

(1.) Procure a piece of co-ordinate or cross-section paper, i.e., paper ruled in large squares one inch to the side, and these again into small squares one-tenth or one-twefth of an inch to the side. This can

be procured from any bookseller at five to ten cents a sheet 15x20 inches in size. If co-ordinate paper is not to hand a large sheet of foolscap may be ruled with light upright lines and made to answer well. For clearness of reproduction some of these lines have been omitted. (See Fig. 3.)

(2.) Let elevation be measured *up and down* on the paper and distances between stakes be measured *right and left*. The datum plane or level of comparison will then be at the bottom of the paper and stake 0 at the left hand side.

(3.) Let one large square up and down equal two feet of elevation.

(4.) Let one large square right and left equal 100 feet from stake to stake.

(5.) Number the stakes along the datum plant as shown in figure.

(6.) At each stake make a dot the proper distance above the datum plane, showing the elevation at that stake, i.e., e.g., at stake 0 in the figure a dot is made 10 feet, i.e., 5 squares above the datum; at stake 100 a dot is made 10 feet 9 inches, i.e., 5¾ squares above the datum; at stake 200 a dot is made 12 feet above the datum; and so on, the proper elevation of each stake being marked.

(7.) Join all these dots by a line. This line gives the shape of the ground surface from stake 0 to stake 800, showing at a glance just where the fall is slow or rapid.

(8.) At stakes 0 and 800 make dots 3 feet below the surface, indicating a trial depth for the ditch at those points. Then lay a ruler on the paper and draw a line connecting these two dots —see dotted line in figure. This line will show where the ditch bottom would run if the ditch were dug at uniform grade and made 3 feet deep at both ends. By counting the number of spaces between this dotted line and the ground surface at any point, the depth of the ditch at that point can be learned. Applying this test we see that the ditch shown in the figure would be four feet deep or more throughout most of its length, and that it would be five feet or more for over half its length, in some places being 5½ feet. Hence we conclude that it is not advisable to dig this ditch three feet deep at both ends and of uniform grade, if it can be avoided—there is too much digging.

This emphasizes the fact that we

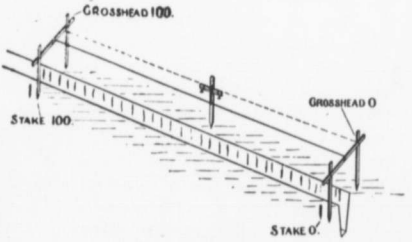



FIG. 4.

must choose grades which are sufficient and still not requiring the drain to be of too great a depth through knolls or ridges, nor too shallow through low places. The minimum grade for safety is about 2 inches in 100 feet for tile drains, while open drains will run well with a considerably slower grade. Knowing the minimum grade to be 2 inches we will choose a depth of 2 feet 6 inches at stake 800 and a depth of 3 feet at stake 300. Joining these two points with a line we at once see that its slope is in the right direction. We next proceed to determine how much

grade this line gives us per hundred feet. Subtract the elevations of the ground surface at two ends, i.e., 14 feet minus 13 feet 6 inches, which gives a fall of 6 inches on the ground surface. Now the ditch is only 2 feet 6 inches deep at its upper end and 3 feet deep at stake 300. This gives an additional fall of 6 inches in the ditch itself which when added to the 6 inches fall in the ground surface, gives a total fall to the ditch bottom of 12 inches from stake 800 to stake 300, or 12 inches in 500 feet, which equals 2 2-5 inches per hundred feet. In the same manner we determine the fall from stake 300 to stake 0 to be 14 inches in 100 feet.

There are now two grades, a rapid one of 14 inches per 100 feet for the first 300 feet, and a slow grade of 2 2-5 inches per 100 feet for the remaining portion of the ditch. These grades give a more desirable ditch bottom than that shown by the dotted line, the deepest digging being a shade less than four feet.

Having determined the grade and dug the ditch to within a few inches of its final depth, the next operation is to remove the remaining earth, leaving the ditch bottom in accordance with the grade specified.

Two stout stakes about 5 feet long should be driven one on either side of the drain at stake 0. To one of these stakes nail or clamp a cross-piece just 6 feet 6 inches above the final ditch bottom, or as the depth of the ditch is 3 feet at this point, 3 feet 6 inches above the surface of the ground. This cross-piece is then made perfectly horizontal by the use of the spirit level, and the other end fastened to the other stake. This is called cross-head 0. (Fig. 4.)

At stake 100 set up a similar cross-head called cross-head 100. About half way between cross head 0 and cross-head 100 set up the home-made drainage level, as previously directed.

The level is moved up or down on the standard until when adjusted it is found by sighting (see dotted line) to be just on a level with the top of cross-head 0, then by sighting towards cross-head 100, as shown by dotted line, a point is found which is also on the same level as the top of cross-head 0. This end of cross-head 100 is clamped just **14** *inches higher* than the point shown by dotted line, the cross-head levelled and the other end clamped. Cross-head 100 is thus exactly 14 inches higher than cross-head 0.

A light cord is then stretched tight and tied over the cross-piece just above the centre of the ditch. The cord should be tight so that there may be no tendency to sag in the centre. In practice it is found convenient not to tie the line to the cross-pieces but to simply pass it over them and tie a weight to each end. This cord is now just above the centre of the final ditch bottom and exactly 6 feet 6 inches from it at all points. The remaining earth may be removed with a ditching spade and when a pole 6 feet 6 inches long resting on the ditch bottom just touches the over-head line the ditch is deep enough at that point. After the first 100 feet has been finished, the cross-head 0 is moved to stake 200 and set the required amount higher than cross-head 100 and this section of the drain graded as was the first section.

# The Farm Cream Separator: Its Selection and Care.

By R. W. STRATTON, O. A. C. Dairy Department.

I WANT to buy a cream separator, which is the best? or which make do you find gives you the best satisfaction? or which do you recommend? These questions are probably more often asked than any other question at the Dairy Department. But, for various reasons, we cannot attempt to answer them. Why not?

Most of the separators at the Dairy Department do not belong to the department, but are placed here free of charge, for exhibition, and for the use of our students. As improvements are made (and they are many) the manufacturers change the machines. All machines here are liable to a great deal of abuse from visitors and students, such as trying and forcing a machine together wrong, running without oil, letting pieces fall on the floor. Lastly, even though we said any one make was the best, the other fellows would say we were *paid for our opinion*, and that is all it would amount to.

The best we can do is to give a few points or general directions to observe in selecting a separator. First a machine must be a close skimmer, for no matter how many other good points a machine may have, if it fails in this point, pass it by. Unless a machine will skim down to .05 (and under favorable conditions it should be less) it is not a desirable machine. In this connection the richness of cream might be mentioned. A machine should give at least a 30 per cent. cream, and skim to the point mentioned, in fact a 40 per cent. cream should not affect the thoroughness of separation. There are many advantages of having a rich cream, such as, more skim milk being left on the farm, less cream to cool and care for, less to haul to the creamery, less vat space required, acid develops more slowly, lower churning temperature can be used, insuring a better body in the butter. The adjustment of the cream screw is very delicate, and care should be taken when changing.

Get one with a capacity in proportion to the size of the herd, and in this err on the large side, give the herd a chance to increase, for a separator of large capacity turns but very little harder than a smaller one. The larger one will take no longer to wash, and will skim a given quantity of milk quicker, thus saving time, and time is money.

Then look for a machine that will turn easy. It is just possible that it may be necessary for you to be absent sometime, and your wife will have to do the turning, so for her sake get one that turns easily. Sometimes it is found that there is as much difference in the ease of turning different machines of the same make, as there is between the different makes. Some makes seem to turn easily at first but have not lasting quality in this respect.

Also look for one that you can readily get to every part that needs cleaning, so that all parts can be thor-

oughly and easily cleaned; not always do we find that the most difficult looking machines are the hardest to wash and vice-versa. It depends more on where the sediment lodges and how difficult it may be to get at.

Get one having a good capacity in proportion to cost, and one having the appearance of being durable. The durability of a machine is one point that cannot be decided at an institution of this kind, on account of so many changes being made by the manufacturers, and the abuse machines receive from students and visitors.

Then there are a number of minor points more or less stress may be laid upon, such as height of supply tank, space between cream spout and bracket intended for cream pail. To my mind this space should be sufficient to allow a shot-gun can to be placed under the spout, for by using this type of can for cream, it can be more quickly cooled. The skim milk delivery should be high enough to allow an ordinary milk can under the spout.

### Care of the Separator.

Before buying a machine a suitable place should be provided for it, preferably a place especially for the separator. It should be situated so it can conveniently be kept clean, ventilated, free from dust, dampness and bad odors, and convenient to the place of milking to make the work of carrying the milk to, and skim milk away from the separator as light as possible. Also having the water supply for cleaning the machine as handy as possible. The foundation or floor under the machine should be solid, and the machine set level.

Get the speed up gradually, see that all parts get the necessary amount of oil; every week or ten days it is well to flush the bearings with coal oil to clean out the dead oil or grit, that may have gathered, and will cause the machine to run hard. If warm water is convenient use enough to fill the bowl; this will warm and wet all parts so the cream will not stick. Keep steady motion and full speed all the time the milk is running through. And after the milk is all separated use enough warm water to flush out the cream remaining in the bowl; if the water is not convenient, skim milk can be used. The water is preferable because it is nearer the specific gravity of the cream, and more readily displaces it, than does the skim milk.

All parts of the separator coming in contact with the milk should be thoroughly washed and scalded every time they are used, and the best time to wash them is immediately after using. A good washing compound is a great aid in cleaning the parts.

The cream should be cooled to 50 degrees or lower immediately after separating. Never mix the fresh cream with that previously separated until it has been cooled. No doubt failing to observe this one point, causes more poor flavored cream than all other causes combined. The lower the temperature at which cream is kept, previous to churning, the better.

Some of the most likely causes for a variation in the per cent. fat in cream separated on the farm are variation of per cent. fat in milk separated. Variation of speed, the higher the speed the richer the cream will be and vice-versa. The faster the feed, the thinner the cream, and vice-versa. The amount of water or skim milk used in flushing the bowl.

If a herd of from 15 to 20 or more

cows are kept, possibly some power such as a tread power, or a gasoline engine could be used to advantage. How long should a separator last, is a question often asked, but which cannot very well be answered. Providing it has been properly constructed and receives good care, it should last a lifetime, apart from some of the main wearing parts which are interchangeable. But too many operators fail to realize how delicate the fine cut gearing is, and how soon neglect, lack of good oil, dampness, or rough usage will cause the machine to run hard, and shorten its time of usefulness.

Finally, I think, it well to buy a machine from a reliable firm, or, in other words, a machine past the experimental stage, that has been on the market for some time, a tried machine. The writer has in mind at least three different separators sold recently in Ontario, that are not sold now, and so soon as those having such machines need repairs, they will be unable to procure them.

After you have decided that you want a machine, don't be in too big a hurry to buy; be sure you are thoroughly satisfied before you settle for any separator. The agents are good talkers, and you may have a long time to repent for your haste, if you are not satisfied.

