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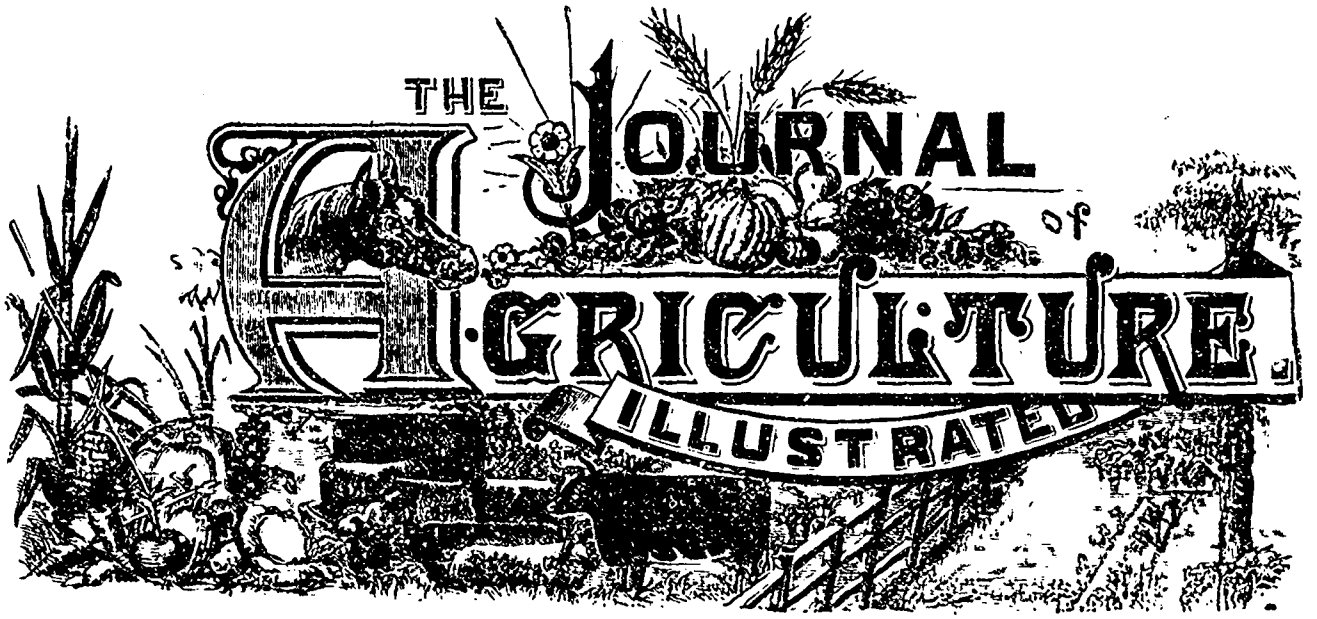

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OFFICIAL PART.

Table of Contents.

The Quebec Dairymen's Convention, 1887.

The next annual meeting of the Quebec Dairymen's Association will take place at Three Rivers, on Wednesday and Thursday, the 19th and 20th January next, 1887. Most important matter connected with dairying generally will be discussed. All interested are invited to attend. Address at once to J. de L. Taché, Secretary, St-Hyacinthe, for members' certificates, securing reduced railway fares, etc.

CLOVER.

It was with a good deal of pleasure that I read an article on "Récoltes améliorantes," in the French number of this Journal for October. M. Lippens, the author of the work in question, has evidently kept himself well informed as to the progress of agricultural knowledge during the past few years. *Words* are nothing to him: facts are all he cares about; and he speaks out like a man who has made up his mind on the matters he treats of. A translation of M. Lippens' article will be found on page 179 of this number.

And, now, let us see what was the opinion of our predecessors as to "meliorating crops;" and, first, what did the Romans, the most attentive of all nations to everything relating to husbandry, think about them? Repeated observations convinced them that besides the alternate resting of the land under summer-fallow, "wheat might," as is observed by Pliny, somewhere about A. D. 110, "be sown after lupines, vetches, beans, or any other plant which has the quality of *fertilising* and *enriching* the soil." How these plants, all *leguminous*, be it observed, possessed this quality, Pliny does not stop to tell us.

Again, I find, in an old work on agriculture dating from about the beginning of this century, the following words: "It has been discovered by modern cultivators that some sorts of crops, such as beans, pease, clovers, and all other plants of the *pulse* kind, are *enrichers* of the earth; while wheat, barley, oats, and rye, together with the whole tribe of vegetables, whose roots are fibrous and spread far, impoverish and rob the ground. It is therefore evident, that by judiciously interposing such green or other *enriching* crops as are adapted to the soil between the grain crops, the farmer may not only, in a great measure, avoid the necessity and expense of fallowing, but frequently be enabled to reap better crops. Besides, under this system of management, he may be enabled to keep a much larger stock of cattle, and consequently produce a much greater quantity of manure, the advantages of which are very great." Here, again, the writer does not stop to tell us how the *leguminosæ*, or pod-bearing plants, are gifted with the power of enriching the soil, but

satisfies himself, and no doubt his readers of that early time, with the simple statement that it is so. Like the learned professor, quoted by M. Lippens, he has no doubt on the subject.

These are the statements that have misled so many people who, unfortunately, are guided by authority, who never think for themselves, and who, in consequence, are continually wandering about in search of rules to lead them. It is the often repeated story of *humus*, so long a deity worshiped by the semi-scientific farmer, which, I regret to see, is still enjoying some degree of vogue, and causing the transportation, at a vast expense, of millions of tons of bog-earth from its site to the compost heap, and thence to the land to be manured.

As M. Lippens takes red clover as a sample of the meliorating crops, I shall follow his lead, and try to show what the real effect of that plant on the succeeding crop is; to what this effect is due; and how to treat the land so that it may derive the greatest benefit from the cultivation of this, the most valuable of all our *artificial grasses*. (1)

And, first, what is the real effect of the clover plant on the succeeding crops of grain?

In England, a good crop of red clover is invariably followed by a good crop of wheat; of course I bar accidents, wire-worm, &c. An equally good crop of white-clover, trefoil, and Alsike, mixed, is *not* invariably followed by a good crop of wheat, even if the weight of the clover be the same. And, yet, the constituents of the one are about the same as the constituents of the other:

	Ash.	Albuminoids.
Red-clover hay..	6.0	13.5
Trefoil hay.....	6.0	14.6
White-clover hay.....	6.0	14 5
Alsike hay.....	6.0	15.0

In fact, white clover and Alsike are rather richer in the only two constituents that need concern us than red-clover! So it is clear, that whatever food produces the above-ground material of the crop of the different sorts of clover, the use they make of it is about the same.

But, if we look at the underground growth of the plants, we shall at once see a mighty difference. Turn to the third volume of the Journal, and on page 173 you will find two engravings, one of the Alsike and the other of the red-clover—the Alsike, by the bye, has about three times as many roots and twice as much crown as any Alsike plant I ever saw, but let that pass.—What difference do we find in the *roots* of the two sorts? The Alsike has a lot of fibrous roots, which evidently are intended to feed on the upper layers of the cultivated soil, while the red-clover has but few surface roots, but an immensely long stout tap-root fitted to descend deeply into the subsoil, and bring up thence the nitrogenous as well as the mineral riches that there abound in, practically, inexhaustible abundance. Lawes, long ago, showed, by his exhaustive experiments, that nitrogen is the impressive manure for wheat, and here we have the solution of the invariable success of wheat after red-clover.

