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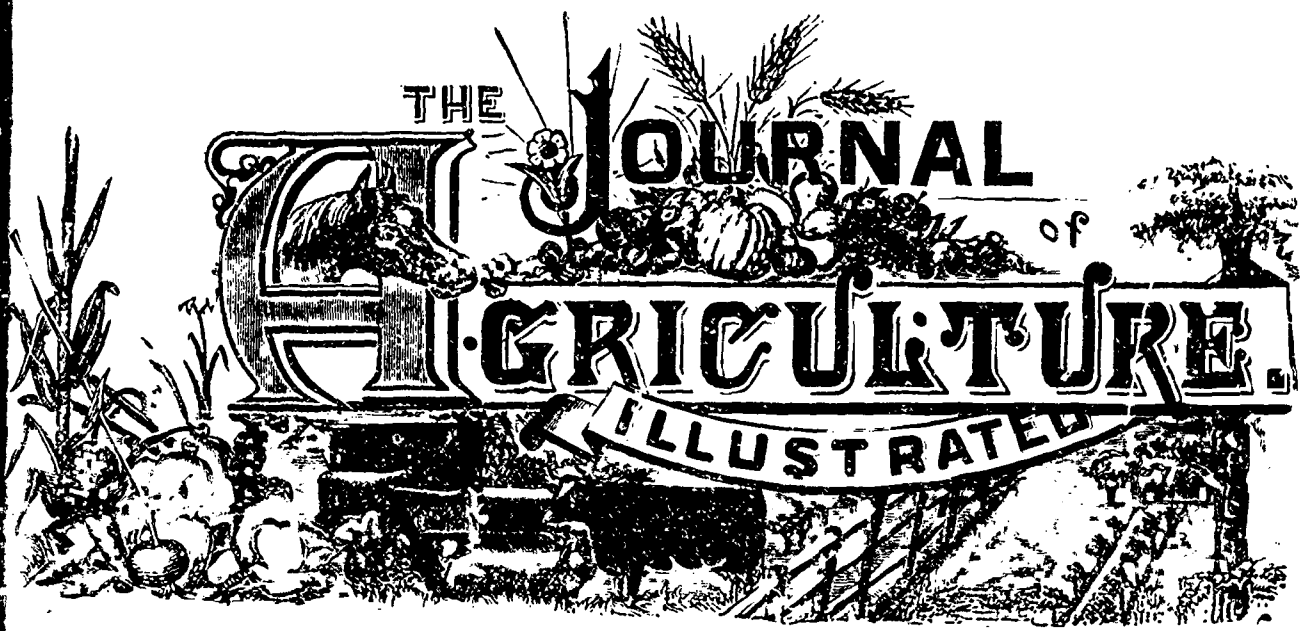

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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—EDITORIAL MATTER. All editorial matter should be addressed to A. R. Jenner Fust, P. O. Box 254, Sorel—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

Table of Contents.

Meeting of The Dairymen's Association.

Thanks to the energetic exertions of their indefatigable secretary, M. J. de L. Taché, the meeting of the Dairymen's Association at Three-Rivers on the 19th and 20th of January seems to have been very successful. Various addresses were delivered by Messrs. Archambault, Painchaud, Casavant and others. Messrs. Chapais and Barnard led in the discussions to which the different papers read gave rise; and various resolutions were passed relating to partially skimmed cheese, and the means to be employed to discover the real feeling of the foreign, and especially of the English, market with respect to it.

In the evening of the 20th the members of LES CERCLES AGRICOLES held their annual meeting at the same place. The session was opened by Mgr Laflèche, Bishop of Three-Rivers, in an eloquent discourse on the estimation in which Agriculture ought to be held, and the three great principles on which the riches and power of every nation are founded. The speech of venerable Bishop occupied two hours in delivery and was listened to with rapt attention.

A conversation took place about a letter received by the president from M. l'abbé Montminy, complaining of a resolution passed by the Council of Agriculture, which evinces a certain degree of hostility to the *Cercles agricoles;* as being in the Council's opinion antagonistic to the *Agricultural Societies*, which the revd. abbé denied to be the case. The Hon. F. X. Larue declared that so far from the *Cercles Agricoles* opposing the proper operations of the *Agricultural Societies*, they had in several cases assisted them when in trouble.

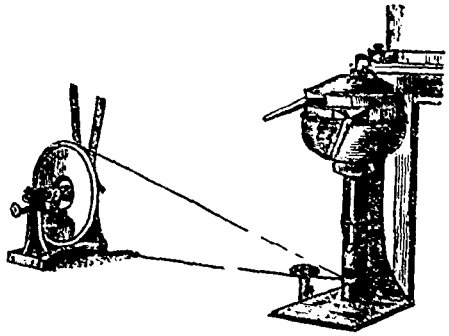
On the 21st a visit was paid by the members of the meeting to Mr. Barnard's farm, about 5 miles from the town, where they were invited to inspect the implements, stock, and siloes of this experimental establishment. Thanks were voted to the Director of Agriculture for his kindness in affording the visitors an opportunity of inspecting his operations. The half bred Jersey-Canadians, the Canadian stallion, and the siloes seem to have afforded great satisfaction to the members of the association.

On their return from the experimental farm the last meeting was held.

Great astonishment was expressed by Messrs. Casavant, Larue, and Marsan at Mr. Barnard's not being a member of the Council of Agriculture, and the visitors were advised to impress upon the minds of the members for their respective counties the propriety of persuading the ministry to appoint Mr. Barnard a member of the Council as soon as possible.

Unfortunately, I could not be present at the meetings of the two societies, so M. J. de L. Taché was kind enough to read an essay I had writen on "Permanent meadows and pastures."

ARTHUR R. JENNER FUST.



Important Improvement in the De Laval Separator.

BY ADOLF WAHLIN OF STOCKHOLM, SWEDEN.

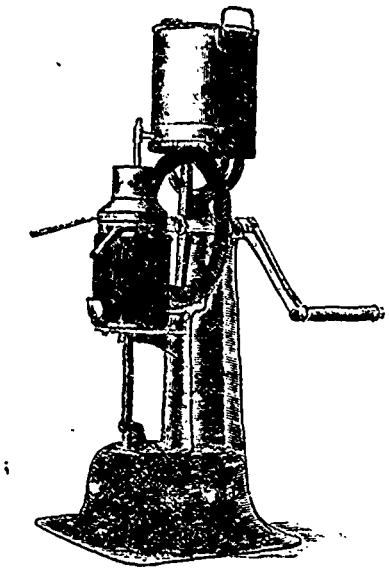
This machine, its merits and great advantages are now so well established and so generally known to all, Americans as well as other nationalities, that it would be useless here to recapitulate any particulars concerning the same. I will therefore content myself with calling attention to only the wonderful improvement, which its inventor has just lately succeeded in effecting. As I have already mentioned above, in my introductory lines, it was the general opinion that the De Laval was a machine very well suited for an ordinary creamery, but for larger creameries, its competitor, which skimmed twice as much, in some cases was preferred, although the latter was much dearer and in some points more intricate and less perfect. It was also argued far and wide by self-satisfied critics, that the De Laval with its smaller cylinder *never could be made* to do such good work as its larger drummed competitor. It is true that the merits of De Laval where so numerous and so apparent that in most cases the factories, were large quantities of milk had to be manipulated, without hesitation purchased even so many as six to eight De Lavals, instead of half that number of the others, thus pushing the sales of the De Laval by the thousands in advance of the number of all other machines sold. And one would think that Dr. De Laval had every reason to rest satisfied with this result. But as I have stated, he is a man who will never rest satisfied with any work of his, as long as there is a single obstacle to overcome. Assiduously he set to work to increase the skimming capacity of his machine and within a year from his commencing, he now comes out with the usual sized machine skimming not less than 1600 lbs. per hour or just double what it used to skim. Besides this, he has also sent out a larger sized machine, which skims up to 1800 lbs. per hour, or equal to any existing machine of double the size, and price, and driving-power. I am not yet at liberty to disclose the secret of the improvement, but I can now assure those, who have already purchased and are at present using the De Laval, that their old machine can be successfully altered to this increased capacity at a reasonable cost; thus making it possible to skim the same quantity as any of its competitors.

The complaint of the large creamery proprietor has thus been answered in an effective and practical manner.

THE HAND MACHINE.

The next complaint was that of the small farmers, who wanted to compete in the making of first-class butter, but whose limited number of cows did not permit the adoption of the necessary machinery, as long as they required expensive driving power. This cry was very general all over the World and the construction of a hand machine has for the last three years been a problem, to the solving of which men of many countries have applied their best abilities and energies in vain. Dr. De Laval had also for a long time been experimenting before he succeeded in showing the world that he still kept the lead he had gained as the ablest of all Separator constructors. At the afore mentioned agricultural fair at Stockholm, the past summer, he brought out two hand machines of different construction, viz :—

THE VERTICAL HAND SEPARATOR.



This machine is constructed on the same principles as the usual well known De Laval. The revolving cylinder has been lightened by shortening its radius, but with elongated walls, and is like its predecessor pressed into shape from one solid piece of the best Swedish steel, thus offering all the guarantees of strength and durability which have made the larger machines so popular. The economy in power to drive it, has been obtained by employing cog-gear, some parts of which, being cast-cog of the finest dimensions, soft and noiseless, are a marvel of manufacture in themselves, and the speed of 6500 revolutions a minute is easily kept up by even a woman of ordinary strength. It separates fully 260 lbs per hour, proper clean skimming, and will only cost about $150 delivered in this country. It is easy to clean, every part of it being easy of access, and cannot possibly get out of order. No sliding belts whatever are used, so that 40 turns of the crank a minute makes the proper speed of the cylinder a certainty. In its present complete and perfect state, it is simplicity itself, though many difficulties in its construction which have had to be conquered by the inventor, have for a long time been to him like the famous Columbus egg. Another reason for the delay in introducing this machine has been the inventor's and manufacturer's resolution never to send out on the market anything of which the perfection had not been first thoroughly proved, so the public has only gained by the delay.

The other machine, (1)

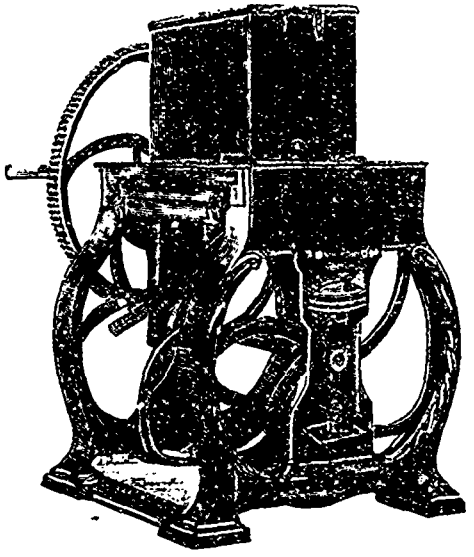
THE HORIZONTAL HAND SEPARATOR,

is constructed on different principles altogether. The speed is the same, forty turns of the crank securing 6,500 revolutions of the cylinder a minute, and also easily operated for any length of time by one man or woman; but here the driving power is obtained partly by spur gear for the principal motion,

(1) The vertical hand separator was thoroughly tested in Montreal in my presence, lately, for three consecutive days, to my entire satisfaction. ED. A. BARNARD.

and partly by friction wheels for the highest speed. The cylinder, a pressed steel tube, open at both ends, is fastened to the revolving axis by an ingenious screw arrangement and placed horizontally in the cast iron frame. This machine separates about 150 pounds more per hour than the vertical hand machine, but is dearer to make, and will probably cost about $200 in America. Both machines are provided with automatic feed regulators and vats, the latter fitted to the machine on special stands. They both exhibit the same finished elegance and careful compactness usually evinced by the De Laval implements.