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# The Art of Plowing.

By CLAUD MITCHELL, Scotland, Ont.

THE question might be asked, is plowing an art? It certainly is, and I am sorry to say with a great many farmers, a lost art. Far too few of our younger generation of farmers have learned the art of plowing. In travelling through the country one sees repeated evidences of the little interest taken in this important feature of farm work.

Teach the boys how to plow. Many attribute this lack of interest in plowing to the advent of the two-furrow and machine plow. In using machine plows it is first necessary to acquaint yourself with the workings of the plow in order to be thoroughly conversant with it when in operation, and little or no difficulty will be experienced in obtaining satisfactory results. Take an interest in the work, see how straight you can plow. The old adage that more grain will grow on a crooked furrow than on a straight furrow is a poor incentive and will not conduce to build up a reputation for you as a model farmer. Plow the back field as carefully as you do the field joining the road, and see to it that your land is plowed in such a manner that strangers passing your farm will be attracted by its neatness; it is a cheap and efficient way in which to advertise. Good plowing is profitable; if a fair crop can be obtained from poor plowing, a better crop can be obtained from good plowing. There are many features to be taken into consideration if good plowing is to be done. In the first place you must select a good plow, that is,

one which will do the proper work in *your* soil. If your soil is loamy, and requires to be turned flat, choose a plow with a good width of share, a board with plenty of turning capacity, a high beam which will enable you to use a jointer when plowing under green or coarse manure, and sufficient length of handles to enable you to handle the plow with ease while at work. If the soil is heavy and inclined to cement choose a narrow plow, one that will set the soil up and give a good harrowige, and with sufficient press to the board to place the furrow over so that it will not fall back.

In the last few years a great many of the more progressive farmers of Ontario have adopted the two-furrow plow, some makes of which are first class implements and will do just as good work as can be done with a single furrow walking plow. Of the two-furrow plows there are the walking and riding styles, either of which is profitable to the farmer as a labor-saver. In choosing a two-furrow plow care should be exercised in its selection as before mentioned, and also see that your dealer does not pan off an overgrown gang-plow on you, but see that you get a plow built on proper lines, one that will do its work properly in your land. The same applies to a riding plow. There are several makes of these which are good as single-furrow plows, but only a few really good two-furrow riding plows.

In operating a two-furrow plow, lay out your field systematically in lands of a uniform width, set up stakes to start the land, and adjust the plow to let the front plow cut a shallow furrow and the rear one nearly the depth you intend plowing the field. The next time have the front furrow just heavy enough to nicely cover the first furrow turned. By striking the land in this manner you will have a crown of sufficient height, and it will give the land the proper slope. Then plow the land down to one green furrow. In finishing take this furrow with the front plow and at the same time take out the sole furrow with the rear plow. If this method is followed no difficulty need be experienced in doing a first-class job of plowing with a two-furrowed plow.

In low, flat land that has not been under-drained it is best to make the lands narrow, so that the furrows may be used for drainage purposes. Where this is necessary it is best to make a high back furrow, this will give the land the proper crowning slope which will drain off the water quickly.

In plowing under manure, if spring grain is to be sown, do not turn it under too deeply, especially does this apply if fall wheat is to be sown on the same field, as both crops will then be materially benefitted by the manure. The second plowing should be about two inches deeper than the first which will again turn the manure under but nearer to the surface. In this manner there will be very little loss by drainage into the subsoil. In closing I should like to again urge that it will pay you to take pains in this very important part of your agricultural operations, for if there is one part of the work on the farm which requires particular attention, it is the plowing of the soil.

# The Farm Workshop.

By E. W. KENDALL, O. A. C.

CARLYLE says, "Man is a tool-using animal—without tools he is nothing, with tools he is all." When we stop to think of the difference in condition of man to-day, with all the luxuries and conveniences of modern civilization, and man in pre historic times, dwelling in trees and caves; his life one continuous strugg'e for bare existence, we are struck with the truth of the above words.

If we follow the history of man in his progress from the age of stone to that of electricity we see that this wonderful change in condition depends almost wholly upon the improvements made in tools.

At the beginning he has nothing but his hands, a chance stone, or a branch of a tree with which to protect himself from attack or with which to kill that he may eat. Then his very life depends on those crude tools, and he spends much time trying to improve them.

Centuries roll by, we find a great change has taken place. Man is no longer a dweller in caves and a maker of stone implements, but dwells in a house constructed by himself with the help of his neighbors, wears clothing, the material for which has been woven by the women of his household. In this age almost everything needed in the home can be made by some member of the family. We may take Canada in the early days of her history as an illustration. Of course, there are many things needed that the home industry cannot provide, but each little hamlet has its blacksmith and its carpenter skilled men who can make a plow or a shovel, build a house or a piece of furniture, men who understand thoroughly their tools and materials.

Now let us look at modern conditions. Examine the utensils used in the home or around the farm. Most of them have the trade-mark of some large factory stamped upon them. Go into the small town and look for the old style carpenter or blacksmith. In most cases you will look in vain. He has disappeared. The factory has done away with the necessity of such a man. It is quite customary now for a young man who has helped some one to build a shed, to buy a few tools and call himself a carpenter.

What effect does this state of affairs have upon the farmer? He may not notice that the change of the last few years has been so great until he wants some little article made and can find no one to do it. To illustrate such a case—a man owning a gasoline engine had to have part of it repaired. He went to several blacksmiths in a large town, but was told that it would be necessary to send to the factory where the engine was made. He then tried a smith of the old type, near his home, and had it made in a few minutes. Many other cases of a similar nature might be mentioned, all going to show that the time is coming when the small repairs will have to be made at home.

The progressive man will provide himself with the tools necessary for these repairs, just as he is to-day, in-

stalling the gas engine to do his sawing and churning, pumping and feed-cutting, and it is the purpose of this article to help him in the selection of such

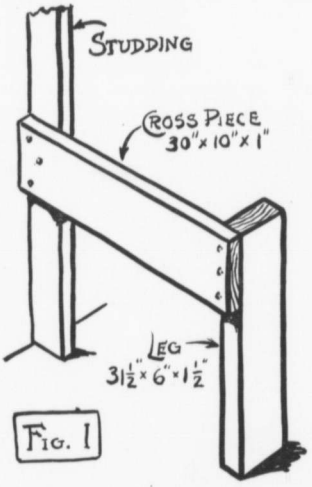

FIG. 1

tools. In many cases people do not buy on account of lack of information regarding prices and for that reason, opposite the name of each tool will be found the price at which it is selling in Guelph to-day.

Quality should be the first consideration in buying a tool, as a poor one never lasts long and never does satisfactory work while it does last. Of course, even the best of tools may become useless through lack of care, and if chisels, planes and files are thrown into a box or pan with an assortment of nails and screws, one can never hope to keep them in working order.

There should be some place set aside for the work where there will be a strong work bench, and a convenient cupboard for holding tools, nails, etc. Many people find it convenient to locate such a workshop in the carriage or implement house, one side being arranged for wood and the other for metal work.

The benches might be permanent fixtures, built as shown in figures 1, 2 and 3, or the one for wood work might be moveable. Figures 4 and 5 give the size and indicate the method of making such a bench, the probable cost of which would be $2.50. The wood costing $1.75, and a vise screw, about 75c.

**Tools for Wood Work.**

| | |
|---|---|
| 1 rule, two-foot, four fold .. ..$ | 15 |
| 1 knife, fixed blade ..... | 35 |
| Saws— | |
| 1 rip saw, 5 point ..... | 1 50 |
| 1 cross-cut, 8 point .. ..... | 1 25 |
| 1 keyhole ..... ..... | 25 |
| Planes— | |
| 1 Jack plane ..... | 85 |
| 1 smoothing plane ..... | 75 |

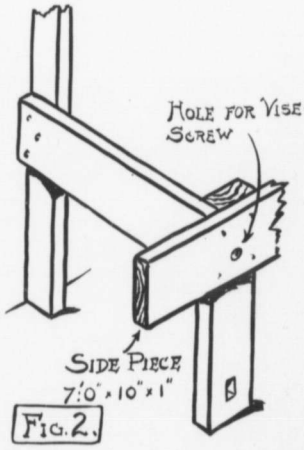

FIG. 2.

Chisels—

| | |
|---|---|
| Bevelled socket chisels, | |
| 1½-inch ..... | 70 |
| 1-inch ..... | 65 |

| | |
|---|---|
| ½-inch | 50 |
| ¼-inch | 40 |
| Brace | 1 00 |
| Auger bits— | |
| 1-inch | 35 |
| ¾-inch | 25 |
| ½-inch | 20 |
| ⅜-inch | 18 |
| Centre bits— | |
| 1¼-inches | 15 |
| ¾-inch | 15 |
| 1 hammer | 60 |
| 2 screwdrivers— | |
| Large | 30 |
| Small | 15 |
| 1 oilstone, "Wachita, No. 1" | 65 |
| 1 oilcan | 15 |
| 1 trysquare | 35 |
| 1 framing square | 1 25 |
| 1 bevel | 40 |
| 1 hand axe | 85 |

The above tools would be bought as needed, and a place arranged for

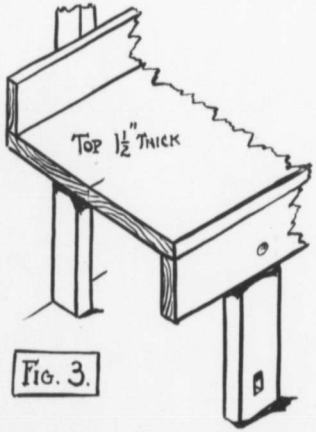


FIG. 3.

them in the cupboard. In order that they might not be affected by dampness they should be given a light coat of oil when not in use.

For metal working the following tools will be found most convenient:

| | |
|---|---|
| A vise with 3-inch jaws | $3 00 |
| Ballpene hammer, 1½ lbs. | 45 |

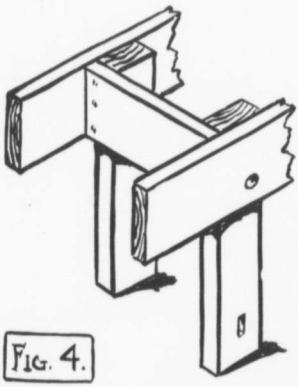

FIG. 4.

| | |
|---|---|
| Bench or breast drill | 3 50 |
| Cold chisels— | |
| ½-inch | 15 |
| 1-inch | 15 |
| Files— | |
| 1 coarse 12-inch | 35 |
| 1 bastard 12-inch | 30 |
| 1 second-cut, 8-inch, flat | 20 |
| 1 second-cut, 8-inch, half-round | 25 |
| 1 triangular saw file, 6-inch | 13 |
| 1 knife file, 6-inch | 40 |
| 1 round, or rat-tail file, 8-inch. | 18 |

To many people the question of a forge on the farm is a new one, but with the introduction of the small fan-blower, an efficient but cheap forge can now be bought. These forges are destined to become as common as the cream separator, which a few years ago most farmers would never have thought of buying. They are great savers of time, and time is money to the busy man. Suppose, for example, a forging in a thresher breaks, what happens? Six or eight men and a team

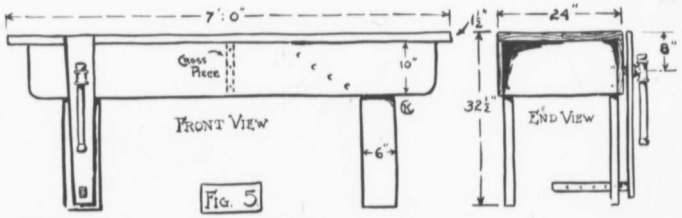

FIG. 5

of horses stand idle while the broken part is taken to a blacksmith several miles away. Thus two or three hours at least are lost on a ten-minute job. Figure out the cost of the lost time, and you will find it go a long way towards the payment of a forge.