There is, indeed, a mystery about this invaluable plant which, as yet, no one has been able to solve. No manure out of the thirty-four different kinds tried at Rothamsted seems to have any effect on its persistent reluctance to grow if sown more than once in twelve years on land that has been frequently cropped with it. As for its 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, except as regards the carbon, which, as a manure for the succeeding crop, is utterly insignificant in value; the air always supplying it in abundance.

At Rothamsted, every known method has been pursued to find out why red-clover will not grow continuously on the same land. On a piece of land, long cultivated as a garden, clover *was* grown, without any further manuring, for twenty-eight years in succession; but not so on ordinary farming land. In 1848, having some acres in clover, Sir John Lawes determined to apply a variety of manures to the crop, and to re-sow it if it died away. After twenty-two years, feeling tired of wasting money on several acres of land without arriving at any definite results, the experiment was restricted for the next ten years to a few square yards, and the succeeding ten years gave no more successful results than the twenty-two years that preceded them.

Again, in order to try whether the land was only red-clover-sick, or whether it would refuse to grow any other crop of the same order, Lawes sowed three red-clovers, three white-clovers, two yellow-clovers, *trifolium incarnatum* (crimson-clover), red-sainfoin, pink-clover, Bokhara-clover, and the purple vetch: every one of these had the opportunity of feeding on *thirty-four* different combinations of manures, each of which combinations differed more or less from the other. The results of this experiment, carried on during several years, is as follows: Five of the different crops grown, viz., sainfoin, tares, Bokhara clover, lucerne, and trifolium, under every one of the thirty-four different manures, were good, and even very good; four of the other crops have the large majority good or even very good; four have the majority bad, but the only crop which is bad throughout the whole of the thirty-four varieties of manuring is the ordinary red clover!

In another field, where an experiment on an ordinary four-course rotation of turnips, barley, red-clover, wheat, was commenced in 1848, and carried on, without any application of manure to the soil from that day to the season 1883, the following results were arrived at:

The third crop in the rotation was red-clover, and a very large produce was carried off, but, as usual, when the attempt was made to repeat the crop after an interval of four years, it failed. Beans were then tried in place of clover, and they were repeated every fourth year till 1873, when red-clover was sown with the barley. The crop was not diseased in any way, and it stood the winter, but there was no active growth; and the hay, which was cut three times, only weighed 1½ ton per acre. Beans were sown in the fourth following year, and red-clover was again tried with the barley in 1881; the crop, as on the previous occasion, stood the winter well, but the produce was very small, and would hardly bear the expense of cutting.

In another experiment, in the same field, where the turnips in the same rotation received a very liberal application of artificial manure every fourth year from the commencement, the clover was an exceedingly large crop. When this land was first put under experiment, in 1848, it was in rather high condition; the failure of the clover crop when repeated in the seventh year could not therefore be due to want of food in the soil, as in the interval between 1854 and 1874 the removal of twenty unmanured crops must have greatly impoverished the land, yet Lawes still obtained a crop, though a very small one; and even eight years later than that date the crop was not diseased.

Hence we draw the following extraordinary deductions:

The clover disease is not due to the poverty of the soil; and that it is not due to richness of soil is proved by the success of the clover crop when grown continuously on a rich garden soil.

And this disease of the clover plant is not a new thing by

(1) Of course, clover is neither artificial nor a grass, but the phrase is the ordinary one. A. R. J. F.

any means. As long ago as 1790, I find, "that in Hertfordshire, England, farmers have cultivated the *red*-clover so long and so repeatedly (every fourth year) that the soil is, as they say, sick of the plant. It matters not how fine a plant may be in the autumn, it dies away before spring. Mr. Keate had a proof of the benefit of not sowing it for one or two courses consecutively. Having part of a field for five or six years under lucerne, when it was broken up, barley and clover were sown over the part which had been under lucerne, and also over the rest of the field which had borne clover in the usual rotation—every fourth year—where the lucerne had been, the clover was extremely thick, fine, and regular; on the rest of the piece it was a perfect failure, and was ploughed up."

Again, in the report on the agriculture of Norfolk, same date, we find that "thirty years ago (1760) they had for some time found their clover crop failing, from its renewing too often; this caused the variation of substituting trefoil for one round, and the clover being sown but once in nine years, the evil was removed. And he found the same account every where in the south of the county, that the land, whatever the soil, was what they call *sick* of clover. Formerly it was sown every fourth of fifth year, but now, if it returns so often, it fails for acres together.

All over the Eastern counties of England, on the finest as well as on the poorest soils, the same disease exists to-day. The only chance the farmers have to secure a good crop of red-clover is to sow it only once in twelve years, and thus the old monotonous round of the four-course system has been converted from

Turnips, barley, red-clover, wheat;
into Turnips, barley, red-clover, wheat;
Turnips, barley, trefoil, wheat;
Turnips, barley, beans, wheat.

I think, therefore, after all I have brought before my readers on the subject of this dire malady, that I have a right to say that the frequent recurrence of the red-clover will ultimately lead to its refusing to grow at all.

And having, I hope, settled this part of the question, let us now see how we should treat the red-clover crop in order to secure the greatest benefit from its cultivation.

Seed and sowing.—The seed of red-clover is large, full, glossy, and of a bold purple colour. The usual weight is 64 lbs. per imperial bushel. When sown alone, for a one season's crop, the grant or Rawdon clover should be chosen. Fourteen pounds are plenty for an acre in good tilth. The ordinary seed-box answers very well for sowing this seed, and, if the ridges are of ordinary width, I should recommend the sower to sow two half ridges at a time with 7 lbs. to the acre and then cross the land with the remainder. This will save blanks, and a vacant spot in a piece of land that is to be untouched for at least two years is no joke. Not only will it bear nothing, but it will be a famous nursery for weeds. Why seeds succeed better with barley than with any other grain crop, I do not know, but experience says that they do.

If the season be a very forward one, I should not sow clover at the same time as I sowed the grain, but wait till the latter was three or four inches high, and then harrow the small seeds in with a pair of light harrows and roll immediately. I like the grain to get a fair start of the clover in good soils, as sometimes the latter is so luxuriant at harvest-time that it materially interferes with the drying of the lower part of the sheaves. There is no fear of light harrows injuring the grain-crop; on the contrary, the stirring will do it good.

If the season be an ordinary one, and the barley or other grain sowing be, in consequence, deferred until the middle of May, the clover-seed should be sown before the last stroke of the harrows, and the light harrows used for covering it. It do not care to cover the seed more than half-an-inch deep. Roll, in this case, when the grain is well up.

In the fall, keep all animals off the young seeds, particularly sheep and horses.

In the following spring, as soon as the land is fairly dry, pass a *bush-harrow* across the ridges, and a week afterwards, roll, in the same direction, with the heaviest roller you can find.