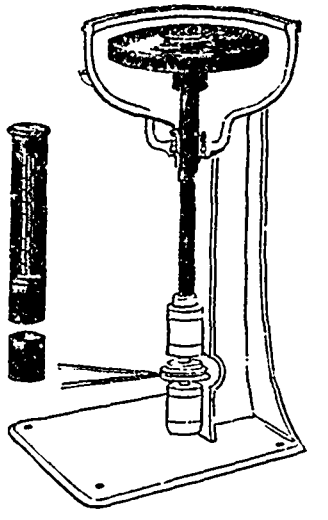
The importance of and future for hand machines in this country, as elsewhere, is so evident that very little need be said on this subject. Every observant mind must have noticed that another reform in the dairy is again sorely needed after the extraordinary impetus given a few years ago by the introduction of the system of Cream Separators. The development in the trade has been almost phenomenal, and the in-



crease of skimmed milk produced almost limitless. Consequently a great difficulty has arisen, namely, how to find a profitable use for the flood of skim milk, and in most cases it has had to be gotten rid of for little or nothing, many times at a loss, whilst in some other parts milk has become quite a scarcity. The desire for hard cash by the farmer has induced him to deliver to the factory as much milk as possible, letting his own household, in many instances, go without this most indispensable article of food. But the hand machine will considerably help to equalize matters. The farmer can separate his milk as it comes from the cow and have his skim milk fresh on his farm, as food for both man and beast. That calf breeding or hog raising, for both of which sweet skim milk is the best of food, is more within the province of the individual farmer than for the otherwise more than busy butter factory, cannot be doubted. Having only the cream to transport will also cause all parties concerned a saving in carriage of no little consequence. The boon which this little machine will prove to the housewife of the wealthier communities during the hot and sultry weather of the American summer, when thunder and heat prevent cream being produced at all, will also add greatly to its demand. In larger dairies where at present the evening's milk is mixed with the mornings, so as to require only one skimming a day and save the labor and expense of heating the boiler and starting the engine going twice a day, these hand-separators ought to be very welcome, and taking all matters into consideration, I think I am safe when I say that this De Laval success will be hailed with gladness on both sides of the water.

De Laval's Lactocrite.

Another reform also sorely needed and which has for a long time been the standing topic for the leading scientists in milk trade, namely, how to alter the existing ruinous system of buying and selling milk exclusively per measure or weight, without reference to the greater or smaller percentage of fat which it contains. The need of a method, practical and at the same time reliable, by which to ascertain the actual percentage of butter fat contained in milk has indeed, I may say, become almost fatal to the milk dealer. It has been proved that a defective method in this respect alone, has in many instances been the cause of losing a whole year's income on a farm. Many methods, more or less expensive, more or less complicated, have from time to time been introduced, but



they have all been too slow and too unreliable for practical use, and therefore never so generally adopted by the trade as to cause the reform needed. The Danish Professor Fjord took the matter up and introduced his so called control centrifuge in connection with the Danish Weston Separator, which was at least time saving. However, the quantity of cream in milk cannot be taken as a standard for butter, as one sample of milk, will often give a layer of cream twice the thickness of another and still yield considerably less butter. The problem yet remained unsolved, until Dr. De Laval succeeded in constructing his *Lactocrite*. (1) The noted European authority on dairy matters, Professor Fleischman, of Raden, (Germany), has carried out a series of experiments with this apparatus and gives it the following recommendation as the result of said experiments, viz:—That it is simple, accurate, quick and cheap, all requisites which are necessary to secure success to any and all agricultural implements. It is easily managed by boys, as was done at the milk testings of the Swedish exhibition referred to above, and is as accurate as a chemical analysis, the highest difference ever reached at comparative trials being two hundredths of one per cent; it is very time saving, a boy being able after some little practice to test up to 60 samples an hour, and it is very cheap in comparison with other milk testing methods, only about one cent per test.

(1) A charming hybrid! Why not call it a "*Galactocrite?*"

The machine, consists of a round steel disc with a spindle like that of the De Laval Separator bowl, and of test-boxes of platina-plated brass provided with a graduated glass tube. The steel disc is in one piece with the spindle and is run in the usual frame of the De Laval Separator. The speed required is the same as that required for separating milk and no greater regularity of speed is needed. From a cavity at the top of the steel disc the test-boxes (see engraving) are put into cylindrical holes bored radically and almost level in the disc, and in this position the boxes are lying during the rotation. Up to twelve tests can be made simultaneously.

The method consists simply in addling some acetic acid to the milk, whereby the casein in the milk is dissolved, which makes it possible by heating the mixture and subsequent separating by centrifugal force to extract the butter-fat and read off the quantity in the graduated glass tube of the test-box.

A great many comparative analyses, as stated, prove this new method of ascertaining the butter-fat in milk to be perfectly reliable, and its result to be but little depending on the individual skill of the person making the tests, consequently this method can easily be used on every milk farm.

Bearing these facts in mind there should be no obstacle in the way of introducing this valuable apparatus also in this country wherever milk testing is required, as in towns for city analysis or police inspection; on farms for valuation of different systems of feeding and different butter-producing capacity of cows; in dairies, buying milk or cream from different patrons, for paying according to value; and at dairies for controling the work of the Separator by testing the skim-milk.

To give your readers an idea of what this machine has already accomplished, I will mention that at the Swedish fair already referred to before, the milk from about 800 cows was tested every day, at every milking. As it may perhaps interest also the Americans to see the average of the different breeds and crossings, I will here give a *resume* of the result.

SWEDISH BREEDS.

Highland	4 290
Herregards	4,188
Stromsholmk	3.648
Grades	3,878

LOWLAND BREEDS.

Dutch	4.023
East Friesland	3,420
Oldenburger	3,192
Angler	3,460

OTHER PURE FOREIGN BREEDS.

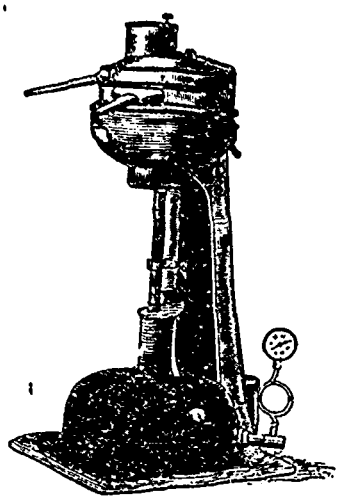
Ayrshire	3,889
Yorkshire	3,530
Algauer	3 3€4
Norwegian Mountain	4,503

CROSS BREEDS.

Stromholms (Swedish), 1-8 Short-horn, 1-8 Algauer	3,858
Herregards (Swedish), Yorkshire Short-horns.	3,423
Heregards (Swedish), Yorkshire Short-horns, East Friesland	3,185
Herregards (different herds)	2,968
Dutch and Herregards	3,545
Swedish and Dutch	3,562
Swedish and East Friesland	3 350
Oldenburger and 1-2 Ayrshire	3,778
Ayrshire (different herds)	3,760
Ayrshire and Swedish	3,460
Ayrshire and Short horn	3,787
Katrineholm (Swedish) and Ayrshire	3,328
3-4 Algauer	3,217
1-2 "	3,883
Grades	3,464

The Lactocrite is also constructed so that it can be run in the Vertical Hand Separator.

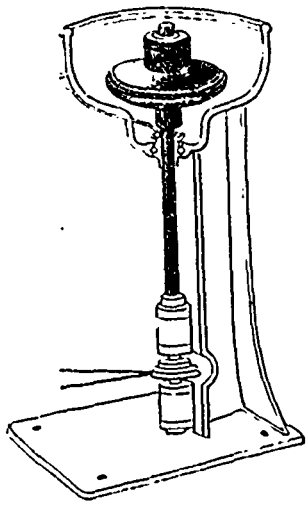
THE DE LAVAL TURBINE SEPARATOR.



This is certainly next to his Separator and Lactocrite, the most ingenious invention and greatest boon that even Dr. De Laval has ever offered to the dairy world. It does away with steam engines, shaftings, valves, gears, belts and machinists in dairies. The spindle carrying the centrifugal cylinder or disc is driven directly by a jet of steam without the intervention of either of these factors just mentioned, and by a very clever device the turbine is so constructed that the wear from friction renders the running bearing or joint more and more steam-tight, instead of causing it ever to leak. It can be applied to the churn, butter worker, etc., and the waste steam can be used for warming the milk and water, as well as several other purposes. It runs very smoothly and can be driven up to any height of speed. The consumption of steam is about the same per horse-power as when engines are used, but the saving in the first cost of establishing a factory and in the running expenses is so considerable as to save the cost of the turbine itself within a year or so. No mechanical knowledge is required for managing it, the speed being regulated by opening or closing a common steam cock, raising or lowering the steam pressure, which is indicated by a usual steam guage fixed at the inlet on the steam pipe close to the turbine. With no belts and shafting, it does not require a great deal of room, the bottom of this machine measuring only 3 x 2 feet and it can be placed in any corner, without any foundation whatever. The steam turbine can also be applied to churns, and there are already several turbine dairies of considerable extent erected in Sweden and the satisfaction is unanimous. The starting and stopping of the machine is done much easier, and especially in churning it will prove of great value, as it enables the attendant to stop the churn gradually and as slowly as desired, a fact of great importance in making good butter. The inventor has, with this machine, tried to meet the requirements of these who, aware of the profits that butter making with modern appliances offers to the farmer, still c anot venture into it for the reason that it costs too

much ready capital to commence with, besides reducing the running expense, thus proportionately increasing the profits realized.

THE DE LAVAL EMULSOR.



The Emulsor was first thought of and introduced by the trade in America, but of a very expensive and intricate construction and is so well known to all Americans that there is no need for my pointing out the purport of this machine. Without feeling much sympathy with the manufacture of artificial cheese, the originally intended object of this machine, Dr. De Laval was spurred on to construct one himself just in consequence of the defects in the other, and he has succeeded. He has reduced the price of the Emulsor from $700 and $800 to something beneath $100, and the driving power required to less than one-fifth of the American machine, besides giving us a machine that is simplicity itself, durable and most effective. The apparatus consists of two hollow steel discs which by a screw attachment are pressed tightly together. The skimmed milk and the fatty substance are let into the hollow between the discs and by centrifugal power forced through the fine circumferential crevice into a tin receiver. Though artificial cheese may not win much favor in America, still there may be a great future in store also for this machine as it enables the utilizing of skimmed milk for a very fattening and nutritious food for cattle. Anyhow the renowned inventor has proved his superiority where construction of new dairy appliances are concerned, and gained his object to place within the reach of any farmer or dairyman means by which to lead into useful and profitable channels the flood of skim milk which has indirectly been a consequence of his first great invention, the Cream Separator.