### Forging Equipment.

| | |
|---|---|
| Forge | $10 00 |
| Anvil, 50 lb. | 6 50 |
| Hammer, Ballpene, 1¾ lb. | 50 |
| Tongs— | |
| ½-inch flat | 1 00 |
| ¼-inch flat | 1 00 |
| ½-inch bolt | 1 00 |
| Cold chisel | 20 |
| Hot chisel | 20 |
| Rasp, 12-inch | 70 |

If one wished to repair the milk can, or any article in tin, or if he wished to zinc line a trough, the following outfit would be necessary:

| | |
|---|---|
| Copper soldering iron | $ 50 |
| Pound soft solder | 30 |
| A pair of tinners' shears | 1 50 |
| A bag of charcoal for stove | 15 |

Borax, resin, sal ammoniac, hydrochloric acid, small pieces of zinc—a few cents worth of each.

A sheet of tin for patching.

[The prices quoted above were kindly supplied by Mr. T. A. Richardson, Guelph.]

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### MORE LOVELY GROWS THE EARTH.

More lovely grows the earth as we grow old,
More tenderness is in the dawning spring,
More bronze upon the blackbird's burnished wing,
And richer is the autumn cloth-of-gold;
A deeper meaning, too, the years unfold,
Until to waiting hearts each living thing
For very love its bounty seems to bring,
Intreating us with beauty to behold.

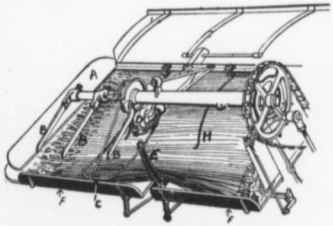
Or is it that with years we grow more wise
And reverent to the mystery profound—
Withheld from careless or indifferent eyes—
That broods in simple things the world around—
More conscious of the Love that glorifies
The common ways and makes them holy ground?

*Helena Coleman.*

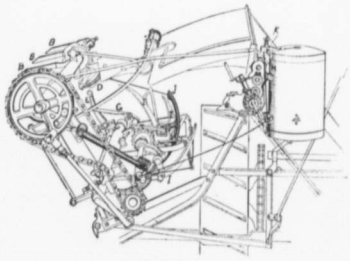
# The Care of the Mechanism of a Self-Binder.

By F. W. HUNT, of the Massey-Harris Co. Limited.

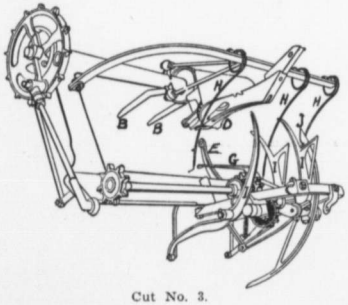
WHEN the announcement was made, less than a generation ago, that a successful twine binder had been produced many there were who did not hesitate to declare that such a thing was absurd, an impossibility, too good to be true, etc. The need had been felt for some time, for the wire binder was far from satisfactory, and many still preferred to bind the sheaves by hand. Now, the twine binder, or as it has come to be familiarly called, the binder or self-binder, since there is no need to distinguish from the wire binder which has long since disappeared, is taken as a matter of course. There still remains, however, in the minds of many, more or less of an element of mystery as to the manner in which the knot is tied, and as a thorough understanding of the principles on which the binding mechanism operates is necessary to the intelligent care of same, it might not be out of place to explain briefly the manner in which the sheaf is bound.



Cut No. 1.



Cut No. 2.

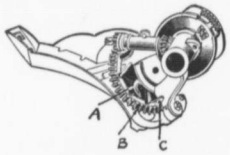


Cut No. 3.

A—Head Board.
B—Discharge Arms.
C—Stripper Rail.
D—Knotter.
E—Compressor.
F—Drop Boards.
G—Trip.
H—Sheaf Spring.
I—Packers.
J—Needle.
K—Tension.

While the binding mechanism varies considerably in appearance and in details on different binders, the underlying principles will be found to be substantially the same, so that a description of one will suffice.

Cut No. 1 shows the general view of the binding device with grain about to be bound. Cuts 2 and 3 show different views of the same with binder deck removed to better show the arrangement of the parts and the various parts are named for convenience in referring to same. The knotter is shown in cut 4.



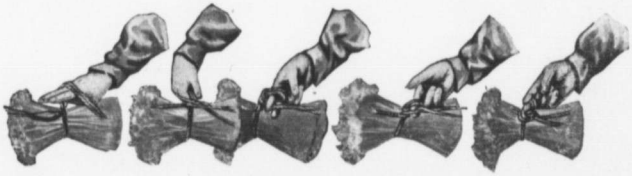

Cut No. 4—The Knotter.
A—Bill Hook.
B—Cord Holder Ring.
C—Cord Holder.

The end of the cord is held by the cord-holder which is pressed against the cord-holder ring by a spring. The grain is pressed down against the compressor by the packers until sufficient has accumulated to operate the trip, causing the needle to advance and bring the cord around the sheaf and to the point where it enters the notch in the cord-holder ring, which then revolves sufficiently to carry the cord beneath the cord-holder where it is firmly held while the bill-hook revolves and ties the knot. The knife cuts the cord and the discharge arms discharge the sheaf from the binding platform or deck. The action of the bill-hook is illustrated by using the first and second fingers of the right hand, as shown in cut five.

This should be sufficient to give a general idea of the manner in which the important parts of the binding device operate and will be a great help in locating any troubles with this mechanism.

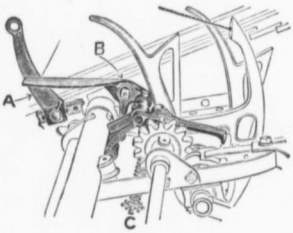
Now, before you start your binder in the field turn the binding attachment by hand and watch carefully until you understand *what each part does, and why it does it. Do not touch any adjustments of the knotter until you can give a reason for doing so.* Be sure that the needle is properly threaded. It may not be easy to see why putting the twine in from one side or the other makes any particular difference, but this is very important. If the knotter misses a sheaf or two at the start do not jump at the conclusion that it is out of order; it has been tested before leaving the factory, and it is more than likely that a little grease or dirt on the bill-hook is the cause of the trouble and when this is cleaned off it will work alright.

The operation of the binder is a comparatively simple matter. A lever is provided for adjusting so as to tie the



Cut No. 5—Showing action of Knotter.

middle of the sheaf with grain of varying height. The size of sheaf can also be regulated as well as the tightness of same. Cut No. 6 shows the manner of making these adjustments on a well-known binder.




Cut No. 6.

The size of sheaf is regulated by adjusting compressor A and trip B. The tightness of sheaf is regulated by turning small malleable nut C whic tightens the trip spring. In a binder which differs from the one shown, you can easily determine what adjustments will correspond to these.

Keep all bearings well oiled, when you are through with the season's harvest, coat the knotter and other bright parts with thick grease to protect them from rust and store the machine under cover at once. Plenty of oil when working and a dry place when not in use mean several years added to the life of a binder.

Now as to the difficulties which may sometimes arise. Breaking of the twine is a very aggravating form of trouble. If it occurs between the knotter and the tension it is due to too much tension—or poor twine. Do not have too much tension on the twine; it is better to tighten the trip or compressor spring if a tight sheaf is desired.

If the twine breaks at the knot it may be caused by the knife being dull or worn down so that it does not cut the twine quickly enough. It is well to examine the ends of the twine on a sheaf occassionally to see if the knife is cutting smooth and clean. If there is any indication that the twine has been frayed or broken, the knife needs attention. In grinding the knife take care to do it as it was originally done—if all on one side, do it that way when you sharpen it.

Cut No. 7 Knife.

Cut No. 8 Bill-hook.

The tension or bill-hook should not be changed unless absolutely necessary. By turning the knotter slowly a point will be found where the spring does not bear on hook, and at this point the spring should be loose enough to be moved slightly with the fingers. Failure of the bill-hook to hold the twine may be due to a little dirt or grain under the jaw. Clean it out and do not tighten spring unless absolutely necessary, as that means increased friction and wear. The same might be said of the cord-holder spring; if the end of cord slips out it is better to have a little less tension on the twine and get tightness of sheaf by compressor as previously mentioned.

All parts of the binder device must work in time in order to properly perform their work. Should it become necessary to replace any part of the binding mechanism have the binder in a locked position and carefully note the marks which are provided for setting all parts to work in time. The gears will usually be found marked with notches or pointers, which must come together when gears are in locked posi-

tion. Sprockets are provided with notches and a certain number of links of chain must come between these notches to bring all parts in proper relation. Instructions on these points are usually given in the directions which accompany the machine and are frequently stencilled prominently on the binder. Always after making any change in the adjustments or any repairs it is advisable to turn the parts by hand to see that everything is working smoothly.

In conclusion there is one point which cannot be too greatly emphasized, that is, that a thorough understanding of the principles on which the binder works is of the greatest assistance in remedying any trouble which may arise.

Photo by Lucie Bailey.

"Brook! whose society the poet seeks
Intent his wasted spirits to renew;"
—Wordsworth.

# Muslin Curtain Ventilation.

UNDER the supervision of the Physics Department, experiments were conducted during the past winter in the college dairy stable for the purpose of ascertaining the true value of the muslin-curtain ventilation system. It was thought that the recording of the daily mean temperature was not sufficient to either commend or discommend the use of muslin for the ventilation of stables, consequently very careful tests were made to determine the carbon dionide ($CO_2$) content of the air. To avoid unreliable readings, such as those which might occur during the day when the doors are frequently opened, all our experimental work was carried on at night. Although we sought to determine only the amount of carbon dioxide in the air, there are other impurities, but it is generally conceded that these impurities are to be found in the same ratio as the carbon dioxide.

The dairy stable is about 120x33 feet with an 8.5 foot ceiling. About three-fifths of the floor space is divided into stalls, feed-ways, etc., while the remainder of the floor space is divided into box stalls. On the north side there are ten windows, on the south and west, respectively, there are two and on the east side there is one. Each window is about 3.5x3.3 feet and extends from four feet above the floor to within fifteen inches from the ceiling. A good description of the King system which was installed several years ago, is given in Bulletin 143. Briefly, the fresh air is admitted at the ceiling, both at the sides and centre of the stable, while the heated air is withdrawn by outlets which run from the floor to ventilators on the roof. All outlets and inlets were closed while the muslin was in use.