Mow the crop when the majority of the heads are in full bloom. In this part of the country, this will generally be about the fifteenth of June. The second crop will be ready, on an average of years, by the tenth of August, and if the season be not too dry, a fair cut may be begun for green-meat, by the first week in October. Is this treatment better for the succeeding crop of grain than one cutting and then pasturing? I think so, I have always found that the roots of the red-clover increase in bulk below ground in proportion to the growth of the stems above ground. And this is a very old feeling in England. At Ware, in England, Mr. Whitting, writing in 1796, "has no doubt about it; better wheat is grown after two mowings than after one." Mr. Clarke, of Sandridgebury—1800—"always finds his wheat better after two mowings, whereof the first is for hay, the second for seeds." Mr. Biggs, near St. Albans, "grows better wheat after mowing than after feeding, and better after two mowing than after one, and this general superiority has amounted to four or five bushels an acre."

For experiment sake, let any one take two acres of clover, keeping one closely fed all the summer, and mowing the other as often as the heads come into bloom, that is, when the plant has attained its greatest height—and, after carefully selecting a yard square of average quality in either piece, dig up the roots, say, two feet deep, and weigh them separately. I think he will be convinced that the *amelioration* of the land from this crop is owing to the riches brought up from the subsoil by the roots of the clover-plant, and not to the imbibition by the leaves of the free nitrogen of the atmosphere. (1)

ARTHUR R. JENNER FUST.

(1) Not a very clear or logical exposition of the subject, I fear, but I have been very "seedy" for the last few weeks.

MELIORATING CROPS.

Quebec, August 25th, 1886.

Certain persons have conceived the idea, that there are some crops that have the peculiarity of improving and enriching the soil that supports them; this peculiarity is more especially attributed to the leguminous crops in general, and more particularly to red-clover. The crops, they say, derive nothing, or hardly anything from the soil, and thrive almost entirely on matters absorbed from the air... from the atmosphere. Starting from this principle, they lay down a distinction between exhausting and meliorating plants, and assert that it is sufficient to maintain a proper proportion between the cultivation of the two kinds to preserve the fertility of the land and even to increase it, the deficiency caused by the one being restored, and more than restored, by the residue of the other remaining in the soil. To this principle may be referred the system of rotations which pretend to maintain the soil in an indefinitely improving condition, and even to progressively increase the crops derived from it.

I happened, one day, to have a discussion with a young man on this point who sustained, tooth and nail, the above theory, asserting that he had learned to trust in it from what he had heard during his attendance at one of our agricultural schools. Whether this was true or not, I do not know, but

I fancy I recognise the same teaching in a lecture given by a certain professor of agriculture at the meeting of the Dairymen's Association, held at Saint-Hyacinthe on the 16th January last. My readers may judge of this from the following extracts taken from the fourth report of the Association in question :

" A *rotation* is the succession of plants which follow one another on the land during a period of years at the end of which the course of cropping is resumed in a constant order which enables the land to produce the greatest possible amount without its fertility being impaired, and even sometimes enables it to regain that which it has lost by a too extended production of exhausting plants " (Page 79.)

" Other plants have the property of resting the soil, and of helping to economise its resources : they are those which extract from the land but little nourishment." (Page 81.)

The author makes special mention of *red-clover*, which, says he, " extracts the greater part of its nourishment from the air, and restores (*rembourse*) by its roots to the land more than it has drawn from it." (Page 82.)

" The remains of red-clover constitute in the soil a manure which *maintains* its fertility, to the profit of the succeeding crops." (Page 82.)

" An instance of a rotation with successive crops .

1st year, cattle-roots manured ;

2nd year, barley or wheat, or both ;

3rd and 4th year, red clover, or a mixture of clovers and American tares ;

5th year, wheat, or oats, or maslin (oats and pease), according to the quality of the soil."

This rotation is a *meliorating* one, since it comprises three *meliorating* crops against two *exhausting* crops."

The author, though he does not expressly say so, evidently classes *red-clover* among the meliorating crops.

I beg to state, with all humility, to the learned professor and to all of his way of thinking, that the doctrine is an erroneous one. Were this theory true, the plants, which borrow nothing from the soil, would grow as well on a bad soil as on a good one, on a suitable soil as well as on a soil not adapted to their wants, the preparation of the land would be only a work of extra refinement, even were it not entirely useless. Now what does experience teach us ? If the land is rich and well prepared, the clover crop yields well. In the opposite case, the yield is insignificant. If the upper layer of the land only is rich, the clover starts well, but fails when the roots reach the inferior subsoil. Nevertheless, the ambient air is the same every where. Then, the clover must find its food both in the soil and in the air, like all other plants, it yields more or less abundant crops, as the soil is more or less suitable to its growth. All the world knows that ! " But," say they, the food matters furnished by the soil to the pod-bearers, are much less in quantity than those it furnishes to the cereals and the root-crop." Unfortunately, it is not so at all. Burn any plant you please, and you find that ashes remain, these ashes represent the mineral matters furnished by the soil. The heavier the crop, the more abundant are the ashes, and the proportion between the combustible and the incombustible parts of which the different species are composed, will show us if the loans levied from the soil are much greater as to one plant than as to another.

The subjoined figures show that red-clover demands for its development large amounts of mineral matters. The proportion of mineral matters of certain plants to their general composition is as follows :

	p ct.
Hard wheat	2.22
Soft wheat	2.12
Barley	3.10
Oats	3 25
Rye	2.60
Pease	2.10
Vetches, tares, lentils	2.30
Red-clover hay	7.76

As to Alsike and white-clover, the proportion is about the same. (v. p. 178.) (1)

These figures may vary a little according to different authors, but nothing can show more clearly the falseness of the theory, that so called meliorating plants derive their nourishment from the atmostpheric air alone.

Here, I cannot refrain from a remark which must have already struck the readers : A plant which receives all its nourishment from the air cannot leave any ashes when burnt. (2)

Another remark I have to make is this :

" Among the meliorating forage plants," said the learned professor, " there are some which rapidly cloy or wear out the land, and cease to grow, leaving the soil in a state of exhaustion : such as red-clover and pease, which should never be sown again on the same land before the expiration of four or five years." (Page 82.) (3)

How can a plant which does not impoverish the land, but enriches it, cause such an exhaustion ? And why must we wait four or five years before sowing it again on the same land ? Besides, this statement is not in accordance with facts. Here, on the contrary, is what is the real state of the case :

In a poor soil, red-clover will not take. If the subsoil is bad, the clover will not last. If the subsoil is rich, the clover will last a long time. The first season may cause it to disappear for a time, but in succeeding ones it seems to return to life of its own accord. Still, the time of its duration is limited. As age approaches, the roots of the clover prolong themselves, stretch out into the subsoil, and then obtain their food from the inferior layers. These lower beds must by degrees become exhausted, after an interval of some time, more or less extended, the clover, which no longer finds there sufficient nutriment, begins to suffer, and finishes by disappearing altogether for want of support. All plants whose roots penetrate deeply into the subsoil are in the same predicament.

The so-called meliorating plants feed just as do the so-called exhausting plants, and the former no more spare the plant-food in the land than do the latter.

Meliorating plants are a pure fiction of the imagination, they have no real existence.

The pod bearing plants grown for fodder dive into the subsoil for the chief part of their food, after harvest, they leave at the surface a quantity of refuse matter with which the upper soil enriches itself. These plants act as miners in the vegetable kingdom, they search out the riches of the subsoil, and the upper soil benefits by what is thus brought within its

(1) Wolff gives hay of red-clover = from 5.30 to 7.00.
A. R. J. F.