Dec. No. of Agriculture.

The Macomber Hand Planter for Corn, Beans and Beet Seed.

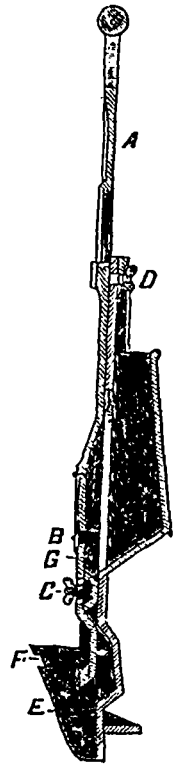
I have tried this planter with corn, peas and beans last season and I am entirely satisfied as to its efficiency. It saves time, labor and seed and works perfectly. The following will no doubt prove interesting to the readers of the *Journal* who, so far, have not tried this machine.

Ed. A. Barnard.

The vast economy of labor incident to the employment of machinery is in no industrial pursuit more clearly apparent than in that of the cultivation of the soil, so that now the farmer is able to work his ground more thoroughly, and to bring forth better and more remunerative results than was possible with the primitive implements that formed the tools supposed to be sufficient, say, a quarter of a century since.

It is gratifying to announce the continued success of the Macomber Hand Corn Planter. It has now been before the farmers of this country for the past four years, and the manufacturers have successfully introduced many thousands of them.

The experience acquired in the manufacture, sale, and introduction of so large a number has enabled them to so improve, perfect and adapt them to the needs of the general



A—Plunger.

B—Automatic cut-off.

C—Gauge block to regulate quantity of seed.

D—Cap and thumb nut for holding plunger in position.

E—Spring to hold corn from dropping out.

F—Notch for fastening spring.

G—Seed Cell.

farmer that they easily maintain their well earned reputation. During the past year the new planter has been subjected to the most severe tests in all kinds of soils, and our customers give it their unqualified approval.

The result of the ingenuity of the senior member of the firm who, being a practical farmer, discovered the defects of all the hand planters previously introduced, and noticing their defects gave the subject close attention, and ultimately evolved a planter that, working upon entirely new principles, avoided the objections existing against its predecessors. It radically differs from all other hand planters in having no disk or slide, the seed cell being constructed in the plunger, thereby avoiding considerable friction and consequent wear. The most novel feature characterising this machine is the automatic cut-off which insures accuracy in dropping the seed. It is made of iron and held in position by a steel spring which permits the cut-off to move only sufficiently to prevent the kernels from being broken, or more of them to pass through than are necessary, and from its construction uniformity of action is sure. It works easily; not liable to disarrangement, is neat in appearance, and when the directions for its use are strictly followed, is guaranteed to do all that is claimed for it. Wherever it has been placed at

work it has demonstrated completely its ability to perform to the uttermost all that is claimed for it, and from every section of the country farmers and dealers in agricultural implements cheerfully certify to its merits, and enforce its claim that it is the best machine for the purpose that has ever been placed on the market. The simplicity of its construction, and the ease and certainty of its operations, have caused it to spring into sudden and lasting favor, and prove the small sum of money expended in its purchase to be one of the best investments that a farmer can make. This Planter was only patented in the autumn of 1882 and the first season fifty of them were manufactured, but so rapidly has it grown in popularity that they are now sold in every state and territory in the United States, with large numbers in the Dominion of Canada. They are being gradually introduced into South America, and the corn growing sections bordering on the Black Sea, while the trade with Australia bids fair to soon equal that with the United States. Could any statement more clearly set forth its intrinsic value?

S. M. MACOMBER & Co.,
Manufacturers,
Adams, Grand Isle Co., Vt.

DE OMNIBUS REBUS.

Box 254, Sorel, Que.—January 21st 1887.

Fertility of Pastures.—The main dispute between Professor Marsan and M. Lippens sums itself up in this: whence do clover and other leguminous plants derive their food? M. Marsan contends that they derive the greater part of their nutriment from the air; M. Lippens, on the contrary, says that they obtain the greater part from the soil. On this point Sir John Lawes—he never lays down a law, nor does he even state an opinion without giving his reasons for it—Sir John Lawes, I say, in a recent article, published in the Dairyman, speaks as follows:

"An ordinary pasture is made up of a variety of plants, belonging to different botanical species, which we generally classify under three heads, although the third, called miscellaneous, or weeds, belongs to a variety of orders.

The general composition will be found in the following table:

	Nitrogen, per cent	Mineral matter, per cent.
Gramineous Herbage (grasses).....	1.17	5.9
Leguminous do (clover, wild vetches, &c.)	2.32	6.8
Miscellaneous do.....	1.32	8.7

Hay, being a mixture of these different classes of plants, must necessarily vary a good deal in composition, but it may be considered to contain, on the average, 1.3 per cent of nitrogen and seven per cent of mineral matter. (1) "And now follows a sentence to which I beg all my readers to pay the greatest attention: "In treating of the application of manures, I shall ASSUME that carbon, hydrogen, and oxygen are derived from the atmosphere, and the mineral matter and nitrogen from the soil."

Now, can anything be more touchingly frank and modest than this? Here is a man of good education, a man of large property, both real and personal, a man looked up to and listened to by the whole agricultural world, and this man, who has devoted fifty years of his life and a very large part of his income to the carrying on of experiments in every department of agriculture, to say nothing of his having placed in the hands of trustees half a million of dollars, to carry on this work after his death, this man, after having conducted a long series of experiments on the *vexata quæstio*, whence do plants obtain their nitrogen? *assumes*, for the sake of argument, that they obtain it from the soil. Lawes evidently thinks this is the source, but he avows plainly that he is not sure, and that till he is sure, he will not speak.

Rather different this from what we have heard lately from those who follow the school of Ville, &c. The truth is that we farmers, like all the world at the present day, have to throw off our childish habit of running in leading strings. The weight of all *authority* has greatly diminished, and the sources of recognised authority are quite different from what they were a century ago. The physician of to-day cares not two pence what Galien or Hippocrates said, neither does the man of science trouble himself about the opinions of Aristote. People question all things and all men, and accept nothing without examination. They have observed that discussion often elicits truth, that controversy is useful on many difficult subjects, and that in most circumstances many heads are better than one; hence, they have learned to distrust all *ex cathedrâ* teaching, and to refuse acceptance of all theories that are not supported by the force of numerous experiments.

It would do the professors of agriculture in our colleges no harm if they were to consider that, during the growth of natural science, in the last fifty years or so, a new method or spirit of inquiry has been gradually developed, which is characterised by an absolute freedom on the part of the inquirer from the influence of prepossessions or desires as to results. This spirit seeks only the *fact* without the slightest regard to consequences; any trusting or obscuring of the fact *to accommodate it to a preconceived theory*, any tampering with the truth as regards the actual result of investigation, is, in matters of science, the unpardonable sin. (1)

Meliorating plants.—When I hear turnips, for instance, called a meliorating crop, I understand what the speaker intends to say. He means that the ploughing, cultivation for this root, leave the land in a better condition after its removal, than after the severance of a crop of wheat. The same thing is frequently predicated of a crop of beans or pease, when these legumens are sowed at wide intervals and horse- and hand-hoed. All this is as old as the days of Jethro Tull, who flourished, if I remember, some 200 years ago.

Tull, having observed that breaking the earth, by digging or horse-hoeing between the plants, gave them great increase of growth, imagined that this cultivation of the soil rendered all manuring unnecessary, and that though the plants had yielded a good crop, the earth was left richer than before, notwithstanding all the plants had imbibed from it.

Some thirty years ago, the Rev. S. Smith, of Lois-Weedon, revived the idea, as may be seen in the Journal of the Royal Agricultural Society of England, vol. 12, part 1, p. 133. Mr. Smith sowed wheat in divisions of three feet apart, with a separation of three feet left naked between each division, the spaces in each triple row being one foot.

In the beginning of November, when the triple rows were distinctly visible, he trenched the naked intervals, bring up six inches of the subsoil to the surface, and casting the seven ploughed inches of the staple to the bottom. In the following spring, the rows of wheat were well hand-hoed and weeded, and the 3 feet intervals were stirred with a one horse scarifier up to the very period of flowering in June. Four acres treated in this way, yielded at harvest 164 bushels of good, clean wheat, weighing 61 lbs. a bushel, with 8 tons of straw! Mr. Smith adds—in italics—"I expect a similar crop, year after year, on the same four acres of land, treated in the same way." In support of his hopes, he quotes Jethro Tull to this

(1) The legumens being the least of the three in bulk. A. R. J. F.

(1) Of course, this spirit is as old as Friar Bacon. It received a new impetus from Lord Verulam, and has been, more or less, gaining ground ever since. A. R. J. F.

effect: "the more successive crops are planted in wide intervals, and often hoed, the better the ground does maintain them. The last crop is still the best, without dung or changing the sort of plant."

Unfortunately, in a very few years the utter absurdity of these expectations was fully exposed. The crops, unmanured, fell off by degrees, as the practical farmers of the neighbourhood predicted, and the system—commonly called the Lois-Weedon system—fell into complete disrepute, and is now never even talked about.

Experimental farms.—An experimental farm may be defined as that sort of a farm establishment which is chiefly applied to the making of experiments, with the view of ascertaining unknown causes, effects, or results, in the various departments of husbandry.

This is a plan which has been often attempted in bygone times, but unlimited failures have been the ultimate result until lately. The cause of these failures has generally been the want of a due combination of *real practical* agricultural knowledge with the soundest scientific acquirements. We can find every where good farmers and good chemists, but the man who unites a thorough knowledge of the art of farming and of the science of chemistry is as yet far to seek.

For experiments are not easy or simple things to make, even were it determined what experiments should be made; and to obtain sufficient results to found one generalisation upon will occupy the time, care, and patience of the experimenter for more than two or three seasons. "For," as says a writer of the last century, who had evidently studied his subject, "the term *experience* may be said to denote those deductions which a person draws as the average results of practice continued for a considerable length of time, and which is unquestionably the surest guide that can be followed, where the observations are sufficiently correct, and the circumstances discriminated in so clear a manner as to create no sort of confusion; still, where these peculiarities are wanting, the conclusion thus drawn may be extremely fallacious. And what increases the evil in this case is, that when conclusions have been once drawn in consequence of an imperfect discrimination of circumstances, there is scarcely any hope of eradicating the error; as the mind, when once accustomed to think in a certain way, is apt to proceed in the same ever afterwards; and that the same want of discrimination which caused the first error will induce a succession of similar errors ad infinitum."

Again, we must not forget that it happens, unfortunately, in farming, that things which are capable of affecting the results of a process or operation are so jumbled together into one chaotic mass, that it is a matter of extreme difficulty to distinguish such as are essential from those which are merely accidental, and, consequently, it is easy to mistake one for the other.

The primary object in every experiment should be to make it comparative in its circumstances, as regards the field, soil, situation, time, and labour, with a crop raised in the ordinary way. Without making such an extensive comparison, no satisfactory conclusion can be arrived at, since no common ground would exist by which to measure the loss or gain obtained by the experiment.