Owing to the lack of windows on the south side, the conditions are not ideal for the muslin-curtain system, nevertheless the stable is undoubtedly more favorably constructed for such ventilation than the average Ontario stable. Both cheese-cloth and cheap factory cotton were used. The cloth was simply tacked on the outside of the window, and where these curtains were placed, the windows were hinged at the bottom so that when partially opened the air was forced to the ceiling. Danger from draughts was thus minimized.

The following results of a few tests show the highest and lowest amounts of carbon dioxide recorded with both the King and muslin-curtain system:

**Muslin-Curtain System.**

| Date | | Vel. of Wind per hr. in miles. | Outside Temp. for 24 hrs. in Far. max. | min. | Temp. in stable for 24 hrs. in Far max. | min. | $CO_2$ content in stable. per 10,000 vols. of air. floor. | ceiling. |
|---|---|---|---|---|---|---|---|---|
| March | 9 | 1 | 34° | 22° | 60° | 54° | 24.4 | 18.8 |
| March | 10 | 6 | 38° | 23° | 57° | 50° | 13.34 | 10.0 |
| March | 11 | 8 | 38° | 28° | 63° | 54° | 14.45 | 11.12 |
| March | 12 | 12 | 44° | 32° | 53° | 34° | 12.22 | 8.9 |
| March | 14 | 9 | 39° | 24° | 63° | 48° | 24.4 | 12.23 |

**King System.**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Feb'y | 24 | 9 | 21° | 6° | 59° | 51° | 8.9 | |
| Feb'y | 25 | 21 | 32° | 10° | 55° | 53° | 8.9 | |
| March | 3 | 9 | 31° | 22° | 58° | 55° | 17.79 | 20.2 |
| March | 5 | 21 | 36° | 24° | 59° | 55° | 14.45 | 17.79 |
| March | 6 | 44 | 42° | 36° | 59° | 54° | 11.12 | 15.56 |

The highest temperature recorded with the use of the curtains was

63° and the lowest 34°, while the highest with the King system was 59° and the lowest 46°. With the latter very little difficulty was experienced in keeping the stable between 50° and 55° which is the range of temperature that finds most favor with the herdsman. The muslin system was difficult to control. Not infrequently, a calm evening would necessitate leaving all the windows open and, at such times, when a breeze would spring up during the night the stable would cool to a temperature much lower than that desired.

The purity of the stable air with the muslin is dependent largely upon the strength and direction of the wind. True it is that there is continuous circulation of warm and cold air through the cloth, but this circulation is not rapid enough during calms to ensure sufficiently pure air within the stables. With the King system a wind is not necessary for good results although it does assist in drawing air out of the ventilators thereby increasing the flow of warm air through the outlet shafts.

One of the most interesting results of our work may be observed in the records given above. Both systems gave as low as 8.9 volumes of carbon dioxide per 10,000 volumes of air. With the King system, however, the purest air was found, not at the ceiling, but near the floor, and this we consider to be a very worthy feature.

The muslin-curtain system costs comparatively little and will give fair satisfaction when carefully manipulated, but the rapidity with which the meshes of the cloth become clogged with dust and its tendency to darken the stables are serious drawbacks. In comparison, the cost of installing the King system is very much higher (the system at the college cost $136), but when properly constructed there should be no additional expense, and certainly excellent ventilation, in spite of our changeable climate, may be obtained with very little trouble.

H. C. DUFF, '09.

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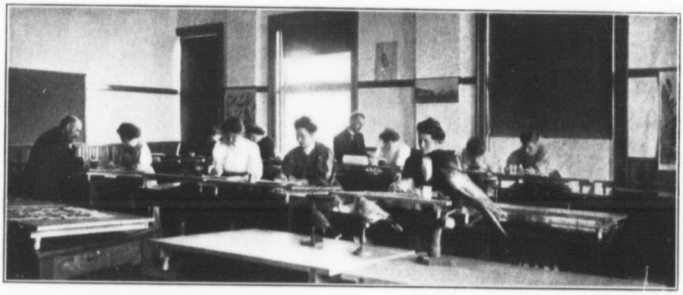
## THE PROSPECTOR.

Lured by the golden glamor of the West,
  He crossed the pathless plains and scaled the bold
  Titanic forms that, rising fold on fold,
Touch heaven's blue; and, toiling, strove to wrest
From Nature's rugged and reluctant breast
  The treasure she had hidden there of mold—
  The treasure of her hoarded yellow gold—
Seductive hope of many a hapless quest!

For this he left all other hopes behind,
  And gave his manhood's prime and powers away,
Content to be forgotten of his kind—
  Yet all the while within himself there lay
The unregarded treasure of the mind,
  Deep-buried, priceless, wasting day by day. *Helena Coleman.*

# Some Interior Views of the New Machinery Hall.



CLASS AT WORK IN THE DRAWING-ROOM.
This room is equipped with typical geometrical models, casts, tables, blackboards, drawing boards, and apparatus for making drawings of the objects to be made in the workroom.

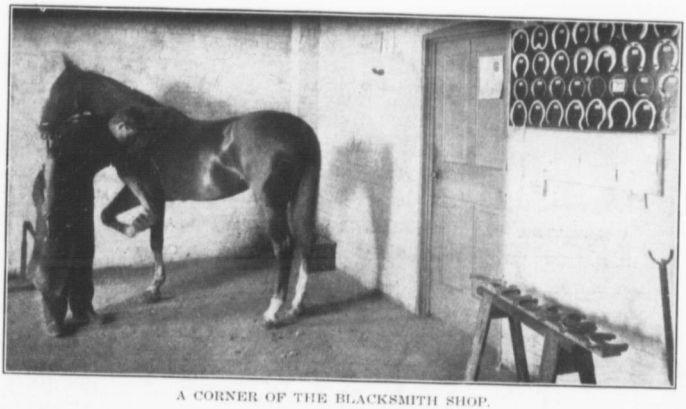
STUDENTS AT WORK IN THE MACHINERY HALL.
There are installed three gasoline engines, and numerous tools and implements for demonstration purposes in farm mechanics.

CLASS AT WORK IN THE WOODWORKING-ROOM.

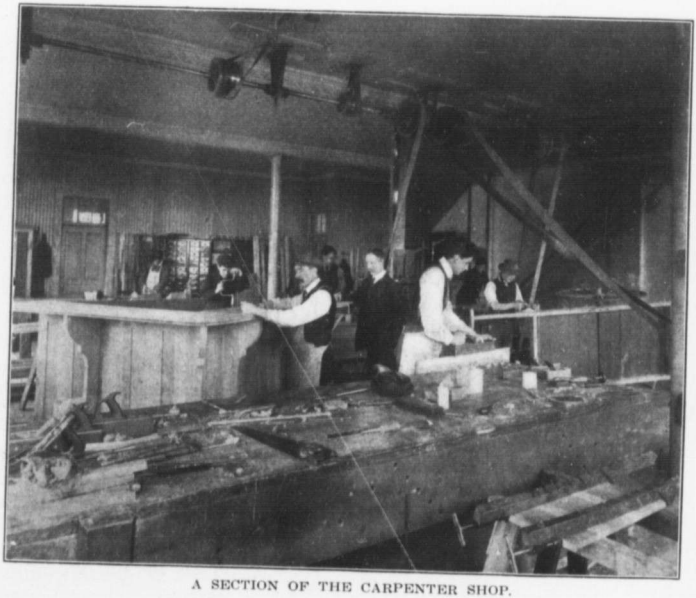
Each student is provided with a bench and a set of tools, viz.: Jack plane, rule, try square cutting board, tenon or back saw, a knife and three chisels—¼, ½ and 1-inch. In addition to these there are distributed in different parts of the room on racks and in cupboards a complete kit of woodworking tools.

CLASS AT WORK IN THE FORGE ROOM.

The forge room is fitted with ten down draft forges connected with a blower and an exhaust fan, each power driven, together with anvils, swage blocks, grindstone and all necessary tools and appliances.



A CORNER OF THE BLACKSMITH SHOP.



A SECTION OF THE CARPENTER SHOP.

# The O. A. C. Review

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G. LeLACHEUR, '10, Locals.
J. W. JONES, '09, Staff Photographer.

DAVID M. ROSE, '08, Acting Business Manager.

## Editorial.

**Investigate and Experiment.**

Most of the men who attended the "Ontario Agricultural College" during the College Year' 07-08, are now engaged in actual farming operations for themselves on their own farms or at their own homes. Many of them will not be back at the College next fall to resume their studies there. But because they will not be at the college is no reason whatever why they should give up altogether, reading and studying. We do not believe they will. We believe that the one year or the two years which they have spent there, will have instilled into them an earnest desire to keep up with the times in things pertaining to agriculture. Not only would we urge these men to keep themselves in touch with what others are doing, but we would urge them for their own benefit, and for the benefit of others, to put into practice where possible the theories studied at College No doubt there are some theories which would not apply to all conditions. For this reason we believe it to be the part of wisdom to investigate and experiment, and discover if possible what is needed to make their land more productive, which variety of each kind of grain is best adapted to their particular soil or locality, which are their best cows that they may keep them and breed from them, which are their poorest cows that they may weed them out, and many other things of equal value which we will not here enumerate. What we wish to do is to stimulate men not to depend on what others have done and are doing, but to take the initiative and to do something for themselves, find out something for themselves, and in the doing of it they will gain knowledge and information which will be of service not only to them, but to those around them as well. The conducting of investigation and experimental work will increase the in-

terest and pleasure of life on the farm. We need more examples of broad-guage success on the farms to make agriculture a more prosperous, progressive, widely-coveted and highly-esteemed occupation. We firmly believe that in this way people will be made to realize the advantages which farm life offers.

**Agricultural Engineering.**

Our readers will notice that this number of The Review is devoted largely to agricultural engineering. Not so many years ago the possibility of such a profession as engineering being likely to come into such a prominent and close relation with agriculture would have been ridiculed by all but a few far-seeing individuals.

In the days when Ontario was a densely timbered wilderness, the pioneer farmers worked hard and long to make both ends meet. The implements at their disposal were characterized by a crude simplicity, the marks of that first stage from which has developed the labor-saving machinery at the present day playing such an important part in reaping the rich harvest of the soil.

In this connection Canada and Canadians have played a very important part. The steady influx of settlers increasing the area of land under cultivation and the growth of the cities depleting the country of many of its young men gave rise to an urgent demand for labor-saving machinery on the farm. This demand has been met through the efforts of a few men whose names will long be remembered as the pioneers in the work of producing labor-saving machinery and who years ago, saw ahead of them a great field for engineering knowledge adapted to supply the wants and needs of the agriculturist. As the result of investigational and educational work in connection with agriculture, the benefits to be derived from underdraining, from the use of cement and concrete in various forms and ways and from the construction of good roads, etc., is coming to be realized and appreciated and the adaptation of this knowledge to use on the farm comes under agricultural engineering.