(2) Whence comes then the carbonic acid found as the carbonate of potash, of soda, &c., in the ashes? These salts do not exist in the growing plants, but are formed during their combustion. When plants are burned, all the organic acids are burned, and consequently, although in living plants the potash is combined with organic acids to form neutral or even acid salts, yet, as these acids are destroyed when plants are burned, caustic potash, soda &c., are left, which of course combine with carbonic acid to form carbonates of potash, soda, &c, The carbonic acid, I need hardly say, is formed by the burning of the carbon contained in the plant. A. R. J. F.

(3) Can the word *rassasier*, to cloy, have anything to do with De Candolle's long exploded theory that plants leave behind them certain excrements that render the soil wherein they have grown unpropitious to plants of the same species? A R. J. F.

reach. It is in these upper layers that the cereals spread out their roots, and that is the reason why grain answers so well after artificial meadows. But the improvement does not last long; there is only a simple change of position of the nutritive elements. The riches brought to the surface from the subsoil must soon exhaust it. And more; the buried waste matters do not remain permanently in the upper layers; but are carried off by the subsequent crops which feed upon them. The more abundant the yield of the land, the more the land exhausts itself. The nutritive elements contained in the products sold off the farm are lost to the land which yields them.

A soil which receives no other manure than the remains and the roots of the plants it produces must inevitably become poor.

Any system of rotation which has no other base than the above is false in principle, and for this simple reason: the law of restitution is not observed; the land does not receive the elements of what has been taken from it, the raw material from which plants are formed dis-appears from the soil in the exportation of its products, and is not replaced by extraneous manure.

Besides, if the plants in question really possessed the qualities so benevolently attributed to them, the use of manures would be unnecessary. no thoughtful man would agree to such a proposition as this.

It is then utterly false that land, by its own exertions, can at the same time produce crops and still be growing richer. The truth is, that all crops are exhausting. Still, I do not mean to say that they are all exhausting in the same degree; of course, the physical condition of the soil is by no means the same after one sort of crop as it is after another of a different species, and it is to this point we must attend if we wish to establish a good system of rotation.

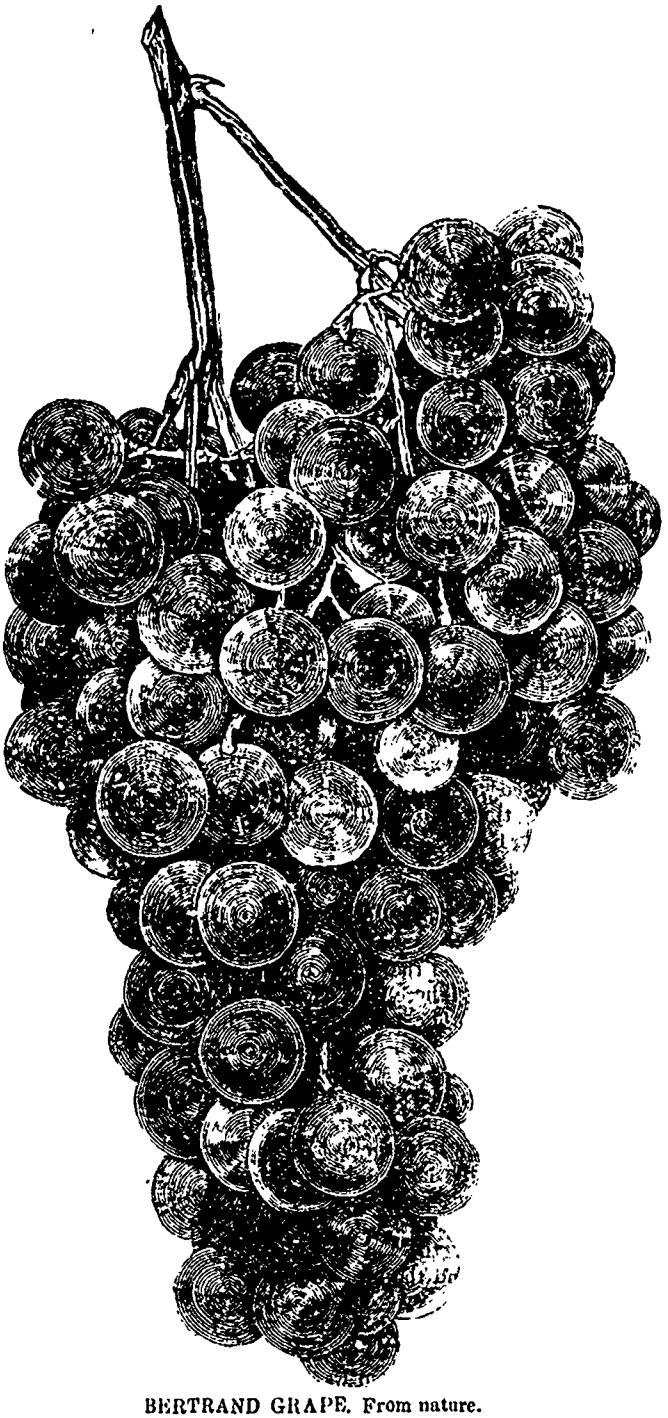
The following appears to me to be a rational interpretation of the advantages presented by a good system of rotation.

A hoed crop begins the course to pulverise and clean the land. This crop is to be manured.

The first crop removed only partially deprives the land of the manure applied. A store remains for the support of the subsequent crops. Grain follows the hoed and manured crop, and it finds sufficient food in the upper soil which is still sufficiently rich, and which has undergone, through the frequent stirrings given in the preceding year, by the effects of the rain and sun, an excellent preparation, leaving it in the best possible state for the support of a cereal crop, the roots of which do not penetrate deeply into the soil. A new crop removed leaves the land poorer than before. After a year or two, the grain crop gives place to the forage plants, which find a material proportion of their food in the subsoil, and leave at the surface refuse remains which, after being ploughed in, decompose and assimilate themselves with the soil, and thus become suited to the support of the grain or other crops which follow the meadow or pasture. This last resource being exhausted, we must absolutely manure again, and by that means restore to the land those elements of which it has been deprived by the severance of those crops which it has yielded us. These combinations may, of course, be varied indefinitely. Peremptorily, with a good system of rotation a considerable amount of expenditure for labour may be spared, since the greatest bulk of crop is obtained at the least possible outlay. Only, this must be borne in mind: the more perfectly we succeed in extracting from the soil the greatest amount of nutritive substances it is capable of yielding, the more we bring to perfection the *art of exhausting it*.—It is physically impossible to husband the raw materials which serve as plant-food; or, in other words, to obtain any crop at all without more or less exhaustion of the land. Any economy of this sort is absolutely imaginary. Thus, we conclude, meliorating rotations subsist no more than do meliorating plants. Really to enrich the land, in the true sense of the word, is to supply it with more nutritive elements than we take from it in the form of crops.

In another letter, if you will allow me, I will treat another question which is intimately allied to the present one: Can we, by sowing largely of grass-seeds and consuming with cattle the greatest possible amount of the vegetable produce of the farm,—can we indefinitely preserve and even increase the fertility of the soil. I am, Sir, your obedient servant,

B. LIPPENS, Rue d'Aiguillon, 11, Québec.



BERTRAND GRAPE. From nature.

DE OMNIBUS REBUS.