The present experiments being tried in England seem to me to be conducted on a proper principle; as thus: A farmer announces to the county society his desire to submit part of his land to the process of experiments in, say, the growth of roots. The chemist employed by the society analyses the manures to be applied, a committee visits the farm in question two or more times during the season, and the crop is carefully taken up, weighed, and analysed, under the superintendence of the committee and their chemist.

From the county of Norfolk, I hear all sorts of good reports as to the good that has been derived from this system: the practical knowledge of the farmer seems to have acted as a check on the theoretical knowledge of the chemist. In Sussex, this has been gained: Mr. Jamieson, the chemist, who has been running a muck for some eight years against the use of sulphuric acid in the manufacture of superphosphate, is at last convinced that the acid does not produce "finger-and-toe" in the root-crop, but that a dressing of superphosphate may with advantage be substituted for part of the fine-ground coprolite to promote early germination.

One of the earliest experiments I should recommend to be made on any experimental farm established in this country, would set at rest for ever the question whether our *apatite*, in a finely ground state, is capable of assimilation by plants. The experiment has been tried over and over again in England, and the universal verdict of both practical farmers and agricultural chemists is, that apatite, however finely ground is, unless dissolved in acid, perfectly useless. And yet M. Franchot, the manager of an extensive apatite mine near Hull, gravely states: "the pulverised phosphate (apatite) is superior to that *manipulated;* which means diluted with sulphuric and other acids." On the other hand, M. Abalski, the mining engineer employed by the Quebec government, states in his report for last year: "Valuable as the apatite is for manure when dissolved in sulphuric acid, in a simply ground state it is utterly useless."

The question is so thoroughly decided in England that undissolved apatite is now never tried there even by the most sanguine experimenter. Still, there are people here who, whether from interested motives or from pure obstinacy I do not know, refuse to be convinced of the absolute truth of this fact, and it would be worth while making the experiment in this province to complete the demonstration.

Another point that demands a thorough elucidation is the *Guénon* theory, which is too familiar to all breeders of milch-cattle to need any dwelling upon. The Guernsey people evidently do not believe in it, and I hear from private sources that the Jersey farmers only pretend to believe in it to please their American customers. In England, in nine cases out of ten, the milkmen utterly ridicule the idea that the position of certain hairs in the hindquarters of a cow can afford any indication of her milking powers. Still, my dear countrymen *are* prejudiced, and there *may* be something in it.

Ensilage, again, and its divisions, into sweet and sour; here is a vast field for practical investigation. For instance, we all know that in Scotland from two to three bushels of turnips a day, with oat-straw, will make a bullock ripe fat. In fact, until about thirty years ago three-fourths of the fat cattle sent to London from Scotland never tasted any other food; oil-cake and bean-meal being quite modern innovations in that country; as may be seen by referring to the 1851 edition of "Stephen's Book of the Farm." Well, would ensilage and straw fat a bullock? That would give one some idea of the practical value of ensilage as compared with turnips. I believe in ensilage most devoutly, but I believe also in the root-crop, and I do not wish to see the one extrude the other without good reason.

What is the cost of growing swedes or mangels? With farmyard dung alone or combined with artificials: is there so much salt in the sandy lands of this part of the world, that the addition of more is pure waste? Which answers best for roots and grain, *old char*, containing 80 % of phosphate of lime, at $15 00 a ton, or superphosphate containing 24 % of "soluble and precipitated" phosphate, at $26.00 a ton.

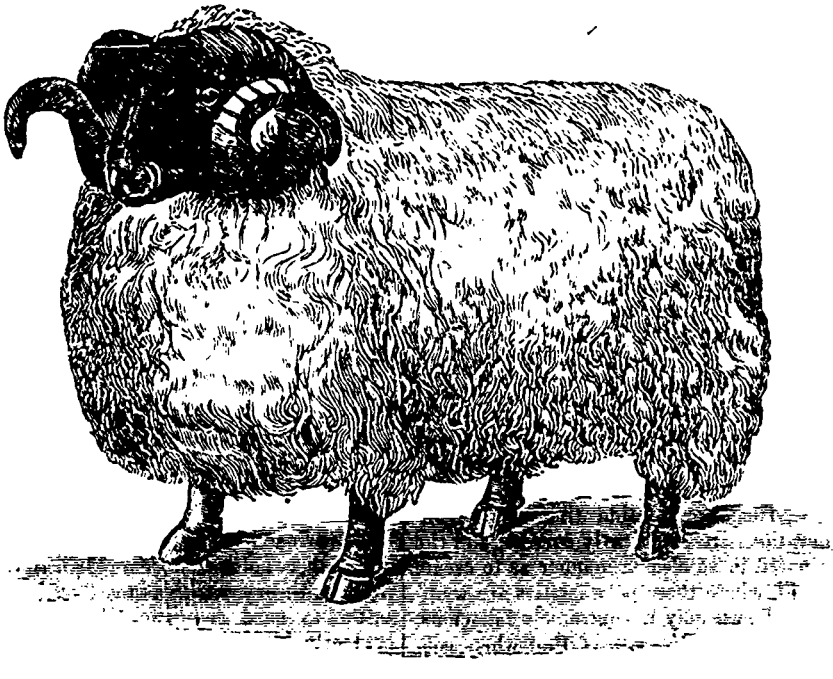
Seed to the acre, again! How shall we sow, thick or thin?

Is the true principle that, as I believe, the better the land the less the seed required, or as certain people here maintain, sow thin on poor ground and thick on rich soil? Again, as to the depth at which the seed should be deposited: shall we follow the Rural New Yorker, and never sow wheat deeper than one inch, or the plan I have so often advocated, viz., sow it from three to four inches deep and let the germinal and coronal roots have a chance to do their best offices for the young plant.

Once more; shall we sow wheat thinnish and barley thick, as recommended by Mr. Clare Sewell Read, the celebrated Norfolk farmer, at the December meeting of the London Farmers' club? Shall we sow oats at 6 pecks an acre and reap at the utmost 30 bushels, or shall we sow as my friend Mr. Gylling, of the Fosbrooke's Farmaid, 4 bushels and reaped 72?

Is it true that, in a warm summer climate like ours, where the grain runs through its stages with great rapidity, less seed is required, than, as in England, where the grain takes a month longer in coming to maturity?

There are heaps of other points waiting a solution: use of roller on heavy lands; what grasses for heavy and light land, respectively; permanent grasses vs. alternation of grasses, grain, and roots; methods of growing fall-wheat in the western part of the province of Quebec; cheapest way of singling roots, does ammonia hasten or retard the ripening of crops; (1) and innumerable others *quæ nunc prœscribere longum est.*



BLACK-FACED RAM "SEVENTY-TWO."
Re-engraved from the London Live Stock Journal.

Clovers.—The price of clovers and other seeds in this country seems to me to dearer than they need be. For instance; rapeseed, the highest price for which in the English market is 10 cents a pound, is quoted in the seedsmen's lists here at 20 cents; lucerne, which in England is worth 14 cents, is quoted here, in one list, at 35 cents; and, strangest of all, trefoil, or hop-clover in England 3 cents, here, 35; (2) and white-clover 17 cents there and 35 cents here. There are freight and duty, &c., to pay, but surely a fair profit can be made in the trade without such exorbitant charges.

(1) M. Chapais, in his experiments on the use of sulphate of ammonia, seems to be convinced that this manure hastened the ripening of his potatoes. I, on the contrary, have *always* found that nitrogenous dressings, whether in the form of guano, nitrate of soda, sulphate of ammonia, or pigeon's dung, have the effect of lengthening the active growth of the plant, and thereby delay its maturation.

(2) This may be from the fact that *black-seed*, i e the pods of the trefoil before the grain is threshed out, is the seed meant.

A. R. J. F.

Commercial fertilisers.—*Fairfield's* letter on this subject is worthy of atttention. As I have frequently observed in this Journal, the price of these succedanea is so high in this country, that their use is out of the question. Now, here is a wonderful thing! Every week, I see in the "Country Gentleman" two advertisements of "Canadian Unleached Ashes," to be sold 'by the car-load at New-York! This ought to be put a stop to; not, of course, by Government interference, but by our own farmers making use of the ashes for the improvement of the older lands.

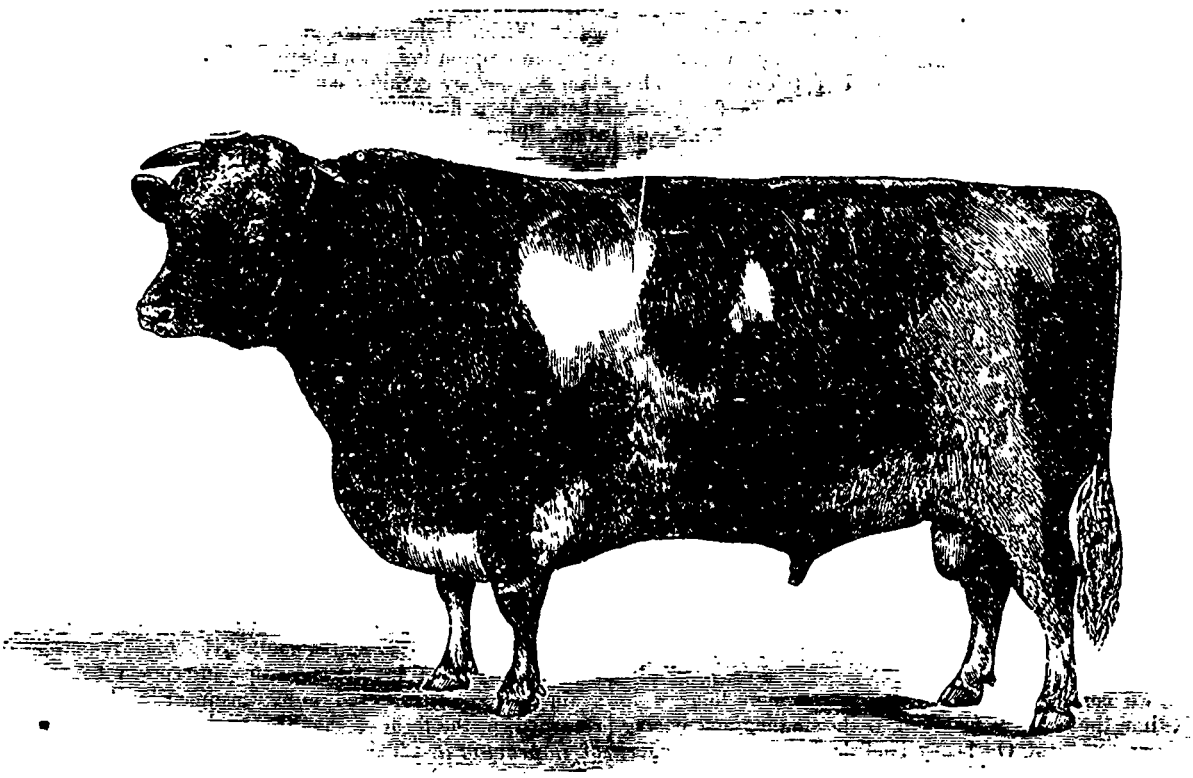
Ville's plan for settling the question: what sort of manure does my soil require? is the right one. He divides a piece of land into five plots and treats them as follows:

Plot.	Manures.
One.....	Superphosphate, potash, ammonia, plaster.
Two	Superphosphate, potash, plaster, no ammonia.
Three.....	Ammonia; no minerals.
Four.....	Farmyard dung.
Fifth	No manure.