The advent of American mechanical and engineering skill into the realm of agriculture has produced an industrial movement of which the beneficial and economical results are indeed impossible of calculation and hard to surpass.

The use of machinery and mechanical power on the farm is slowly but surely placing the agriculturist on the same footing as the city man with the regular and reasonable hours of labor and assured profits; and that drudgery and slavery to work which in the past has rendered our farmers insensible to the brightening influences in life, and has been the cause of their extreme thriftiness and conservatism is being obliterated. Agricultural engineering is rendering possible, and bringing nearer that time when the farmers of this country shall take their lawful place as leaders in everything that pertains to their country's welfare.

**Meterology and the Farmer.**

In these days when the many branches of science are being brought into close relation to agriculture, it seems to us that a few words upon the benefits and advantages occurring from a careful study of

meteorology in its relation to farm practice would not be out of place. While many of our farmers are acquiring quite an effective knowledge of some of the sciences relating to agriculture, such as Soil Physics and Agricultural Chemistry, yet undoubtedly the average farmer knows little or next to nothing concerning the science of weather forecasting and the work and duties of the meteorologist. Still no one will deny that the relation existing between meteorology and agriculture is of great importance. Our government has in its employ a number of men who are paid for devoting their brains and time to the study of the atmosphere and its various phenomena. These men form an organization having its agents scattered throughout the Dominion and their reports upon local conditions and indications are regularly wired to the central bureau. The reports thus received are tabulated, corrected and charted. These charts show the areas of high and low barometric pressure, the former indicating storm centres and the latter cold waves, the prevailing winds, the recent rainfall, the clouds and the temperature. From these charts and his knowledge of the phenomena involved, the forecaster is able to deduce with a great amount of accuracy the atmospheric conditions prevailing for the next one, two or three days, as the case may be, in a given district. These forecasts are made known to the public regularly at short intervals. Their benefit to the farmer is obvious. His operations during the harvesting and seeding seasons should be largely guided by them, and the whole planning of the labor by an up-to-date farmer will not be complete without a reference to these forecasts.

Some of our farmers may claim that the reports of our meteorologists are not reliable, but experience disproves this claim, for a critical study of the actual weather prevailing in a certain district compared to the forecasts for that district will go to prove that in the main our meteorologists are correct. The farmer, who possessed of average intelligence, becomes conversant with the means and principles through the use of which our weather forecasters reach their conclusion, will assuredly come to place more reliance in those conclusions and will thus be in a better condition to advantageously carry on his farm operations.

**An Acknowledgment.**

For the past two months The Review has been laboring under some slight difficulties owing to the absence from the college of several members of the staff. The editor, assistant editor, Old Boys editor and Locals editor have been for some time engaged in the departments of agriculture at Lindsay, Perth, Morrisburg and Ste. Anne de Bellevue, respectively. But the Review has not suffered during this time for upon Mr. A. G. Turney, the able editor of College Life, has devolved almost the sole responsibility of the publishing of this issue as nearly every Review man now at the college has been busily engaged with his final Senior Year examinations. Mr. Turney has always been a tireless and faithful worker on his college paper, but to him, at this time especially, is due the heartiest thanks of the staff, the student body and our readers in general for the immense amount of time and energy which he has given to The Review.

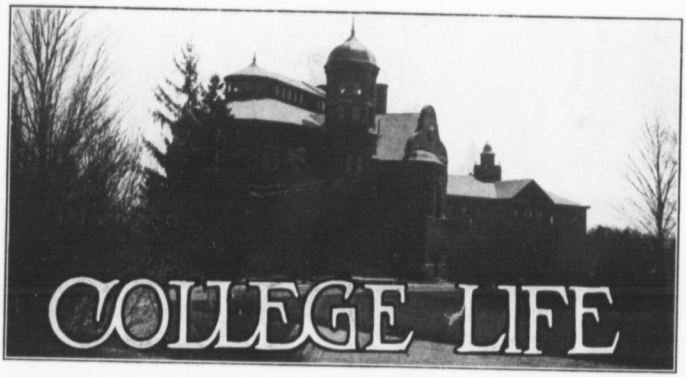



Photo by E. F. Coke, '09.

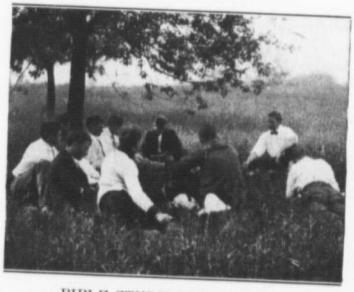
## The Niagara Student Conference.

IT may be truthfully said that the day of creeds is passing. The world is coming to agree with Tennyson, when he says:

"There lives more faith in honest doubt
Believe me, than in half the creeds."

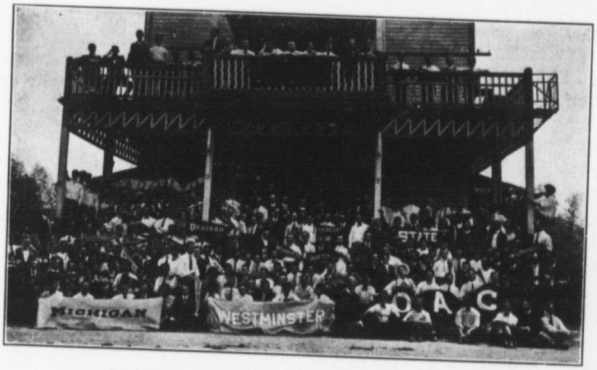
Mankind is gradually becoming emancipated from the fetters of dogmatism and is beginning to understand that true religion, true Christianity consists in the knowledge and friendship of a personage rather than the belief in a creed. The perfection of Christ's life and the efficiency of His teachings were not results of His belief in a divine Father and the brotherhood of man, but the result of His definite knowledge of His relationship to God. Listen to His words, "I and the Father are one." His religion was not a mere speculation, but a reality; and it is such a religion the world is craving for to-day. If there is one place more than another where reality is necessary, and unreality is despicable, it is in the church. The church and the world are sick of unreality, and yet they are full of it. The work of Christ is being done to-day by men and women who possess a Christianity that is real and to whom the personality of Christ is a living reality; and the work of Satan is being done by professing Christians whose Christianity is unreal and to whom Christ is but an historical character.

With men of the former class at their heads, and with an avowed aim to assist college students in their fight for character, various summer student conferences are held annually throughout the world, under the direction of the International Y. M. C. A. Committee. Eight of these conferences will meet in America during June, 1908, one of which will be held at the Strathcona Hotel, Niagara-on-the-Lake, from June 19th to June 28th. This place is situated on Lake Ontario, at the mouth of the Niagara River, two hours' ride by boat from Toronto, and within convenient distance of Niagara Falls, via, the famous scenic Gorge route.



BIBLE STUDY GROUP, 1907.

The Hotel Strathcona and its capacious private grounds are given over completely to the charge of the Y. M. C. A. Committee for the ten days of the conference, so that the gathering is like one huge camp of students, free from all intrusion by outsiders, and this is one of the most striking and agreeable characterisics of the convention. Freed from the fetters of conventionality, and clothed in outing rather than in fashionable attire, students from Ontario, Michigan, Ohio, West Virginia, Western Pennsylvania, and Western New York, representing all professions and all denominations of religious belief meet together with one aim. This aim is not to study doctrines and confessions of faith, but to strengthen character by studying the Bible openly and with conviction, and by association with strong men. The mornings are given over to systematic Bible and mission study in small group classes which are held wherever it is most convenient, generally on the ground beneath a spreading elm or maple tree. At eleven o'clock each day a platform address is delivered by some prominent man. All the afternoons except Sundays are devoted to sports, such as tennis, baseball, rowing, fishing, and excursions to Toronto and Niagara Falls. At 6:30 in the evening the most effective addresses of the conference are delivered. As the sun is setting in the golden west, we sit on the beach of old Lake Ontario and amidst the quiet rippling of the waves listen to masterly addresses, while one's imagination carries him far, far away, to a little sea called Galilee, upon whose shores the greatest teacher the world has ever known taught the lessons of life two thousand years ago.




DELEGATES AT THE STRATHCONA, 1907.

The delegates at Niagara this year are to be favored with addresses from—Fletcher S. Brockman, Shanghai, China; Rev. Robert Freeman, Buffalo; Bishop Wm. F. McDowell, Chicago; Mr. Robert E. Speer, New York; President R. A. Falconer, University of Toronto; and Garfield Williams, London, England. These men are intensely practical and plain spoken, striking straight from the shoulder, and dealing with the things of every-day life in the bold straightforward, manly manner which college students, the world over, respect and admire.

Remember this conference is an outing for college students where all may obtain healthy physical, mental, and spiritual exercise. It is for you, and you will do well not to miss it. If you are thinking of taking a holiday take it at Niagara. You cannot spend any length of time in the association of such men as the delegates at Niagara, without returning to your work a better citizen. The conferences have been and will continue to be epoch-making influences which are mighty powers in shaping the destiny of thousands of college students, elevating character and raising the standard of citizenship, stimulating men to "self-reverence, self-knowledge, and self-control, which three alone lead life to sovereign power."

P. E. A.

### Nature Study.

Well, perhaps, the weather has not been just as favorable to nature study as it might have been, but still we have observed some creations of nature hitherto entirely foreign to our vision, and we have also observed some of the commonest of nature's works from new aspects and in new lights. Should some unthinking mortal, filled with an unwarrantable presumption, dare to question the truth of the last statement, let me refer him to Messrs. Allen and Mackenzie. Does he mean to say that these two worthy gentlemen who have even when floating on the calm waters of the River Speed, or when in those waters, when in a canoe or out of a canoe, have observed things, does he mean to say that these famous aquatic acrobats have not observed certain of nature's works in a new light and from different aspects? Have they not observed canoeing in a new light, and the bottom of the River Speed from a distance of approximately three millimetres? Have they not observed the canoe and nature study from fresh aspects? Why certainly, they have.

### Popular Lectures.

On Thursday afternoon, April 29th, Dr. Abbott, of Toronto University gave an illustrated lecture on Psychology. In his address, Dr. Abbott dealt particularly with color senses; and by the use of the spectrum and various colored discs, rotated on machines, he succeeded in correcting some popular errors which exist concerning colors. This lecture proved so interesting that the second lecture announced for the evening was delivered before a large and deeply interested audience. This lecture was highly instructive and also in some places very amusing.

On Friday evening, May 8th, Professor Alexander, of Toronto University, delivered an interesting address on the "Life of Browning." The lecture was held in Macdonald Institute and was well attended.

### The Use of the Library.

The librarian, Miss Dwight, informs us that over two thousand books were

taken out of the library during the four weeks previous to the commencement of the First, Second and Third Year examinations. This goes to prove that the library is growing in popularity, and that its great value is becoming to be more generally recognized, and taken advantage of.