Stimulants.—A mistaken notion has arisen in some quarters that artificial manures are stimulants, and exhaust the soil. Any manure containing one constituent of vegetation is exhausting—phosphates and potash not less so than ammonia salts or nitrates, for if a nitrogenous manure enables a crop to use to good advantage supplies of phosphates and potash in the soil which would otherwise be lying idle, so also, on the other hand, do phosphates and potash cause the absorption, through the increased growth of the plant, of the available nitrogen of the soil. Such a result is, in fact, what is wanted. Of course, each of these things is exhausting if applied alone and continuously; but such a system no sensible person would recommend.

Cheddar Cheese.—Apparently, all Englishmen do not hold the same opinion about foreign Cheddar as my old friend Archdeacon Denison! Mr. H. F. Moore, a cheese factor of large experience, residing at Frome in the midst of the Cheddar district and close to the North Wiltshire district, and who thus has had unusual opportunities of becoming well acquainted with the subject, has lately written to the *Times* a letter, in which he says, with the knowledge of the high quality of the Cheddars recently exhited at Frome and at Islington fresh upon him, that neither at Frome nor at Islington could 400 cheeses of such even quality be picked out as those, 400 in number, which are now to be seen at the Colonial Exhibition consigned from Canada, under the care of Professor J. W. Robinson, of the Ontario Department of Agriculture.

Canadian tobacco. — Some time ago, I spoke in this Journal of a small, weedy looking, narrow leaved tobacco which I had cultivated at Joliette in the years 1868 and '69, as being far superior in flavour to any I had ever tried. Well. I could not have been far wrong in my judgment, for this last month, the experts at the Colinderies, as the Londoners are pleased to term the Indian and Colonial Exhibition, determined that the best flavoured tobaccoes for the pipe were the East Borneo, the Maltese, and *le petit tabac canadien*, from the manufactory of MM Médéric Foucher & Cie., Saint Jacques l'Achigan, in the province of Quebec! ! !

I gave the last of my seed to the Curé of Compton Centre, in 1873, and I have never been able to recover it since. Will no kind friend on the North of the Saint-Lawrence send me a pinch of it? There is a lot of different sorts going under the name of *tabac canadien*, but the kind I mean has a queer-looking pointed leaf, growing all askew, about ten or twelve inches long by seven or eight inches wide. It is safe to ripen every year, if planted in decent time, and will not need much space to grow in. I used to set mine at 26 inches by 12 inches. But the better plan would be to alternate cabbages and tobacco to give more room for the air and sun to make their way.

Come, now, we have got the best Cheddar cheese and the best tobacco in the whole exhibition. Cannot we manage, next year, to send the best butter?

Aphis on late turnips. — My ex-pupil, M. Séraphin Guèvremont, has had a curious experience with late Altringham turnips. The seed was sown on the 28th of July, in a garden which has long been in cultivation, and is full of manure. The turnips came up the fourth day, grew away out of the fly's reach, and when the leaves were about eight inches in length, three contiguous rows—there were twenty rows in all—were attacked by a green *aphis* and completely devoured! The other rows were untouched. The attack seemed to be made regularly, as probably the remaining rows had grown out of the beasts' power before the swarm could touch them. During a long experience of turnip growing, I never saw such a thing happen, but if any of my readers have met with loss from the same cause I should be glad to hear from them.

Dairymen's Association.—I hear from M. J. de L. Taché that the Dairymen's Association of the province of Quebec will hold this annual meeting at Three-Rivers, on the 18th and 20th of January 1887. A most interesting feature of this meeting will be the presence of several farmers who have begun to preserve their fodder corn in silocs, almost all of whom are members of this Association. If the attendance at the Three-Rivers meeting is as large as the attendance at Quebec last spring, the success of the Association will be ensured.

Shorthorns as Milch-cows. — *Beauty*, a non-herdbook shorthorn cow, the property of Mr. Hornby, milkman, Holloway Road, London, won, at Islington, last month, the Lord Mayor's Champion cup for the best milch-cow at the exhibition of dairy-cattle, &c.

Escutcheons.—I see the Guernsey people have given way at last about this matter; more to satisfy their American customers, I suspect, than from being convinced of the predictive power of the distinctive mark. They have also taken to judge by points, I see, five points, out of the total hundred, being allowed for the escutcheon! Well, I know I am getting on in years, but I confess I can see no connection between the pattern described by the hair between the two thighs of a cow and her production of milk.

Irrigation.—It was a moving sight, as one mounted the hill leading to the Exhibition ground at Sherbrooke, to see the numerous though tiny runnels of water, full of manure-matter, making their way down to the river Saint-Francis without doing the slightest good to anybody. Repetition, I know; but at last some thoughtful man—Mr. William Hale, for instance, will see that there must be "something in it," and I shall see one water meadow laid out in the Valley of the Saint-Francis before I die.

Ensilage.—I see Sir John Lawes cannot make up his mind about ensilage. He, of course, judges from a chemical point of view, and is indubitably correct in his figures. But the truth of the matter is, that the question is long past fighting about. Whether a certain per centage of nitrogen is or is not lost in the silo does not signify two pence—I beg pardon, cents.—The cows like the food, they do well upon it, and millions of gallons of milk, which would otherwise have never been seen, will be produced from it. Still, you won't get my pupils here to give up growing roots, for all that; though they don't know *azote* from *apple-pie*, they see the enormous benefit they are to their cattle, and value them accordingly.

Milking trials at Islington.—At the Dairy-show, this year, only the butter-fat present in the milk was taken account of. Fifty-eight cows were entered for competition, and there seems to have been a vast difference between the yields of the highest and lowest, even after allowing for the time from calving. About a dozen cows gave so much milk that the stewards and judges had them milked a second time, but everything turned out to be all right. A Shorthorn cow, Lucy, five years old, gave the extraordinary quantity of 41

lbs. of milk at the morning's meal—in fourteen hours; some of the Jerseys and Guernseys, not much more than a fourth of this in the same time. The issue of the butter yield trials is not yet out.

Guernseys for crossing.—Mr. L. F. Allen, of Buffalo, is supposed know what he is talking about, and what follows is a condensation of his last letter to the English Agricultural Gazette. Within the last five years he has adopted grade Guernsey cows for his dairy by the use of thoroughbred Guernsey bulls to his herd of high grade Shorthorn cows. Up to the present time, his experience favours the Guernsey over the Ayrshire, Jersey, and Holstein. He prefers them to the Jerseys for their great size and hardihood, robust forms, carrying more flesh and equal quality and quantity of milk according to size. He does not undervalue the Jersey, but their diminutive size and want of flesh do not suit his fancy. The full square udders, good size of teats, easiness of milking, and lymphatic temperament of his half- and three-quarter bred Guernsey-Shorthorn cows quite equal his expectations. Mr. Allen seems to have no faith in the "seven days trial" of Jersey and Holstein cows. "It may be," says he, "that the regular quantity of butter given by these 25 lbs. to 40 lbs. butter cows in a single week's trial might not, on the same continuous rations with other cows, yield over seven or eight pounds a week during her milking season of eight, nine, or ten months.

Good advice.—At page 80, of the fourth report of the Dairymen's Association of the province of Quebec, I am glad to see these words: "As a general rule, we ought to grow the greatest possible quantity of roots or hoed crops, if our means and the power of obtaining labour allows it; for, the wholesale cultivation of roots for cattle-feeding is the foundation of all improvement of the land and of animals, and their cultivation is profitable."