With two or three sets of plots like the above, a farm would be soon, so to speak, self-analysed.

Fairfield, who forewards his real name in confidence, would oblige me very much if he would continue his observation on this subject. Our farms are getting poorer every day, and I do not see how we are to keep them from ultimate barrenness unless by the aid of imported manures and cattle-food. As M. Lippens says, no amount of "meliorating crops" will save the country from final ruin. We are no better off than other countries. Our land cannot be for ever pouring forth abundance, and receiving nothing in return. Do people suppose that England, with her average of 29 bushels of wheat an acre, produces this yield by means of "meliorating crops"? Far from it; the amount of imported food, alone, would astonish some of our untravelled gentry. For example. I remember, as long ago as 1853, wheat fetching at the time $1.08 a bushel, three brothers, farming about 2,500 acres of land in the county of Cambridge, buying between them a lot of Egyptian beans for cattle food. How many bushels? Well, I do not know, but there were three hundred tons; in fact, it was a brigantine's cargo they bought. Hudson, of Castle Acre, in the county of Norfolk, made nothing of buying three hundred tons of cake a year, besides lentils, and other pulse. And all these articles of cattle-food were in addition to an enormous use of superphosphates, &c., for the root-crop. If you had told these men—all of them renting farmers

—to preserve the fertility of their land by growing "meliorating crops," my stars, how they would have laughed! If you had hinted that, according to the views of M. Marsan—who, alas, was not born in those days—they were to "consume the forage crops on their farms with the cattle, and that these would furnish lots of manure for the enrichment of the land, and that this abundant manuring would cause a constant improvement of the soil and a continually increasing augmentation of its products;" that, "forage crops, conjointly with the stock of the farm, furnish to the soil fertilising materials in sufficient abundance to preserve for an indefinite period the productive powers of arable land, and even to gradually increase them;" I say, if thirty years ago you had told the



SHORT HORN BULL ROYAL INGRAM 50,374. Re-engraved from the London Live Stock Journal.

men of whom I speak such nonsense as this, they would have turned away with, probably, a remark to the effect that you, the teacher of those strange theories, must have been asleep since the days of Jethro Tull.

Butter that will not come.—Mr. W. A. Hale, of Sherbrooke, is good enough to furnish us with his idea of the cause of this trouble. No pre-conceived theory, but experiment put to work at once. I should like to hear from some of our dairymen on the subject. For myself, I confess, utter, entire ignorance of the reason why, after the cream had been frozen, the butter came in five minutes, unless Mr. Hale's idea of the breaking of the casein sacs, by the alternate freezing and thawing of the cream, be correct.

Draining.—In a late number of the "Country Gentleman," J. F. G. is advised by the editor of that Journal to cover pipe-tiles with straw after they are laid. This is about the worst plan that can possibly be adopted, and evidently proceeds from the brain of one who cannot grasp the idea that water enters the conduit of the drain from below and not from above. The true practice is, to cover the pipes with the toughest clay that can be conveniently had, and to tread it down firmly. The straw, or other like material, is sure to rot, and will in many cases allow the earth to settle and ultimately choke the drain.

Another contributor to the same publication says: "I use horse-shoe tiles laid on 1-inch hemlock boards, the joints being covered with sea-weed, straw, or sod, the last covering being the kind I prefer. The water in this kind of tile is given a freer run on a 16 foot board than when it is meeting with more or less obstruction at much shorter distances in case of the round tiles—the frequent joints at the bottom being the interruption I have reference to." The drains must be bottomed out wonderfully straight to allow of a 16-foo board being laid under the tiles! Again, the boards rotting in time would be likely to fill up the tiles; whereas the soles generally used would last as long as the tiles. Lastly, the main superiority of the pipe-tile over other sorts of conduits is, that it requires so much less earth to be taken from the lower 15 inches of the drain to admit it. The bottom of the drain, to admit the hemlock board, could hardly be less than six inches wide; whereas, with an inch-and-a-half pipe, no part of the lower fifteen inches need be more than three inches wide.

Sulphate of ammonia.—In England, by the last market reports, nitrogen in the form of sulphate of ammonia is worth about 10 cents a pound. Here, it cannot be bought for less than 17 cents.

Hoeing roots.—M. Pierre Guèvremont, who manages the large farm of his father, the Senator, tells me that the cost of singling and hoeing his root-crop last year did not exceed $2.00 an acre. Not one of the hands who did the work had ever even seen a piece of swedes or mangels hoed or singled. The land was as foul as need be, the manure being full of

seeds of all kinds of rubbish which, as it had been drawn in a raw state on to the land, all sprouted, and, when I returned from my tour of inspection in August, almost drove me wild. The singling was done by a man *gapping* out the plants, so as to leave a bunch of three or four every ten inches, to be afterwards reduced to a single plant by children. Both the men and children employed learned their lesson marvellously fast, though so new to them, and though both the master and the employed fancied I was leading them on to destroy the whole crop, particularly when I impressed upon them the necessity of leaving the young plants as bare as possible. However, that is all changed, and M. Guèvremont told me yesterday he intends sowing at least five acres of roots next season, as his milch cows, of which he has ten, have never done so well as they have this year. They have been on swedes ever since the 25th of October and, with the mangels and carrots, he has enough to last them until the end of the season. The swedes certainly yielded 30 tons an acre, and as far I can calculate, cost about one dollar a ton. All estimates of cost of growing, never mind what crop, are fallacious, but let us see. Premising that the manure bought cost ten cents a load within, at the outside, three hundreds yards of the field, we may say:

Rent &c.....	$4.00
Fall ploughing	2.00
Cross-ploughing	2.00
Grubbing, harrowing, &c.....	1.00
Drilling at 24 inches.....	—.75
Manure 30 loads at 15 cents.....	4.50
Carting and spreading do.....	2.50
Splitting drills	—.75
Rolling drills.....	—.25
Seed, 3 pounds at 30 cents.....	—.90
Sowing seeds.....	—.25
Singling and hoeing.....	2.00
Hoeing, second time	1.00
Horse-hoeing three times.....	1.20
Topping, tailing, and cartage of 30 tons.	7.00
	$30.10

Thus, we come to this, that roots cost no more to grow in Canada than they cost in England, if the singling and hoeing are properly managed. On heavy land the cost will be greater, but it must not be forgotten that I have charged the whole labour and manure to the root-crop, whereas I might easily have charged half the dung and one-third of the labour to the debit of the succeeding crops of grain, hay, pasture, and grain again.

I do not intend to mislead my readers by persuading them that these farms at Sorel are to go on producing,as they do now, these enormous crops of roots. I say enormous, because I never saw anything superior in England or Scotland. The land I speak of is, as regards roots, in a perfectly virgin state; but the time will come, and that quickly, when the mysterious wo kings of Nature in her laboratory will no longer be able to supply the plants with food ready fitted to their wants, and the yield of roots will be greatly diminished, in spite of all the efforts made by the farmer to furnish their required pabulum. In Scotland, the effects of growing roots every fifth year are already begun to be felt. In Norfolk, where the four course husbandry originated, the farmer is beginning to see that roots every fourth year will no longer yield more than three-fourths of a crop, and in parts of that splendidly farmed county, the disease of "finger-and-toe," for which as yet, no remedy has been found, has driven the turnip grower nearly out of his senses.

Therefore, in the face of these examples, I say with a warning voice, grow roots by all means, but, as in the case of red-clover, do not grow them at too short intervals on the same land. On light land, where clover and timothy will not "stand out" long without failing to yield, I should, I think, recommend the six-course shift:

Roots, fodder corn, vetches, &c.;
Grain;
Meadow; } Three years grass at any rate, to
Meadow; } be mown or pastured as the
Pasture; } owner may prefer.
Grain;

reserving, of course, some of the outlying part of the farm for permanent pasture, if the farmer can be persuaded to try it.

After the roots, I should sow barley, and after the grass oats. Wheat I should not grow at all, as I have never seen a paying crop on light land here, and the theory that a farm should grow everything consumed by the farmers family whether it is fitted for it or not, is too absurd to need refutation. There are some fine loamy soils at Compton and other places in the Townships, which will grow barley and wheat, butter and cheese, equally good in quality; but, as a general rule, heavy land will not grow good barley, nor light land wheat; neither will the same soil produce butter *and* cheese of the same quality.

Meliorating Crops.

As my translation of M. Lippens' articles on the teaching of the professors of agriculture in our colleges has caused a great deal of interest to be shown among the readers of this Journal, I think I cannot do better than continue them. The following letter from M. Lippens appeared in the French edition of the Journal for the month of January:

Sir,—M. Marsan, in his reply to my observations on the theory of "meliorating crops," asserts that I am guilty of agricultural heresy, affirming that the teaching I uphold is too absolute and fails in exactitude. He says that I did not understand the drift of his lecture; that I failed to observe that all his courses, or shifts, contained a manured crop; and that every one of his forage crops, interposed between the grain crops, are supposed to be consumed by the cattle and returned, in the form of manure, to the land for the purpose of *improving it*. This fact alone is, in his eyes, enough to convince me of error. He calls my argument *captious*—apparently well-founded but false when minutely examined. In spite of this, he declines to sift it to the bottom.

"I shall not undertake," says he, "the discussion of each of his propositions, it would be too lengthy a task, *and of doubtful utility to the public*." He makes great fun of the state of things that would exist were the principles which I have developed equally true in theory and practice. "We should have a school of agriculture paid by the State to teach erroneous theories and cause the ruin of the farmers." And he adds, evidently with the intention of holding me up to ridicule: It is very lucky, though late, that the country has received into its bosom a learned foreigner to rouse it up and enlighten it with the torch of science." (1)

(1) If the *pays* does not like to be enlightened by the torch of science in the hands of a *foreigner*, I wonder why, when the Director of Agriculture was first appointed, he went on a tour of some months to study the manner in which the *foreigner* conducted his agricultural operations? When the idea of starting an experimental farm was formed, I rather think the Council of Agriculture of the *pays* sent a committee to the States to see how the *foreigner* conducted his experimental farms, and even published a pamphlet on the subject. Being a foreigner myself, I rather resent this little appeal of M. Marsan's to the vilest of all the passions which affect the uneducated classes—jealousy Besides, M. Marsan is fond of quoting foreigners, but then they do not come here to upset his tales of ancient days.
A. R. J. F.

He next tells us that he is a pupil of professor Schmouth, and he adds that all the enlightened farmers of the chief agricultural countries profess a doctrine in conformity with his teaching and opposed to mine. And then he gratifies the reader with a wealth of quotations from the works of Landry, Girardin and Dubreuil, Schwertz, Gasparin, &c.

Before entering upon an examination in detail of M. Marsan, it would be as well, I think, to define strictly the points in dispute, to formulate in a few words what is the agricultural theory laid down by M. Marsan, and what is the theory which I bring forward in opposition to it. Thus, the reader will easily perceive on which side lie the agricultural heresies, the erroneous theories, and the insidious arguments.

The *ideal* system of the farmer is this: to reap abundant harvests with little outlay, and, at the same time, to keep his farm, in a constantly improving state.