### The Subscription Competition.

As there will be no July and August issues of The Review, the editor of these columns wishes to again call your attention to the subscription competition, particulars of which were published in our April and May numbers. Get busy for the next three months and let us have some subscriptions. The O. A. C. Review is worthy of you. Show that you are worthy of it and that you appreciate it. Send to us for receipt books if you want them. Get down to work, get in line for the prize, and let us have a favorable report for our September issue.

### The Final Examination Results.

Below are given the first twenty students in the First and Second Years in order of merit. Space does not permit of the entire list being published in these columns. At the time of going to press the Third Year results have not been posted.

#### First Year.

1, Gandier. 2, Clement. 3, Strong. 4, Baker, A. C. 5, Cohoe. 6, Ewing. 7, Emmerson. 8, Bradt. 9, Martindale. 10, Toole, W. 11, Toole, A. A. 12, Galbraith. 12, Schuyler, R. 14, Martin. 15, Hutchinson. 16, Culp, S. H. 17, Coglan. 18, King. 19, Baker, A. W. 20, Filson.

#### Second Year.

1, LeLacheur. 2, Aldwinckle. 3, Beaupre. 4, Christie. 5, Wilson. 6, Reek. 7, Todd. 8, Faulds. 9, Ferguson. 10, White. 11, Moorhouse. 12, Packard. 12, Tothill. 14, King. 14, Lloyd-Jones. 16, Shaw. 17, Canby. 18, Heurbley. 19, Robinson. 20, Robertson, C. L.

G. LE LACHEUR.

### Scholarships, First Year.

English and Mathematics.—W. J. Strong, Essex, England.

Physical Science.—S. H. Gandier, Lions Head, Ont.

Biological Science.—A. C. Baker, Harding Hall, London, Ont.

### Medal, Second Year.

The Governor General's Silver Medal.—First in General Proficiency, 1907 and 1908.—G. LeLacheur, Murray Harbour, P. E. I.

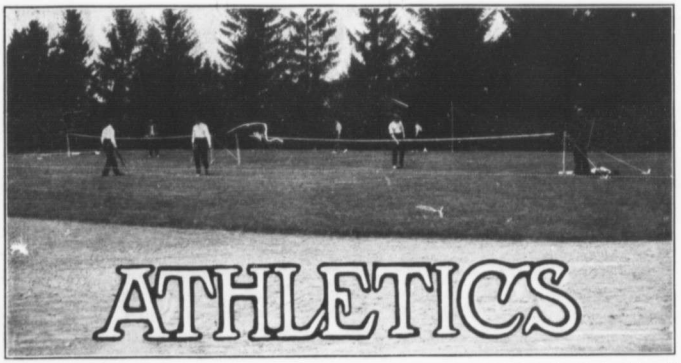



Photo by E. F. Coke, '09.

DURING the past month athletic doings have been somewhat few and far between, for the weather has been nothing if not inclement, and the student, who, ever since the term closed, has been hoping for some healthful exercise in the balmy spring air, has had, with the exception of a few days, to submit to the all-powerful elements and remain sullenly inactive. However, such few days as permitted of outside sport have been marked by a success with which we have every reason to feel gratified, and which should stimulate us to greater efforts another year.

### Association Football.

Towards the close of March a meeting was held for the purpose of organizing an Association football team, to play a series of games throughout the Nature Study Course. Not more than fifteen persons were present. Nevertheless, a manager and captain were elected, respectively. "Bill" Bailey and A. J. Logsdail. An arrangement was made whereby our team was admitted into the City League, consisting of the Guelph Scots, the Guelph Rovers and Acton. Home and away games are played between the four teams, both in the spring and in the fall, and the team finally heading the league becomes the holders for the year of a splendid silver cup, donated by Jock Smith, of the Bell Piano Company. The members of the winning team are also all presented with medals. Special arrangements were made for the college to play off the spring series before the boys broke up at the end of Nature Study.

On Saturday, May 9th, we played the redoubtable "Scots" on the campus. A very high wind blowing diagonally across the ground prevailed all afternoon and rendered an exhibition of good soccer impossible. The teams proved to be fairly evenly matched, but in the second half the O. A. C. did slightly better work and by a piece of good combination secured the only goal of the afternoon. On the following Monday evening the Rovers came up to try conclusions with us. Good weather prevailed, and a fairly fast exhibition of football was witnessed.

The Rovers defense was somewhat weak, and the college had considerably the better of the game, and scored once in each half, while the Rovers

Photo by E. F. Coke, '09.
PUTTING THE SHOT.

failed to get the ball past Shaw. In these two games the line-up of the college was as follows:

Goal, Shaw; backs, Hoy, Unwin; half-backs, Duff, Middleton, McKenzie; forwards, Light, R. R. Moore, McRae, Logsdail and Turney.

On Tuesday evening we played the Scots on their own ground, and were defeated 1—0, our men not showing as good form as in the previous games. Turney being injured in the game with the Rovers, was replaced on the forward line by White. On the following Friday evening we played Action on the college campus. Much ra'n had fallen, and the ground was in a very slippery condition. A poor game resulted, in which the O. A. C. were again victorious by one goal, the visitors failing to convert a penalty. In this game Jackson replaced Middleton on the half back line. On Saturday May 16th, the college team journeyed to Acton, where they met and defeated the locals by two goals to one. In the first half play was even and Acton succeeded in scoring. In the second half the O. A. C. woke up and completely outplayed their opponents, scoring twice. An idea of the play in this half may be got from the fact that our men only had one place kick from goal. In this game Tothill replaced Jackson, who was unable to play. The remaining game of the spring series with the Rovers was postponed owing to rain, and will be played in the fall. Thus far the O. A. C. has played five games, won four and lost one. The team has accomplished good work and deserves commendation. With a much larger number of students to pick from in the fall, our chances of heading the league and carrying off the cup and medals are certainly bright.

### Tennis.

At a meeting held shortly before the close of the examinations, E. F. Coke was elected President and A. D. Campbell, Secretary of the O. A. C. Tenni Club. Owing to his leaving the college, Mr. Campbell handed in his resignation, and Mr. Maclaren was elected to his place. Since then, weather permitting, the tennis courts have been scenes of activity and merriment. Mr. Coke being a firm believer in co-education, both in study and athletics, organized a tournament in which the Macdonald girls and O. A. C. boys were to jointly participate. Nothing but the lateness of the season and the almost incessant rainfall prevented him from bringing the tournament to a successful conclusion. Below are given the results of the games played.

**Division A, First Round.**

Coke and Miss Powell beat Murray and Miss Mongall 6—1, 6—1.

Logsdail and Miss Allen beat McLaren and Miss Casey 6—3, 5—7, 6—3.

Jones and Miss Carpenter beat Tothill and Miss Clarke 6—4, 3—6, 6—1.

Unwin and Miss McTavish beat Jull and Miss McArthur 6—3, 7—9, 6—4.

Lawrence and Miss Bailey beat Allen and Miss Fuller 6—3, 12—10.

Moore, R. R., and Miss Wilks beat Atkins and Miss Phillips 4—6, 6—2, 6—4.

Cutler and Winslow beat Fraser and Caesar 6—4, 3—6, 6—2.

**Second Round.**

R. R. Moore and Miss Wilks beat Lawrence and Miss Bailey 6—5, 6—4.

**Division B, First Round.**

Bailey and Miss Bligh beat Middleton and Miss Sullivan 6—3, 6—2.

Hoy and Miss Hartley beat Moore, P. H., and Miss Clowes 6—2, 5—7, 6—2.

Angle and Miss Peebles beat Metcalfe and Miss Nettleton 6—4, 3—6, 4—0.

Joubert and Miss McKee beat McKenzie, N. D., and Miss Garland 1—6, 6—4, 6—3.

Clowes and Miss Ross beat Wolverton and Miss Wykoff 6—3, 6—4.

The success, both socially and athletically, has justified its organization and has ensured it as an annual event, weather permitting.

A. G. T., '09.

Photo by A. E. Slater, '08.

# Our Old Boys.

IT IS an old, old truism which states that "In spring the minds of youth lightly turn to thoughts of love." During this amorous season the callous, the cynical, and the indifferent alike fall victims to the wiles of Dan Cupid. A few avoid his snares for a few brief seasons only to fall at last: helpless captives. This month he numbers among his victims one in whom our readers have more than a passing interest.

Just a year ago Miss Alice Gertrude Rowsome resigned her position as Librarian and Lecturer in Modern Languages at the O. A. C., to assume the responsible task of organizing the splendid library at Macdonald College, Ste Anne de Bellevue, P.Q. Hardly was her task completed before we learn of her resignation to accept a still more important position, in perpetuum.

She is to be married in June to the Rev. John Inkster, M. A., until recently financial agent of the Presbyterian College, Montreal. The wedding ceremony will be celebrated at the home of the bride, Burlington, Ont. Immediately after the ceremony the happy couple will leave for the British Isles where among other points of interest, they will visit the Orkney Islands, the birth place of the groom. In the early fall they will return to take up their residence at London, Ont., where Mr. Inkster has accepted the pastorate of the First Presbyterian Church.

Miss Rowson resigned her position at Macdonald College in April. Before she left she was tendered several receptions and showers by the faculty, and was presented with a valuable set of spoons—happy thought—by the students. We feel confident in extending on behalf of our readers their heartiest congratulations to Rev. and Mrs. Inkster.

J. R. Hutchison, '00. A little over a year ago The Review published a short account of "Hutchy's" welfare and progress at Slate River. In this account the statement was made that he lacked but one thing to crown his success. Of him this can be said no more. The crowning event of his successes took place in St. George about the twentieth of April, when he was united in wedlock to Miss Maude Nixon, of St. George. Mr. and Mrs. Hutchison will take up their residence on their large dairy farm, near Slate River, where they will be accompanied by the good wishes of their many friends, among whom The Review wishes to be numbered.

H. J. Neething, '04-'06, after completing his two-year course returned to his native colony of South Africa to accept the position of State Entomologist of the Orange River Colony, which position he still occupies, with head-quarters at Bloomfontien. We have been recently notified of his wedding, which will take place on May 19. The bride-to-be is Miss Bessie Jacobsz. The Review extends congratulations.

D. H. Horton, '99-'01, after securing his diploma commenced farming for himself in the County of Welland, where he now owns and manages one of the finest farms in the county. A short time ago he took as mistress of his comfortable home, Miss Aida Wessel, of Rochway, Lincoln County. A happy and prosperous future is the worst wish of The Review for Mr. and Mrs. Horton.

I. F. Law, '05-'07. On Wednesday afternoon, April 29th, was celebrated the marriage of Miss Ethel Morrow Kelly, second daughter of Mr. Samuel Kelly, of Hamilton, to Mr. I. F. Law, Solina. The ceremony took place at the home of the bride's parents, in the presence of a small party of intimate friends, after which they left for Toronto, Oshawa and points east. Mr. and Mrs. Law will take up their residence upon the Law homestead, at Solina; Mr. Law, sr, having recently retired to Oshawa.