Again: "Dry sands must be manured frequently, though small dressings will do, and be ploughed as seldom as possible."

But, what does M. Marsan mean by saying, on the same page: "Land with an impermeable subsoil must be broken up deeply—subsoiled—? There is no such thing as an impermeable subsoil. Our English clays, London-, Oxford-, and lias-clays, are as stiff again as any to be found in this side of the Atlantic, and yet the rain-water finds its way into the drain-pipes 4½ feet deep with the greatest ease, and disappears from the surface within twenty-four hours after a heavy fall.

Here is a droll mixture of grass-seeds for an *arpent* of land.

	lbs.
White clover	6
Alsike clover	1
Rawdon clover	4
Timothy	2
Italian rye-grass	1
Kentucky blue-grass	1
Orchard-grass	1

Only fancy! one pound of Italian rye-grass to the arpent! Why, the quantity of this grass *sown alone* in England is four bushels. And what is the use of six pounds of white-clover, when that trefoil springs of its own accord all over the country? This recipe is taken from M. Beaubien's address to the Association last April. The rest of his speech abounds in good sense.

More about siloes.—The herbage, red-clover and oats, put into the silo at Rothamsted contained 46,511 lbs. of dry matter; the silage taken out contained only 39,391 lbs. of dry matter. Of the ash, 50 lbs. had disappeared; of the dry organic matter, 7,070 lbs.—or to put it in another way 374 lbs., of crude nitrogenous matter and 6,696 lbs. of crude non-nitrogenous matter had disappeared—10 per cent and 16.8 per cent of the whole original mass respectively!

OUR ENGRAVINGS.

The Bertrand Grape.—Belongs to the Æstivalis group. From Augusta, Georgia.

Cheviot Ram.—A good specimen of the hardy race of sheep that pasture on the hills between England and Scotland.

Berkshire pigs.—Boar and sow. It is surprising what a number of half-bred Berkshires have invaded the district between Sorel and Ste-Anne de Sorel. When I came here, thirty months ago there were nothing but the flop-eared Canadians to be seen. Now, I hardly see one that has not distinct marks of the Berkshire in it.

ARTHUR R. JENNER FUST.

CORRESPONDENCE.

ARTHUR R. JENNER FUST, ESQ.

Dear Sir,—Your note of the 6th inst. in reply to mine of the 2nd, is just received and I am pleased to learn that after all, we quite agree on the subject of artificial manures, for, believe me, I value highly the opinion of a gentleman of your varied attainments and wide observation.

I have given the subject much attention for a number of years, not only by consulting the best authorities within my reach, but also by means of experiments both in the field and in the laboratory and I have no hesitation in saying that the question: "Does the application of artificial manure, tend to exhaust the soil," is correctly answered by *yes* and *no*. *Yes*, under certain conditions; *no*, under certain other conditions and I know of no means by which a soil may be so rapidly and effectively *impoverished*, (if that is the object) as by the judicious use of artificial manures and, on the other hand, I know of no means by which a soil may be so rapidly and effectively *enriched* (if that is the object) as by the judicious use of artificial manures.

The answer seems a paradox, and will perhaps become a *text* for one of your excellent agricultural *sermons*.

C. E.

November 6th, 1886.

ARTHUR R. JENNER FUST, ESQ.

Dear Sir,—I see in the Journal an article written by you with regard to the Dominion Exhibition. You wish some one to explain "how it came to pass that my bull "Tushnigham" took the gold medal from Mr. Cochrane's "Cassio;" first of all I must tell you, it was not for the best Hereford bull, but for the best bull of any age or breed. The first day of judging, my bull was awarded 2nd prize, and on the following day the gold medal, and I was informed that the decision was unanimous. As you say "there was little to choose between the two." Of course it would be out of place for me to dispute your judgment as you are my senior not only in years, but in experience, but I must ask you to consider the points of the Hereford, and tell me which is the more important: the "steak pieces" or the shoulder? I think that Mr. Cochrane's bull is a splendid animal, but you cannot dispute the fact that he is narrow behind. Now my bull is a year younger than Mr. Cochrane's, weighed some 400 lbs.

heavier, and gained nearly 600 lbs. the last 12 months. You say they were as fat as they could be; I am prepared to make my bull weigh 3000 lbs. and still be active for service, next year, (that is if he is alive then). I may also remark that 3 calves by "Tushingham," a bull, heifer and steer (the latter weighed 740 lbs. the day he was 6 months old) all took first prizes, which might have made the judges alter their former decision. I am sorry you did not see the prize Herefords walked round the ring; I have seen a poorer lot at the old country fairs.

Believe me, yours truly,

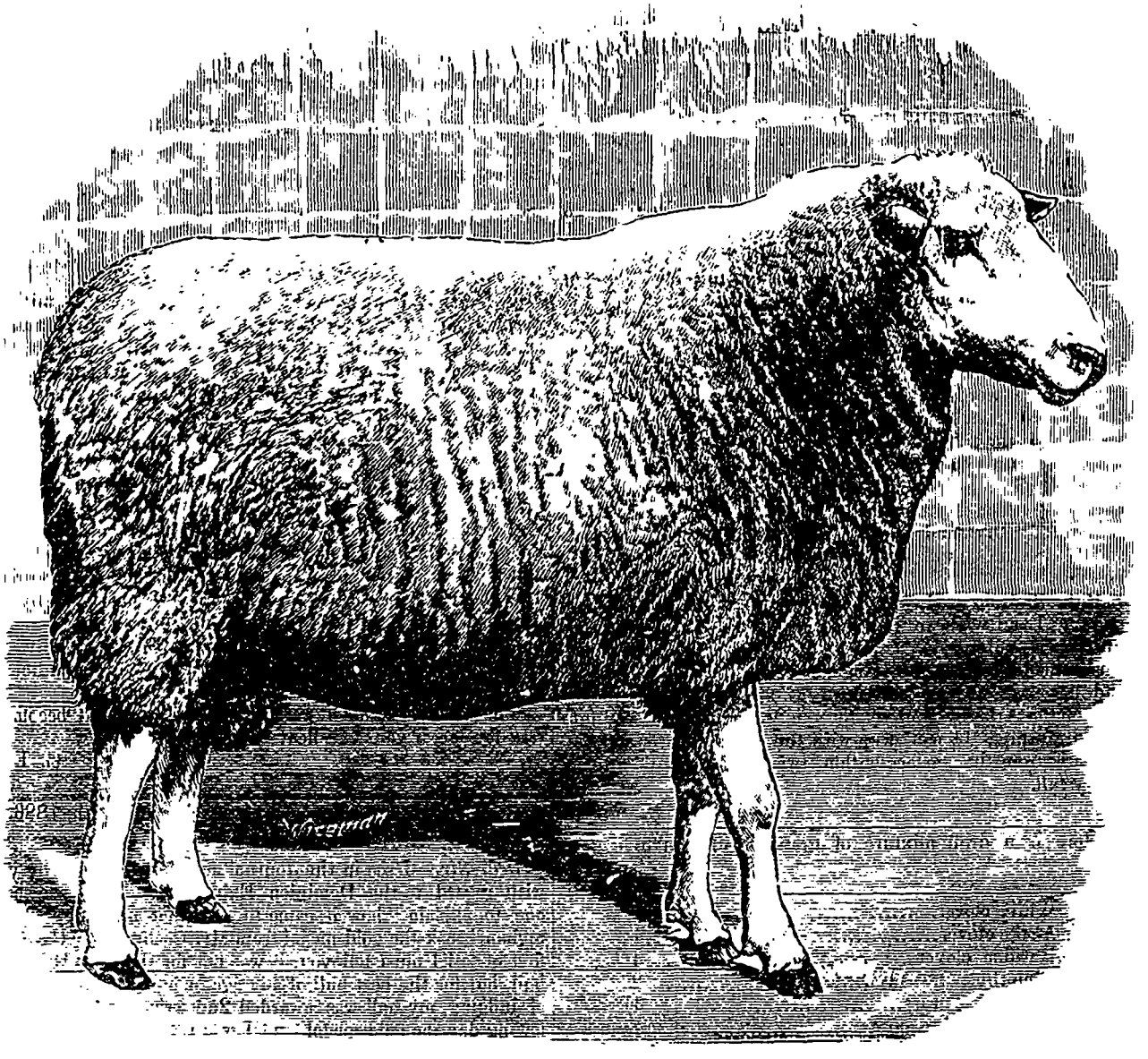
J. WALTER M. VERNON.