These are the means extolled by M. Marsan as serving to obtain this threefold result:

"In the courses of cropping, reserve a large part for forage plants, above all for the legumens which enjoy the singular property of assimilating the nitrogen of the atmosphere and of returning to the soil, in their roots and waste matters, more than they extract from it. Give these forage plants to your cattle, which will furnish plenty of dung to be applied to your land. This abundance of manure will cause a constant improvement of the soil, and an ever increasing augmentation of its products. Forage plants, conjointly with the stock of the farm furnish the land with fertilising material in sufficiently great abundance to preserve for an indefinite period the productive powers of arable land, and even to increase them by degrees."

I hope M. Marsan will acknowledge this to be a fair statement of his teaching as regards the improvement of the land, which teaching is also that of M. Schmouth and of a vast number of other specialists.

I have already said, and I repeat it without hesitation, that this theory is erroneous, that it is contrary to science, and that the facts, carefully observed, show that it is without a leg to stand upon. To this teaching, I oppose the following, begging the readers' pardon for repeating myself:

"The remains and roots of forage plants, combined with the dung and urine of the stock of the farm, do not afford the fertilising matters necessary to maintain for an indefinite period the productive powers of arable lands. The manure derived from the products of the soil alone, is not sufficient to prevent the deterioration which the soil suffers by and through the production of the crops it yields. It is absolutely indispensable that the farmer return to the land, by means of imported manures of foods, those elements which have been ravished from it by the exportation of its products, if he desire to hinder the impoverishment of his farm. No system of rotation, however ingenious, will enable us to escape from the law of restitution. Neither plants nor animals can replace the minerals that are removed by the sale of the crops, and whose removal is one cause of the impoverishment of the soil. No other resource is open to us than to import these matters from outside the limits of the farm."

This is a concise statement of what I said in my former letters. This is what I believe ought to be the theoretical and practical teaching which should guide the farmer who is desirous of entering upon the road to real and lasting improvements.

Terribly mistaken is M. Marsan in saying that his theories are generally accepted by the enlightened farmers and agronomes of all countries. Once upon a time, it was so, but to-day they are almost entirely reposited among the curiosities of bygone times. The quotations I am about to make will signally destroy his illusions: I could bring forward ten times as many, were it worth while. *A tout seigneur, tout honneur.* I will begin with you, M. le directeur.

In the farmers' club of Ste-Anne des Plaines, we learn, among other instructive things, that ..... "certain plants, the clover, for example, derive the greater part of their nutriment from the air."

This assertion appeared to you so rash, that you thought fit to comment upon it in these terms:

"This is far from being ascertained. Clover takes from the subsoil, and very frequently from a great depth, the greater part of its food. In order not to exhaust the soil by the growth of clover, it must be consumed on the land, and that which the clover, like all other plants, has taken from the soil must be restored to it." Ed. (Journal d'agriculture, 1885, p. 96.)

I may as well add that the reading of the above note first put into my head the idea of writing on this matter.

Mr. Jenner Fust, too, expresses himself frequently to the same effect. He publishes a translation of my first letter, accompanying it with observations, from which I make the following extracts: "As for its (clover) obtaining only a small portion of its sustenance from the soil and the greater portion from the air, that I firmly believe to be an utterly untenable proposition." What does M. Marsan say to this?

"Red clover," says Mr. Jenner Fust again, "has but few surface roots (*compared with the alsike*, A. R. J. F.) but an immensely long tap-root, fitted to descend deeply into the subsoil, and being up thence the nitrogenous as well as the mineral riches, that there abound."

I will quote, now, some passages from Lecouteur, editor of the "*Journal d'agriculture pratique*," one of the French publications. These quotations only date from last year.

"The whole system of *atmospheric manuring* rest on the fact, *asserted by some and denied by others*, that leguminous plants can accumulate nitrogen from the atmosphere."

Here, as lawyers say, we join issue. If M. Marsan will be honest about it, he must allow that his doctrine reposes on a very fragile foundation, and that his teaching is anything but sure.

Where is the proof that legumens have, in the vegetable economy, a special part assigned them, and that they are not subject to the same physiological laws as other plants? I will write an essay on the subject, and I invite M. Marsan to do the same He shall show what are the reasons that lead him to believe that the legumens enjoy the exclusive privilege of borrowing from the atmosphere the nitrogen which enters into their composition. I will say, why I think this a fantastical theory, and the reader shall judge between us. This question is by no means of *doubtful utility* to the farmer. But, even supposing that the legumens really enjoy this wonderful power, it does not at all follow that M. Marsan is in the right: far from it. Let us listen to M. Lecouteux once more:

"The phosphates, lime, potash, are all derived from the soil, *solely from the soil*, that *exhaustible* source, which must have restored to it to keep it in condition all those matters which, like the crops and cattle which are sold off the farm, have been taken from it.

Now, chemical analysis proves clearly that clover carries off from the soil a great quantity of these matters; those which remain in the soil under the form of roots and waste, are borrowed from the soil and cannot enrich it. Even the dung produced by the consumption of the forage restores to the soil but a part of these matters.

Once more, M. Lecouteux says:

"Cattle incorporate into their bodies a portion of the mineral and a portion of the organic matters contained in their food; therefore a deficit exists which must be made up to the soil."

Thus, if we do not have recourse to the use of purchased food or manure, we see that the impoverishment of the land is fatally imminent. Even if we could persuade plants to accumulate all their nitrogen from the air, we should still have to account for the inorganic substances required absolutely to build up the frames of plants.

If minerals are absent, nitrogen will not produce good crops. Nitrogen plays an important part in vegetation, but it cannot supply the equivalent of minerals.

Here, again, is a subject which deserves to be treated by itself. (1)

I had hardly recovered from my surprise, when I heard a well-known agronome say :

" In default of sufficient farmyard manure is it advantageous to employ commercial manures, such as guano, superphosphate, plaster, bone-dust, lime, ashes, &c. ? For the general run of farmers these manures are too costly, and there would be no profit in their employment. There is, however, one exception—ashes.....

Instead of these artificial manures, more satisfactory results are obtained from sowing clover-seed ; it is a very cheap fertiliser, and of the greatest service." (See " Journal d'agriculture," Sept. 1886, p. 144)

Clover-seed a fertiliser (!!!) and able to take the place of minerals, enriching the earth with salts of potash and with calcareous and phosphoric matters! Is not that an original idea ? It reminds one of the Mahomedan tradition, according to which from the dung of the elephant in Noah's ark was born a pig, which pig sneezed so powerfully that it gave birth to a rat. The latter theory is quite as good as the former.

On the same page, again, we read that :

With cattle, *one may be always sure of preserving* the fertility of the soil, by the *abundance* of manure the cattle yield.

Learn this, messieurs A. Kérouack and Ed. Pelletier, who spoke thus ; plants and animals consume instead of producing fertilising matters ; they carry off the assimilable elements of the soil instead of nourishing it, they exhaust the land instead of enriching it ; they take much to restore little, and they borrow a great deal but repay merely a trifle.

Might one ask, gentlemen, whence you draw your doctrine ?

To M. Marsan and his partisans I recommend the following work : " *Artificial Meadows*, by Ed. Vianne, director of the *Journal d'Agriculture progressive*, and of the *Journal des Campagnes*."

To give them a taste of the interesting things they will find therein, I will make a few extracts :

" This infatuation (for the legumens) threatened for a time to be fatal to our agricultural wealth..... We saw that the great yield which these forage crops produced on new land diminished rapidly after the lapse of some rotations, and that it could no longer be reckoned upon except on the condition not merely of restoring to the land, in manure, the equivalent of what the crops had borne off, but also of deferring the sowing of the land with the same plants until a long interval had occurred. This awakening was all the ruder since, trusting in the assertions of the greater part of the agronomes of the day, who declared (like M. Marsan) that the leguminosæ enriched the soil instead of impoverishing it, many farmers had pushed the cultivation of clover to the extreme, and had to acknowledge that they had been led into error.

This system of cropping is still carried on without method and without common sense, and it may be said of many that they borrow from capital to collect the interest. In a word, we are ruining the land for want of knowing how to manage it, and this *through trusting to old theories, the falseness of which has been fully demonstrated.* (Introduction.)

The old story, that the cultivation of clover improves the soil, has been so often repeated, that the majority of farmers believe that this plants fertilises the land by itself. This is a *very great and serious error*, against which they cannot be too earnestly warned." (p. 7.)

The author estimates that the quantity of nitrogen furnished by the atmosphere is equal to that of the ethereal, (*aérienne*) part of the plant alone, and he remarks that if we wish to maintain the fertility of the soil, we must, perforce, restore the minerals that constitute the framework of the plant. (1)

Referring to the arguments of Count de Gasparin (one of the authors quoted by M. Marsan), M. Vianne shows that the farmers has deceived himself. He founds his assertion on the data of the learned agronome himself, and he arrives at this conclusion : " Clover has not increased the fertility of the soil, on the contrary, in carrying off from it a great quantity of mineral matters, the soil has been considerably impoverished by the clover."

But it seems to me that the time has come to reply to one of the questions of M. Marsan : " Why did not M. Lippens long ago refute these *ignorant* authors, as well as several others whom I am about to point out to him ? "

For a very simple reason, M. Marsan ; it is because they were refuted many years ago, although your letters show that you were profoundly ignorant of the fact, and that your position is somewhat like that of the monk Alfus, who, after a nap of a hundred years, no longer recognised the neighbourhood of his own monastery. (2)

There is still, another reason : the authors you quote affirm without proof, or they refute their own arguments and contradict each other. If you require a proof of my assertion, you have only to say so. I will furnish you one in an early number of the *Journal d'agriculture.* It will be a nice investigation ; but a not less agreeable one would be to show what circumstances had thus led the majority of the agronomes of past times into such an error. M. Marsan, *after his conversion*, would be just the man to treat such a question.

I will end this letter with a practical example. M. Marsan is requested to assure himself personally of the truth of the following statements, which were given to me by a real, genuine farmer, M. Pierre Lippens :

" For the last five years, I have cultivated the Domaine de Rimouski.

I harvest, on an average of years, 1300 bushels of potatoes, 500 bushels of turnips, 450 bushels of carrots, 600 pumpkins, &c. Nearly half of these vegetables are consumed on the farm by the cattle.

I hardly grow 100 bushels of grain a year, all of which is eaten by the cattle, which have, in addition, all the hay

(1) If M. Lippens will look at the Rothamsted experiments, he will see that as long ago as 1848, this question was thoroughly sifted by Lawes and Gilbert. The upshot of the matter is that minerals alone added at the utmost 3 bushels an acre to the crop of wheat ; that nitrogen alone added from 6 to 8 bushels an acre, but that the two, minerals and nitrogen, combined raised the unmanured crop from 16 bushels an acre to 32 and 38 bushels The land on which the experiments were tried, had been thoroughly exhausted by a succession of wheat crops without manure. A. R. J. F.

(1) I do not understand what is meant by the *partie aérienne* of the plant. It has yet to be proved that the plant absorbs any of the free nitrogen of the atmosphere. Lawes, evidently thinks it does not. A. R. J. F.

(2) The monk Alfus is the French representative of the Yankee, Rip van Winkle. A. R. J. F.

own on the farm, and 1000 bundles of hay from the islands the Rimouski river, which islands never need manure.