The Executive of the Alberta O. A. C. Boys' Association have made arrangements to have a tent on the grounds at the Dominion Fair, which will be held in Calgary, from June 29 to July 9. All the O. A. C. Boys are requested to register in this tent, and make it their headquarters during the time of the Fair.

Arrangements have also been made to hold a dinner on the evening of July 1, to which all those who have attended the Macdonald Institute and Agricultural College at Guelph are invited. The married Boys are requested to bring their wives to this dinner. A good time is expected and the Alberta Boys hope to have the pleasure of meeting a large number from the other provinces at the time of the Fair.

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# Thirty Years Ago.

[The interesting story of conditions and experiences at the college in the year '74, by Mr. T. H. Mason, is published, that those who attended later may more fully realize the strides that have been taken by the O. A. C. in making it what we have to-day, one of the leading centres of agricultural learning on the American continent. The reminescences of a number of the class entering in '83 show that college students then, though now grown to sober middle-age, were much the same as their successors of to-day.—Ed.]

After the great civil war in the United States was over a period of reconstruction set in and it was at that time that provision was made for the formation and maintenance of Agricultural Colleges in the United States.

Great grants of the public lands were set aside for that purpose and the beginning of agricultural education in the United States was started. In Ontario some few leaders in agricultural lines began to agitate for an agricultural school, and in seventy-one or seventy-two the Rev. W. F. Clarke was commissioned by the Hon. John Carling, at that time Commissioner of Agriculture in the John Sanfield

McDonald government, to inquire into the question. Mr. Clarke visited the United States investigating the question there; and inquiries into agricultural education in Britain and on the continent were made. His report recommended the establishment of an Agricultural College and Experimental Farm. The report was received favorably by the government of the day and a farm at Mimico purchased with the intention of establishing the College there.

Shortly after the McDonald government was defeated and the Hon. Arch. McKellar was the new Commissioner of Agriculture. He thought the Mimico farm unsuitable for the purpose and appointed a commission to select a new site, this commission selected the "Moreton Lodge" farm of F. W. Stone, near Guelph, the present site of the Agricultural College. The price paid was $55,000.00. The farm contained 550 acres and had a fine two-story stone residence which was utilized as the basis of the future college building. The rooms around the main entrance are the old stone family residence rooms. Additions were built to the rear for servants; also a class room with a dining room beneath. What is now the Y. M. C. A. room was the first class room. Near where the Massey building now stands was the first two-story cottage residence of the Stones. East of the residence and two hundred yards away were the farm buildings; a large frame barn with a basement beneath occupying the centre of a quadrangle of stone horse stables, sheep pens, and pig pens and approached through archways between the stables.

Where Professor Day's house now stands was a large apple and pear orchard. There was also a kitchen garden of about an acre surrounded by a white thorn hedge. The sets of the hedge had been imported from England.

Down where the Dairy buildings now stand were large barn sheds and root houses. Where Professor Graham lives were two low rough-cast houses for hired men. Over on the Puslinch lot a rough-cast house and frame barn and a brick cottage south from the college along the side road.

The first Principal was Henry McCandless, a North of Ireland man, who had been lecturer on agriculture at Cornell; Rev. W. F. Clarke was rector and resident master. James McNair, farm foreman; James Sirton, live stock foreman; Thomas Farnham, gardener; James McIntosh, mechanical foreman; Mrs. Mercer, matron. Unfortunately, or otherwise, the matrons of the early days contracted the habit of matrimony and Mrs. Mercer became the bride of Hon. A. McKellar before the college was opened. In March of 1874 advertisements appeared in the leading papers announcing the opening of the Ontario School of Agriculture on May 4, 1874. Applicants were to give certificates of good moral character, physical fitness, must be at least 16 years of age and have passed the entrance exam., or possess a third-class certificate. They would be expected to work in the different departments for five hours daily, more if necessary, and if found satisfactory would be entitled to the sum of fifty dollars at the end of the first year.

At noon of May 4, of 1874, I reached the O. A. C., came up from the old Great Western station with Charlie Durant, of West Flamboro. The place was in an uproar, the new servants

had hardly found their way about yet, and I well remember the Spartan dinner that we sat down to. Boiled salt beef, parsnips, potatoes, bread and water; no dessert, no butter and no tea. "Is that the way they're going to feed us?" moaned Charlie, I can't eat dry bread, etc. The new matron was Mrs. Petrie, very tall; and I was very much afraid of her.

The first student was Harry T. Lund, of Blackburn, Lancaster, England. Harry had been there two weeks waiting for the place to open. After the first few days things settled down and we were more comfortable. There were twenty-eight of us at first, and, on the whole, they were an exceptionally fine lot of young fellows; the best lot of men physically I have ever seen.

We had one fellow in his second year at Toronto University, several from Upper Canada College and some from Tassies' school, at Galt, a famous school in those days. The work was laborious and disagreeable at first; digging out the thorn hedge and transplanting it; moving stone piles; making roads; digging drains, etc. Very few of us were allowed to touch the horses. Every afternoon we had lectures from Professor McCandless on agriculture, live stock, farm mechanics or chemistry, and on the whole were not doing so badly.

Unfortunately, Mr. McCandless could not agree with his officers. He was a peculiar man, with a rather domineering air that was exasperating to the very democratic set of officials with whom he had to deal. Then Mr. Clarke had aspirations for the position of principal, and it was not long before the two openly clashed, and Mr. Clarke sent in his resignation. Then the principal and most of the foremen could not agree, there was, of course, a great deal of fault-finding and defiance of his authority with them. The students were not long in finding out how things were going. The principal became anxious to retain the good will of the boys, and granted them all sorts of absurd favors, and on the other hand the foremen were doing the same. All authority was relaxed and practically came to an end, and we were in a state of anarchy. We worked when we chose, and sometimes we did not choose. Work would be stopped on the most absurd pretexts; sometimes the heat was too oppressive, and we found it necessary to seek the grateful shade for an hour or two; then, perhaps, the food would disagree with us. One fellow would suggest that the meat we had for dinner was too "ripe," and that he felt symptoms of ptomaine poisoning; the contagion would spread until the whole lot would adjourn to the college for recuperation.

When haying commenced lectures were abandoned, and we were supposed to labor ten hours daily. Under the unwonted strain we felt the need of more food, so we sent a committee to the principal. They succeeded in convincing him of the necessity and we had a lunch sent to the field at ten o'clock a. m., another at four p. m.; and in order to fortify us for the night another at nine o'clock. Things rapidly went from bad to worse, and the government requested Mr. McCandless to resign. He complied, and Col. Scoble, the inspector of penitentaries, was sent up to discipline us. At the same time William Johnstone, M. A., accepted the position of temporary principal. Col. Scoble only stayed a short time. Mr. Johnstone was a man of great ability,

a rigid disciplinarian and one of the first scholars of his day. He rapidly restored order out of chaos, and it is largely to the inspiration of his strong character and example that any of the students of that time ever amounted to anything.

He was an untiring worker; the first up, the last to bed, and had he been spared would have risen to the highest positions in his country. The O. A. C. owes much to him; established in advance of public opinion, and discredited by the misrule of the first few months, the college of that time was simply a laughing stock for the country. Mr. Johnstone stemmed the current and made possible the achievements of later days. All honor to his memory.

Mr. Johnstone was principal and lecturer in English, Botany, and Zoology; Professor Baptee, Chemistry and Physiology; Professor Buckland, Agriculture, followed later by Professor Brown; E. A. Grange, Veterinary Science; and Rev. Robt. Burnett, Horticultural Department.

The later history of the O. A. C. is well known. Under the able management of Dr. Mills and his associates and successors it has steadily grown in the confidence of the people in usefulness and influence, until now it is quite generally recognized everywhere that it has made good.

T. H. MASON.

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# Hazing in the Early Eighties.

It was in the fall of '83 that the writer stepped off the train at Guelph, an entire stranger, save for an acquaintance formed on the way up with a young man, heading, like myself, for what was then commonly known as the "Model Farm."

We displayed a greeness at the start by being filched of seventy-five cents each by a cabbie for the conveyance of ourselves and baggage up to the college

It was with fear and trepidation that we stood before the then President, Dr. Jas. Mills, and announced ourselves as desirous of becoming enrolled as students. After the usual preliminaries, I was allotted a room on Upper Hunt, where I soon met many others who were to be my class-mates for the coming year. Some of them were big, brawny fellows, who were foolish enough to say later that they would never submit to any initiation, which then formed a very important part of the freshies' early experiences in college life.

For a couple of weeks everything went smoothly. We were beginning to understand the routine of lectures and work. Many of us had gone the rounds in the outside departments; we had been with old "Mac," the carpenter, who had said, "Weel, laddies, come down and have spiff wi' the lassies;" we had met P. J. Woods, the farm foreman; James Stock, the sub-foreman; little Tommy, the Irishman 'ower' the potato patch, and had even taken "Fitz" and gone to spade in the garden. In fact, we were almost used to the "hoe-handle gong," which awakened us for breakfast; and even in that short time some had contracted the habit of appearing near the close of the breakfast hour with unmistakable evidences of having made a hurried toilet in their rush for the porridge.

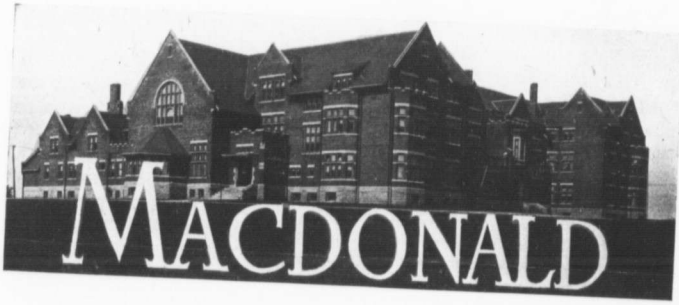
We had noticed that it was rather hard to become acquainted with the Second Year students and the specialists; who together formed quite a bunch, though not so strong numerically as the freshmen, who were the largest class up to that time, numbering over seventy. Rumor said there was to be *an initiation*. The rumor was talked over among the first year fellows, and they had decided that there wouldn't be one. We had a lot of strapping, big fellows and had the advantage of numbers; but as we learned later, sadly lacked organization.

The memorable night came. Under pretence of some Literary or other organization, it was announced at supper that all first year men were wanted in No. 1 class room, situated where the business office is now, immediately after supper. The unsuspecting herd were soon all there. When all were in, bang, went the doors, and we were locked in; guards appeared at the windows to prevent our escape by that exit. Some faces displayed fear, in others anger was depicted; some calmly awaited the next move. In a few moments the doors were opened into the lower class room, located where the students' parlor is now, but part of it was lower than the present floor and the ceiling was much higher than at present; everyone was commanded to enter, and the fun began. The initiators and the initiated to be, were all there. A whisper of insurrection went around, but the novelty of the proceedings and the sudden surprise were too much for most, and the leaders could not get a following. Did you ask what was there? I might reply what was not there? A trough of water, ropes and pulleys, hoes, forks, swords, turnips and turnip knives, mixtures of pepper and salt, vinegar and soap, a wheel-barrow, blankets, etc.