bought and if there are any used on land that has no stones, how deep and wide a ditch can be digged with them?

Yours &c., D. B. MEIGS,

Farnham, P Q.

REPLY.—The only good ditching machine, as far as I know, is the "Rennie Elevator Ditching Machine," an engraving of which appeared in the May number of this Journal. A friend of mine, who saw it at work, says that it is perfect.



CHEVIOT RAM.

Farnham, Oct. 11th, 1886.

Dear Sir,—I see by the *Journal of agriculture* that you take some interest in farming; (*I should rather think I did*) therefore I take the liberty of inquiring if you can inform me in regard to a machine for ditching, where one can be

Messrs. Rennie, of Toronto, will, no doubt, give you any information you may want about it.

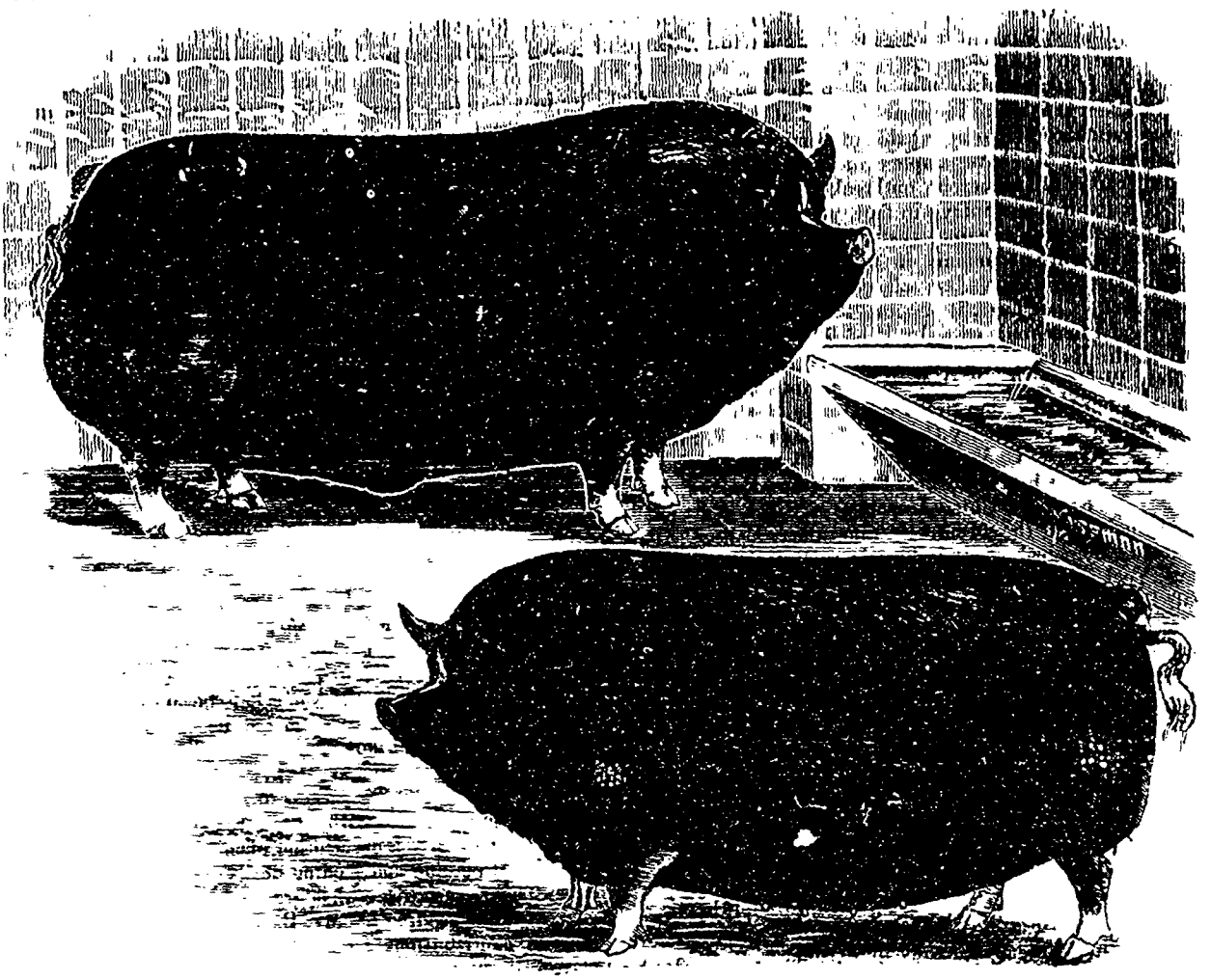
The price, I fancy, is about $250.

ARTHUR R. JENNER FUST.

[*From Philadelphia Practical Farmer, Oct.* 16. 1886.]

The Plague, And How to Escape From it.

The animal industries of the United States are in imminent peril from the ravages of an insidious, contagious and incurable disease in cattle commonly called pleuro-pneumonia or lung plague. Many years ago it obtained lodgment on the Atlantic seaboard from imported cattle, and notwithstanding repeated warnings of the danger to be apprehended from its spread, based upon the experience of European countries that have suffered severely from it, our people blinding themselves to their peril, and by spasmodic and half way measures simply averting the disease for a time in particular localities, have allowed it to spread until it has now obtained a firm foothold in the Western States, as well as in a number of the Eastern ones, and it is only a question of a very short time when it will find its way to the immense herds on the Western and Southwestern ranges, unless radical measures are at once adopted to exterminate it where it already exists, and prevent its communication to other parts of the country. This is a matter that affects not only the raisers and dealers in cattle, farmers, dairymen, and butchers, but every man, woman and child in the country, for it strikes directly at the source of supply of animal food. Allow this disease to spread in the future as it has in the past, and the day is not far distant when the animals affected can be counted by the million and not by the hundred as at present, and it is easy to perceive the effect this will have upon our markets and the scarcity of beef that must be the natural result. For years back efforts have been made in some of the States to stamp out the disease, and some slight attempt has been made by Congress to give National direction to these efforts, but unfortunately it has been on the penny wise and pound foolish principle. Owners of cattle naturally object to having their animals killed without receiving full compensation for them, and the government, both State and National, has failed to make provision to pay for the animals that should be slaughtered to eradicate the contagion. As a consequence temporizing measures have been adopted, animals apparently recovered have been permitted to live and mingle with healthy cattle



BERKSHIRE PIGS.