I sow timothy and clover in abundance.

I haul, yearly, 80 loads of dung and ashes, and I use 300 bushels of fish for manure.

Every year, I buy $50 worth of bran and oil-cake.

I take every possible care of the manure made on the farm.

Now, all these resources together are not enough to maintain the fertility of the soil. The farm I cultivate is to-day much poorer than it was five years ago, in spite of its external appearance.

Several times have I called the attention of my landlord to the necessity of making a more complete restitution (*of the matters carried off in the crops.* Tr.). The farm yields well, but it is visibly growing poorer. The manure of my stock would be desperately insufficient to counterbalance the deterioration which the soil suffers through the sale of the produce.

The exhaustion of the soil is in direct ratio to the abundance of the crops. The farmer that preceded me grew nothing but grain and pasture. His harvests were insignificant, and he exhausted the soil less than I do."

M. Marsan quotes the exemple of a Scotch farmer at Rawdon (Montcalm), whose land had every appearance of fertility, and seemed to be in a splendid state of productiveness. Thanks to a "*meliorating rotation*" the farm did not exhaust itself, and always gave good crops.

A Canadian bought the farm, sowed grain after grain, and in a few years found himself without hay, without pasture, and ruined. Why did he suffer so disastrous a check?

I am tempted, in comparing these two examples, to think that, thanks to his intensive cultivation, (1) it was the Scotchman who wore out the land, and who was crafty enough to sell it after having nearly if not entirely ruined it.

The Scot seems to me to have pushed into activity all the vital forces of the soil and of the subsoil, and have left to his successor the duty of extricating himself as he could after one or two good crops.

M. Marsan is not of that opinion, par exemple. In his eyes, the Canadian is the culprit.

Farewell, till next month.

Your obedient servant,

B. LIPPENS.

December 5th 1886.

(*From the French.*)

Ensilage at the Experimental Farm.

M. J. de L. Taché, the active and zealous secretary of the Dairymen's Association, has sent me the following questions as to the ensilage I have made at the experimental farm I started, two years ago at Three-Rivers. I think it right to lay both questions and answers before my readers.

The longer I live, the more I regret that my means do not allow me to carry out in a more satisfactory manner the experiments of which the *Journal d'agriculture* feels the want more and more every day. It is full time that the public interests itself in this important matter of the establishment of experimental stations under the superintendence of the provincial government. These stations alone can keep the public well informed about the questions which concern the development of our agricultural wealth.

(1) The phrase "*culture intensive*" has been for some years almost English. Well, the French talk of "*un gentleman*," "*le stock*," "*le turnep*," &c., so why should not we borrow in our turn, as, in truth, we have done many a thousand times before?

A. R. J. F.

QUESTIONS AND REPLIES.

1. *Q.—How long have you been making ensilage? Please say what changes in your method experience has taught you to make.*

(1) This is the first year.

I see, at present, no reason to make any alteration in my method, except that, for the future, I shall lessen the weight of earth on the top of the silo, and draw up the carts above the silo, in order to unload more quickly.

2. *Q.—How is your silo built? (a) Materials (b) Dimensions. (c) Foundation. (d) Sides. (e) Means adopted for the exclusion of the air?*

(2) As a shed, attached to the barn and the stables.

a Posts 9' x 3", (1) 24" from centre to centre, old common boards, not tongue-and grooved, nailed to each post, on both sides; the space between the boards filled with dry sand, taken from the bottom of the silo. I believe that any earth, without stones, would do as well as sand; though, no doubt, spent-tan or sawdust would be better.

b 13' x 15' (2) inside measure, and 16' in height, four feet *in* the ground. (One of my siloes holds 100 loads of green forage, half of which is buckwheat not cut up, but just as it left the field—about 75 tons of ensilage altogether.)

c It rests on the sand. I placed a flat stone under every post. The bottom was dug out in the middle 18" deeper than at the sides, and covered with a layer of beaten clay, which had previously been moistened. This bottom must be perfectly impermeable.

e The top is covered with two ranks of boards, laid anyhow, but in such a way as to break joint. The whole is covered with about 30" of bog-earth which when we drew into the barn was rather wet. When it is dry, I shall throw it into the manure-pit attached to my two siloes as fast as we uncover them.

3. *Q.—How much did your silo cost?*

(3) All the wood in the sides and roof are part of an old shed which I bought close by, and cost me about $25.00 delivered. The building of my two siloes (of the same dimensions) with the digging out, took a man 25 days.

4. *Q.—What kind of forage have you ensiled?*

(4) About half buckwheat and half Canadian corn.

5. *Q.—How was the silo filled? (a) Cutting in the field. (b) Carting (c) What length in the chaff-cutter. (e) How was it raised into the silo?*

(5) The buckwheat and corn were cut with a two-horse reaper, which did its work well. The buckwheat, the grain of which was completely formed, was a very heavy crop. Two rows of corn were cut at a time—26 inches from row to row.

b. In carts and pair-horse waggons, loads of 1,500 lbs. and 2,000 lbs respectively. I left the forage in *gavels* (1) at least 24 hours, so as to evaporate part of the enormous quantity of water these plants contain—from 80 °/₀ to 86 °/₀, at least. I reckon that, by this means, I lessened the weight of the loads by from 10 °/₀ to 15 °/₀; but the scales can alone establish these *approximations*—incorrect enough, very likely—which I am compelled to give in these my answers.

c The buckwheat was not passed through the chaff-cutter. The corn was cut into inch-lengths. A good 2-horse chaff-cutter would do about two tons an hour if the men could keep it well supplied. Mine cost $45.00.

d My chaff-cutter is placed on level with the siloes, about 8' above the barn floor, where the carts unload, to supply the instrument. Were the carts brought to the level of the top of the silo, the men's labour would be one-third less. I

(1) The old English word *gavel*, a heap, answers perfectly to the French *javelle*, from which, however, it is not derived. A. R. J. F.

hope to attach an endless web to my cutter to carry the cut silage into the middle of the silo, which will save the work of one man.

6. *Q.—How was the fermentation conducted. (a) Time occupied in filling the silo. (b) Hinderances in the work. (c) Pressure applied?*

(6) We began with the buckwheat, 48 hours after it was cut. The gavels in the field had already begun to heat when we carried them to the silo. The first layer, 36" deep, thrown in with a fork, just as it came from the field was only trodden down for about a foot round the edges to pack it tight against the walls of the silo. In 48 hours, the thermometer indicated 125° F at about one foot below the surface; we then added another layer of about 36", thrown in as above. And thus we proceeded with layer after layer. These latter on an average heated up to 125° F. in 30 hours. Each layer of 36", on an average, only raised the height of the silage by one foot.

Eighteen or twenty days after entering the first layer of buckwheat, we had apparently filled the silo by a layer of 1-inch cut corn 20" deep. It had been in gavels for about 48 hours. The next day but one we added a new layer. Thus dealt with, it took 8 or 10 layers of corn to thoroughly fill the silo, the sinking or packing, (*tassement*) going on of its own accord in a surprising manner. With the corn as with the buckwheat, we allowed the heat to rise to from 125° F. to 150° F. before adding a new layer.

c The only artificial pressure used was given round the walls of the silo to fill up any possible interstices.

7. *Q.—How did you cover the silo?*

(7) See answer 2 *c*.

8. *Q.— How much weight to the square foot?*

(8) 30" of wettish earth.

9. *Q.— When did you close, and when did you open your silo?*

(9) Began to fill about the 27th August; did not finally close till October 2nd, and on the 4th or 5th of that month the earth was placed on the cover. We opened the silo on the 11th of November.

10. *Q.—In what state did you find the ensilage? (a) Colour. (b) Smell. (c) Loss at the sides and top?*

(10) The corn was a little less green, and the buckwheat browner than when they were ensiled.

b Pleasant; vinous.

c No appreciable loss.

11. *Q.—What is the weight of your silage per cubic foot?*

(11) I cannot tell until I have weighed it at different depths.

12. *Q.—In what way have you used your silage for cattle-food, and specially for milch-cows? (a) How much per head per day? (b) Mixed with what other foods? (c) Have you let the mixture heat? (d) Give the results.*

(12) About 35 lbs. or 40 lbs. per cow, mixed with unthreshed oats and beans—haricots—both passed through the chaff cutter. The oats and beans were partially cooked and mixed with the silage.

a The results seem satisfactory, but very careful experiments are required to establish the value of the silage, as compared with roots, for instance.

13. *Q.—How many tons of forage have you grown per arpent?*

(13) An arpent of good land, well manured, I *estimate* to yield from 12 to 15 tons of buckwheat, and from 20 to 30 tons of Canadian corn. Unpropitious circumstances have prevented my gaining an exact knowledge of the yield of mine this year. I hope to be able to do so next year.

Under favourable circumstances, with proper manures, I believe it to be possible to grow, even on naturally poor land, 8 or 10 tons of green fall-rye, and 20 to 25 tons of Canadian corn, the same year, on the same arpent.

14. *Q.—How much does a ton of silage cost? Calculate (a) Cultivation. (b) Cost of ensiling. (c) Interest on the purchase of the land (rent), and on the cost of the silo?*

(14) By means of special implements (two-furrow plough, harrow, cultivator, and grain-and-manure drill, sowing three rows at once of both seed and artificials), I believe that an arpent of corn cost me, for cultivation, about $6.00. The dung is rich, but it is expensive. I spread 15 tons an arpent with the manure distributor of MM. O. and A. Desrosiers. I calculate that this dressing costs me $40.00.

To grow first rate crops I require in addition:

100 lbs. of sulphate of ammonia	$3 50	
200 lbs. of superphosphate	2 50	
500 lbs. of unleached ashes	1 50	
200 lbs. of plaster	.75	$ 8.25
Harvesting and ensiling 30 tons of forage, about		12.00
Dung as above		40.00
Cultivation		6.00
		66.25
Less value of manure for subsequent crops		20.00
		46 25
Plus rent, interest, &c		3 60
		49.85

Cost of a ton of ensilage, $1.66, supposing 30 tons to be the produce of an arpent. The calculation is, that a ton of ensilage is worth one-third of a ton of hay. At the above rate the equivalent of a ton of good hay would cost about $5.00.

It must be understood, that the above calculation is only an *estimate* of that which it seems to me to be possible to accomplish, and not the result of our experiment this year.

15. *Q.—What sort of corn have you grown?*

(15) The white Canadian corn, which grew this year from 6 to 8 feet high, in spite of the exceptional poverty of the soil. Without manure this land would have hardly yielded 12 bushels of oats an arpent.

16. *Q.—Describe, please, the method of cultivation.*

(16) The land was ploughed, with a two-furrow plough and a pair of horses, about 6 inches deep—at least 3 arpents a day. Drills, 26 inches apart were then drawn; the dung was then spread, and covered with the harrows. Next, the grain-and-manure-drill sowed and covered three rows at once with seed and artificials. Quantity of seed, one bushel of corn per arpent. This is twice as much as is wanted when the seed is good. In future, I intend to spread the manure before the first ploughing, when a second ploughing will mix the whole soil and dung together.

I am a great advocate for the use of artificial manures. They have a quadruple effect: (1) they ensure a rapid and strong *braird*: (2) The crows are kept off by their pungent smell; (3) they hasten ripening; (4) they manure the land as well as a half-coat of dung.