The names of two or three who had been very loud in their statements that there would be no initiation for them, were called first; they hesitated and were advised that they had better come and they went. They took their places at the table and were served two pieces of dirty turnip, passed on the point of a sword. They ate them and recanted the statements they had made. After a glorious shave given by some of the mixtures referred to previously, being applied with a horse brush and then scraped off with a turnip knife, they were given the right hand of fellowship and made members of the O. A. C. fraternity. It was apparent that every fellow had been watched, and if he had any peculiarities or conceits, attention was called to them; and an earnest endeavor made to persuade him to change his ways. Some of the small fellows got off by being tossed to the ceiling from a blanket until you could read a sincere longing for home and mother depicted in their faces. Others were made to bare their backs and then run the gauntlet of knotted towels, etc. Two good singers sang the scales and were rewarded by a luncheon of turnips. An essay was the lot of one, boxing or wrestling matches of others, the defeated one having to submit to a shave or similar punishment. When it was all over the class was declared to be duly admitted into good standing.

There is no doubt but that this initiation was carried altogether too far in a number of cases, but a little of the milder forms had certainly a good effect in taking the conceit out of some who needed such a lesson.

T. G. RAYNOR.




# Health and Physical Education at Macdonald College, Quebec.

By JEAN DAWSON, A.M., Ph. D.

THE history of education may be divided into three periods, according to the methods of teaching which prevailed in each. In the first period, the pupil was merely a recipient, and repeated the knowledge that the master imparted. This "pouring in" method in its extreme form lasted almost to the seventeenth century. In the second period, the teacher strove not only to impart knowledge, but to develop mental power as well. While this teaching was a step in advance, it alone was not adequate to the highest advancement and efficiency of the race, since it neglected the physicial education, and failed to recognize the dependency of mind on body. The majority of children died before they reached maturity, and sickness and physical and mental deficiencies were rife. The second period dated from the beginning of the seventeenth century to the present time.

A dawning realization of our low physical condition and the discoveries of Pasteur, Koch and other great scientists have brought us to the realization of four great wastes unchecked in our civilization, namely, preventable death, preventable sickness, preventable condition of low physical and mental efficiency, and preventable ignorance. This knowledge has given the teacher a new view-point, and brings us to the threshold of the third or hygienic period, in which health and the prevention of disease are a factor in our education.

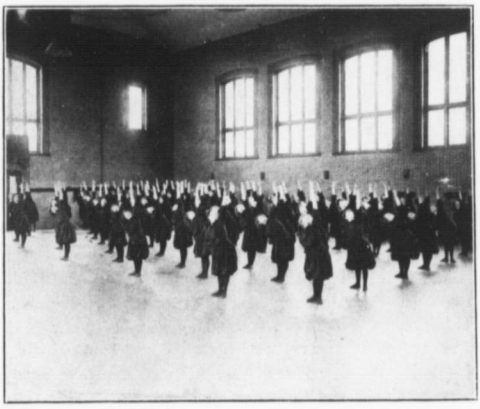
Founded in this age, when a higher standard of personal, school and public health are being established, Macdonald College stands as a model institution in its location and construction. The College has a healthful and picturesque situation on the banks of the Ottawa River, twenty miles west of Montreal, on the Island of Montreal. The buildings are constructed of brick, stone, cement and steel, and are fireproof. They are ventilated by a system of fans, which forces the air in and out of the rooms. The air upon entering

the building is filtered through moistened screens of coke, and is heated in its passage, over steam coils. About twenty cubic feet of air per minute per capita enters each sleeping apartment, thus changing the air in the room every hour. The college is provided with every facility for bathing. The residence buildings have a series of spacious lavatories, constructed of marble and tile, in which the students have access to both tubs and showers.

The most improved method of disposing of sewage is also adopted. The waste material is passed into a septic tank, where all harmful bacteria and other material are acted upon by anaerobic bacteria, and effectually destroyed. The sewage is subsequently aerated and filtered, and rendered harmless before it finds its way into the Ottawa River. Provision for the physical education has not been overlooked. In both the men's and women's residences there is a well equipped gymnasium, and a swimming tank; a skating rink, and two large athletic fields provide for a variety of out-of-door sports.

It is, however, the purpose of this article to give a brief description of the organization and administration of the Physical Training Department, in its relation to the women of Macdonald College. The Department of Physiology is co-ordinate with the other departments of the college, and is administrated by a full professor. A course of two hours a week in physiology is required through out the year. Great stress is laid upon the hygienic phase of the work in the fall term, in the hope that the student may be led to acquire hygienic habits, under supervision, for the year, and it is hoped, for the rest of her life. The work taken in the winter quarter deals mainly with the structure and life processes of the human body. In the spring, public and school hygiene, embracing the causes and prevention of contagious diseases, public sanitation and home nursing are taught in a practical manner. The work of Physical Training is a part of the general scheme for the instruction in hygiene, and requires a course of two hours a week in the gymnasium.

Systematic exercise may be divided into four groups:



A CLASS IN FREE GYMNASTICS.

1. Hygienic exercises.
2. Educational exercises.
3. Corrective exercises.
4. Recreative exercises (sport).

A careful physical examination is made of each woman student on entering college, by the College Physician, Dr. Helen Macdonald, and a series of measurements are taken by the instructor in physical training. Records of these examinations are kept on file for reference and comparison, and they furnish information upon which the assignment of special or regular work is based. All work, whether special or individual, is carefully supervised. The correction of physical defects which are due largely to faulty environment of early home and school life, is given to all who require it.

MACDONALD COLLEGE GIRLS' BASBELL TEAM.

Health and strength are not synonymous. The end of hygienic exercises, unlike those of educational ones, is simply health. Such exercises are comparatively few in number, and require no apparatus, and each student is required to practice them daily throughout the year, in the hope that they may become a fixed habit.

The educational exercises require apparatus, space and appropriate dress. The physical powers are trained, or in other words, the nervous system is educated. In the work required of every student, two objects are kept constantly in view: 1.—The systematic effects, such as the improvement of digestion, circulation, respiration, and the nervous control of the body. 2.—The correction of all physical defects. The work is based upon Swedish methods and military drill.

We are fortunate in having Miss Marjorie Torrance, of the Toronto School of Physical Training and Expression, as the instructor in physical education.

Macdonald College offers unusual facilities for recreative training. The women's gymnasium, a well lighted, ventilated and heated room, is 98 feet by 65 feet, and furnishes an ideal space for basket ball, baseball, Badminton and tennis.

The swimming tank measures 60.6 feet by 26.5 feet, is about 3.6 feet at one end, and slopes gradually to a depth of 6.6 feet at the other end. Swimming lessons and diving lessons are given to all those desiring them.

Much stress is placed on the out-of-door life for girls, and they are encouraged to walk at least one hour (on the average) a day. The recreation field, including two acres, is situated north of the women's residence, and

lawn tennis, field-hockey, basket ball, base ball and bowling-on-the-green may be played in the fall and spring terms. The object of both indoor and out-door sport is to furnish a moderate amount of healthful physical recreation to the greatest number of students. An important rule which influences this desired result is that a girl is not permitted to be a member of more than one organized sport during a season.

SWIMMING TANK, WOMEN'S RESIDENCE.

Having thus briefly described the organization and administration of the Physiological Department, it may be of interest to record some of the results thus far obtained:

MACDONALD COLLEGE GIRLS' MASCOT.

1. The general health of the students is better than upon entrance.

2. The student has, through a study of the human body and the laws which govern its healthful activities, a greater respect for a sound body, and healthful environment.

3. Faults in posture, of gait and carriage, have been corrected in many of the students.

4. Unsuspected physical conditions, tending to depress the health have been discovered and remedied, such as astigmatic eyes, which have caused chronic headaches and indigestion.

5. Physical examinations have demonstrated increased physical efficiency, and irritable hearts have become steady.

6. A marked increase in alertness and nervous control in nearly all of the students.

# Locals.

Photo by E. F. Coke, '09.
CHIEFLY FEET.

The following appeared on an exam. paper, handed in by one of the Fourth Year:—If the cow puts her hind foot into the milk pail, the milk should not be used. Neither should it be used if either the cow's front foot or tail gets into the pail.

Still the maiden clung more firmly,
And with trembling lips and white,
Said, to hush her heart's wild beating,
Mac! We'll never drown to-night.

**Lines From Well Known Ballads.**

A chieftain to the Highlands bound,
His father's hope, his mother's joy;
Found something smooth and hard and round,
John Brown's little Indian boy.

Man wants but little here below,
Oats, green peas and barley;
This world is all a fleeting show,
Over the water to Charley.

John Gilpin was a citizen,
From India's coral strand;
Far from the busy haunts of men,
There is a happy land.

De Roo Van Alderewelt—What means O. C. White? (Oh, I know)—Ontario College White.

Where lives the man with soul so dead
Who never to himself has said,
Returning from the farm in fall,
I'm glad to see Macdonald Hall?

### Hard Hit.

Eastham to Tothill (returned from playing in tennis tournament with Miss C.—)—Well, how did you like your partner?

Tothill—I had a ripping time. She wasn't half bad. (A minute later)—To Lloyd-Jones—Do you know if Miss C.— is coming back next fall?

G.—Whom dog has bitten, kicks the offender across the road, and is confronted with the owner of the beast who demands an explanation in language more forcible than courteous.

"Why," said G., when the man pauses for breath, "your dog's mad."

"Mad! Mad! You double dyed idiot, he ain't mad."

G.—Oh, isn't he? Well, I should be if anyone kicked me like that.

# Massey-Harris Cream Separator


POINTS TO REMEMBER.

**Easy to Fill**

Because the supply can is low —only waist high—and there is no danger of running the can over as there is with a high supply can.

**Easy to Turn**

Because it has cut gears and easy-running bearings — improved Rocker Bearing, Ball Bearings and removable Bronze Bushings.

**Saves More Cream than any other Machine at all Temperatures**

The Improved **Massey-Harris** Bowl readily handles hot or cold milk.

**Easy to Clean**

Because there are but two parts inside the bowl and these are easily removed.

**No Danger from Exposed Gears**

Because all gears are enclosed, yet are readily accessible.

**Durable**

Because made from highest grades of material, carefully finished, and on account of the easy-running bearings.

**Simple**

And will not get out of order

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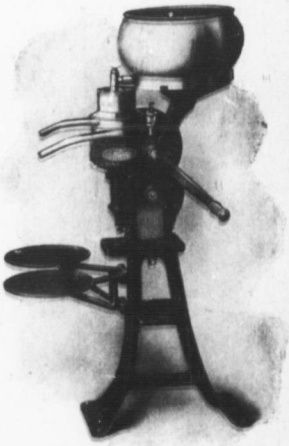
WITH
DOUBLE
SKIMMER
DISCS.

THE
CLOSEST
SKIMMER
MADE.



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# De Laval

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