17. *Q.—What, in your opinion, is the part that, in the future, ensilage will have to play in connection with the dairy-industry?*

(17) I have not had sufficient experience to decide absolutely. Still, I trust that ensilage, well made, will render great service to agriculture, especially in providing winter-food for dairy cattle.

These answers, I regret, given to the best of my ability, are only approximative. We shall never arrive at a certain decision on the matter till after a series of experiments made with the greatest care; and these experiments can only be carried out with the necessary exactitude at experimental stations. It is only there we shall succeed in obtaining comparative results as to the benefit to be derived from the use of ensilage, on the one side, and of roots, clover, &c., on the other.

And it is also only at well managed experimental stations that the different agricultural problems of vast importance that are now awaiting solution, can hope to find their ultimate elucidation.

Ed. A Barnard.

(From the French.)

OUR ENGRAVINGS.

Black-faced ram, "Seventy-Two."
Short-horn bull, "Royal Ingram."

The Black-Faced Ram, "Seventy-two."

The Black-faced Scotch sheep is undoubtedly the oldest breed in Scotland, if not in Great Britain, as it is known to have existed several centuries ago; but, as in the case of all other old breeds that have persisted until our day, considerable improvements have been made in it, as agriculture has advanced. It is a horned breed, the horns of the ram being quite massive and spirally curved; the face and legs are black, the eye is bright and the body square and compact, with good quarters and a broad saddle. The animal is small and the wool rather hairy, the weight of the carcass averaging about 65 pounds when three years old, and that of the washed fleece about three pounds. The mutton is of excellent quality with a peculiarly fine flavor; and the wool is well adapted to the manufacture of coarse cloths, carpets, blankets and rugs.

Black-faced sheep are active, muscular and very hardy, having been for centuries accustomed to the privations of life inseparable from exposure at all seasons upon the bleak and storm-beaten mountains of Caledonia. They instinctively anticipate the advent of a storm, and seek lower ground and shelter, often a day or two before it arrives. During snow storms they instinctively herd together, and when completely buried by the drifts, they manage to pick up a livelihood on the scanty herbage until the shepherd finds and releases them. For mountain sheep they are very docile and are easily cared for with the help of a collie dog; though they can shift for themselves pretty well in emergencies. They are kept in large flocks, sometimes of several thousands. The ewes are excellent and very affectionate mothers, and the lambs survive an amount of cold and hunger that would be fatal to the young of any other breed. The breed can be improved in size and fleece by better conditions and a judicious breeder; but it thrives best under the conditions to which it has been immemorially exposed; and a change of surroundings would, doubtless, cause it soon to lose the qualities which constitute its chief value. Over 40 years ago several importations of the breed were made into this country, but other breeds, with larger bodies, and heavier and finer fleeces and adapted to a wider range of conditions, have attracted so much attention that the Black-faced sheep have been neglected, although well adapted to exposed mountain localities and the unsheltered plains of the Northwest.

We give an illustration of a very fine specimen of this breed, re-engraved from one of an excellent series of original portraits appearing in our esteemed contemporary, the London Live Stock Journal. It is the Black-faced ram "Seventy-Two," the property of Mr. Charles Hawatson, of Glenbuck, North Britain, whose flock is thought the best of this breed in existence. "In size, character, conformation, wealth of wool, and meat, he is equally remarkable; as nearly perfect as could very well be attained." He has had a unique and unbroken show-yard experience, having won five first and champion prizes at the shows of the Highland and Agricultural Society of Scotland, in 1883, 1884 and 1885.

A SPLENDID BULL.

Red Short horns are in greatest demand by those who do not make a careful study of pedigree and actual merit. It is a fact, however, that the deep red cattle are not always the best. At the fat stock shows, the Short-horn winners have invariably been red-and white. The solid reds make the finest appearance to the ordinary eye, but when they come to the real test, the butcher's block, they fail. The flesh is inclined to be tough and close-grained, with the fat laid on in pads without the "marbled" meat so much desired. At p. we show an animal of which the London Live Stock Journal says:—"During the past two seasons, he has been universally regarded as the best bull of his age in the country." This animal, Royal Ingram 50374, is the property of Mr. William Handley, of England. He was calved January 6th, 1883, and is by Sir Arthur Ingram 32490, out of Harmony. He has taken many prizes, notably that at Preston, where he was declared to be the best Short-horn bull in the yard. As will be seen, he is red-and-white in color, long and square, with short neck and legs and splendid hind-quarters

R. New Yorker.

Mr. Hale's letter.—In the last number of the *Journal of Agriculture*, appeared a letter containing several observations and suggestions which his long experience in the county bordering on the St. Francis has led him to make. Mr. Hale, in the first plan, complains that all his efforts to grow apples have proved useless, and he, very rightly, attributes his failure to the presence of protoxide of iron in the subsoil. Just the same cause prevents apple-culture from being successful in this Sorel sand. The trees take well enough; they flourish for a time, and then die away. And yet, this failure is not universal. On the main street of Sorel, leading to the S. E. R. station, there are half a dozen apple-trees of great size that have been planted more than 25 years, and are still bearing fair crops at least every alternate year. The cause of this limited success is an absolute mystery to me; but the cause of the general failure is, I have no doubt, just what Mr Hale assigns as the cause of his apple-trees refusing to survive: *Protoxide of iron* is the *black* rust, and the soil is full of it.

As for Mr. Hale's excursus a deep vs. shallow ploughing, my ideas are simply these: we do not dig our gardens shallow; why should we treat our fields differently? Seven or eight inches deep of pulverised earth will hold moisture enough to support vegetation, when with only five inches the plants might perish for want of humidity. The great mistake that is usually made by those farmers who believe in deep cultivation is, that they go to work too hurriedly and bring up a lot of raw subsoil in ploughing for a grain crop. The plough-furrow should be deepened by degrees, and the increased depth should be obtained before planting roots, or Indian corn, both of which crops are invariably manured for. I am a very old farmer, and have seen all sorts of men and countries, but I never saw deep-ploughing conducted in this fashion that did not greatly improve the productive powers of the soil. Subsoil ploughing would be a better practice still, but I need not tell my friend, Mr. Hale, that its costliness here puts it out of the question. Two ploughs, six horses,

two men, and a boy to drive the horses in the subsoil plough would be an expensive charge for an acre of land; and I never saw more than ¾ of an acre got over in a day yet with this equipment.

But, pray, do not plough *flat*. No harrows, however sharp the tines may be, can get hold of a flat furrow.

ARTHUR R. JENNER FUST.

Sherbrooke, January 14th 1887.

Dear Jenner Fust,—In answer to "F. R." who asks for a reason why at certain seasons it is difficult to make butter come. I would say that your article in the last May number of the Journal, page 67, seems to make the matter clear, when you advised feeding a mixture of fou pounds a day of mixed peas, oats, and linseed during the winter months. For many years I have avoided this trouble by giving to each cow as a warm drink either 3 or 6 pounds of fine shorts a day. This year, having a quantity of carrots I tried them instead, feeding them whole, with fine early-cut meadow and clover hay, soon however the old trouble returned, and starting with the cream exactly at 60° F. six long hours were spent in vain. I then tried the Devonshire plan with great success, but wishing to ascertain if possible wherein lay the first difficulty I tried once more the old plan with the same result as at first: the butter globules would not burst, so I began experimenting, putting the churn out just as it was over night, I brought it in with the cream frozen stiff. Leaving it to thaw out, I waited till the cream had risen to 60° and then on turning the handle for *five minutes* the butter came. Next I took fresh cream and froze it in a bowl, when, on being brought to the right temperature, butter came in eight minutes. Now, may it not be that freezing and heating have the effect of bursting or weakening the casein-sacs that envelop the butter globules? Abandoning the carrots, and substituting 4 quarts of bran a day to each cow, given in a warm mash, I began saving by itself the cream from the cows, *commencing on the day* the change was made, bringing the cream as usual to the temperature of 60°. Note the result: in thirty minutes, about *half* the butter came, was taken out, washed and salted, and in fifteen minutes more churnining the remaing half was gathered. Since then, on bran mashes and hay I have had no more trouble, twenty five minutes being the average time to get the butter to the granulated state, and the date of the time when the cows calved is of course more distant than when the butter first refused to come.

W. A. HALE.

TO ARTHUR R. JENNER FUST.

I read with great pleasure M. B. Lippens' article on "The Enrichment and Impoverishment of the soil" in your last number. I think he has struck the right key note, when he says we cannot keep our farms up without imported manures. But is he aware that the Government charge a duty of 20 % on all imported commercial fertilisers. Which, in most cases, is equal to about $7.20 per ton. Canada is the only country I know of where a duty on fertilizers is imposed. Surely our farmers are not so much better off than those of other countries that they can afford to pay such a tax to the government for the privilege of improving their farms. As all soils are not wanting in the same plant food, what does great benefit on one piece of land may show no results on the next. So that in using commercial fertilizers, the farmer ought not to say they are worthless because they do not show good results on his land, until he has tried several kinds. As the case stands at present, after he has tried the so called superphosphates manufactured in this country and found them of no use to him, if he wants to continue the search till he does find what he requires, he will have to pay the government a heavy tax for the privilege of doing so.

And yet people wonder why the farms in this Province are so worn out? Let the government take off the tax and encourage the use of fertilizers, and we shall have a different story to tell in a very few years. FAIRFIELDS.

Cash value of 1 ton of turnips. (1)

The *Agricultural Gazette*, of England, (Jan. 13th, 1887,) state that one ton of turnips produces an average of fourteen lbs. of live weight increase in flesh. Thus, at 3½c a lb. for such meat, a ton of turnips in this country would only produce 49 cents. When meat sells for 5c a lb live weight, the value of turnips would amount to 70c a ton of 2240 lbs.

The manurial value of such turnips the Gazette estimates at $1 00 (4s, stg) However, for with the farmer who feeds his produce, the net value only must be considered, as he must manure his field in order to obtain the turnips, and such manuring represents actually more fertilizing element than can be returned in the crops.

What says A. R. J. F.? *Quebec.*

A. R. J. F. has to observe that if a ton of turnips will not make more than from 49 cents to 70 cents worth of meat, it will not answer to fat beasts on turnips alone in this country. More; he believes that, as he has often said in this Journal, to fat beasts at present prices is a losing concern never mind what the food given them may be. A R. J. F. calculates the loss on every bullock fatted at $14.00; and this must represent the value of the dung left behind. (v. J. 1886, p. 123.)

Mr. E. W. Stewart, in his book on feeding animals, gives the value of swedes as $3 00 a ton. And allowing twenty tons an acre to be a fair crop, this would give $60.00 for the value of the swedes.

As for "Quebec's" allusion to the manurial value of the ton of swedes, A. R. J. F. would wish "Quebec" to observe that if the manure given to the land for the growth of the crop be reckoned, the manure produced by the consumption of the crop must be also in its turn credited to the crop.

A. R. J. F. would refer "Quebec" to the article on growing turnips and its cost—this was in the printer's hands before "Quebec's" letter was received.

(1) When English people talk of "turnips," they mean *white turnips*, which are very inferior in value to *swedes*. A. R. J. F.

NON-OFFICIAL PART.