A partial quarantine has been established about infected herds that has been so loosely enforced as to be practically of no effect, and numerous experiments of inoculation have been tried. It has been very difficult to educate the people of this country to believe that pleuro-pneumonia was contagious, and harder still to convince them that it was incurable. Many animals that had been but slightly affected, apparently recovered, and to outward appearance to the unprofessional eye, were restored to their normal condition of health, and yet these very animals have been the means of spreading the disease all over the country, and while apparently healthy

themselves, were centres of contagion that disseminated the seeds of the plague to hundreds of healthy animals. While acting as an Inspector of the United States Government in 1881, in my report to the Commissioner of Agriculture, I recommended as an ultimatum, without which the disease could never be eradicated, "the killing of all chronic cases no matter how *apparently* healthy they might be." I arrived at this conclusion from careful observation of the operations of the disease not only in this country, but in England, where I had considerable experience in examining its development and spread. Since that time I have carefully watched the progress of the disease in this country, and have communicated with some of the most eminent scientists and experts in England and the United States, who fully agree that the greatest da , er to be apprehended is from these chronic or apparently recovered cases. Prof. G. T. Brown, Royal Veterinary College, London, professional adviser to the British Government on contagious diseases of animals, in answer to an inquiry I addressed to him, says, under date of October 21, 1884: "It is quite impossible to tell at what period recovered animals cease to be capable of communicating pleuro-pneumonia, but we have ample evidence to prove that they are the cause of numerous outbreaks of that disease in various parts of the country; in fact, you may take it to be a matter of absolute certainty that it is quite impossible to stamp out pleuro-pneumonia in any country where the so-called recovered animals are allowed to remain alive." In even stronger language, if possible, is this opinion reiterated with regard to chronic cases by Prof. Thomas Walley, Principal of the Royal Veterinary College of Edinburgh; Prof. William Williams, F. R. C. V. S., Principal of the new Veterinary College, Edinburgh; Prof. James McCall, Principal of the Glasgow Veterinary College; Dr. James F. Simpson, Vice-President R. C. V. S., England; Clement Stephenson, F. R. C. V. S., Chief Inspector for Northumberland, Eng.; Prof. D. McEachran, Chief Inspector of Stock for Canada, and Principal of the Montreal Veterinary College; Prof. Liautard, Principal of the American Veterinary College, New York, Prof. C. B. Michener, of the same college; Prof. Rush S. Hudeikoper, Principal of the Veterinary Department of the University of Pennsylvania; Prof. W. L. Zuill of the same institution; Dr. Robert Ward, State Veterinarian for Maryland; and Dr. Miller, United States Veterinary Inspector, Camden, New Jersey.

In the face of this testimony, coming as it does from gentlemen who are eminent in their profession, and who have had exceptional facilities for observing and experimenting with the disease, and taken in connection with our own actual experience of the constant spread of the disease and its steady march westward, can we afford to longer close our eyes to the danger that threatens us, and allow all our cattle to be affected, before we awake to the fact that action, prompt, heroic and effective is needed at once, to avert this dire calamity. See to it then that the laws already in existence are rigidly enforced and new ones enacted to meet the exigencies of the case. Have every animal killed that is or has been affected with the disease, or has had the slightest contact with diseased animals. The carcasses of healthy or apparently healthy animals killed by reason of contact can be sent to market after proper inspection to prove that they were not injuriously affected, while those that were infected should be buried or entirely destroyed.

In this way and in no other can the plague be checked, and effectually stamped out. While the present outlay of money to accomplish this may be considerable, yet it will save millions of money in the future, protect the food supply of our country and open the foreign markets which have been closed against us for seven years, by reason of the existence of the disease in this country, and in the end as matter of investment alone prove of incalculable benefit to the cattle interests of the country, and indirectly be of advantage to all consumers of animal food.

JOHN W. GADSDEN,
M. R. C. V. S. Eng.

Philadelphia, Oct. 11th, 1886.

AGRICULTURAL.

T. H. Hoskins, M. D., Editor, Newport, Vermont.

SAVING MANURE IN CANADA.

Our friend, E. A Barnard of the Quebec Department of Agriculture, and editor of the Montreal *Journal of Agriculture*, writes us as follows: "My cows stand on beaten clay alone No litter is ever used. Cows perfectly clean and healthy The manure, solid and liquid, falls in a trough and goes into the cellar. This is dug under the barn:—the stables are in a lean-to. Cellar bottom, six inches of beaten clay on coarse sand Not a drop of liquid manure is wasted. The whole mass, in the spring, forms a thick putty, which is forked into Kemp's distributor and carried to the field. Not a drop of liquid oozing out, provided the mass attains six or more feet high in the cellar. The first three feet are very wet, until the mass forms a sponge which attracts the moisture right through. This is my second year's experience on my cellar. You are the first to have the writen results and you are welcome to them. This plan I have worked out after thirty years of close attention and visits to the best managed farms I knew of in Canada, the United States and in Europe. I know of no such arrangements as mine for the full saving of manure. I find that the large quantity of liquid in the manure checks fermentation very greatly, the more so that I use no litter Straw is too valuable a food on my poor sandy soil to be wasted as manure. All straws are cut, wetted, mixed with richer materials and butter produced."

We consider this experiment of Mr. Barnard, and its complete success as reported. to be worthy of wide publication. We confess to a considerable surprise that cow's manure and urine should, without absorbents, possess the consistency which Mr. Barnard reports, and almost fear that there must be some leakage, if not of the cellar bottom, at least at the sides. Mr. Barnard has promised us more information on this and other important matters, which have been the subject of careful experiment at his farm near Three-Rivers, Quebec. He is making a success of sweet ensilage, and claims to be able to produce it without failure every time. In our next issue we shall give a description of his method of building a silo, and of making and feeding ensilage to his herd of butter cows. These are subjects that greatly interest Vermont dairymen, and the reading of Mr. Barnard's notes will, we hope, lead to contributions from others who are interested in the matter discussed.

Ed. note Ill. Journal Respecting leakage, Prof. Henry Stewart of New York says in *Rural N. Y.* that liquid manure which drains through in a sandy cellar bottom is in no wise lost, as the sand acts as a perfect retainer of all manurial elements allowing only the exit of water. What says A. R. J. F.?

I don't at all object to giving warm food to cows which are *not* to be sent out to grass in the spring. A. R. J. F.

SWEET ENSILAGE, &c., &c.

Mr. Ed. A. Barnard, of Three-Rivers, P. Q., writes to us as follows on subjects of interest to every farmer:

"Sweet fermentation has already been tried here by a few of our plain, uneducated farmers. They simply follow the

advice given in our French *Journal*. At our last dairy convention, they reported publicly and with all detail, their entire success. But the *modus operandi* is simple, and rests, I might say, entirely on the use of a common thermometer. There is no need for hurry nor of extra help. It takes about thirty days to fill up a sixteen-feet deep silo. A layer of three feet of uncut fodder—all fodder uncut except maize—is put in. After two or three days the heat attains one hundred twenty-five degrees Fahrenheit; then a new layer of equal depth is laid. Generally two layers are thus put in three days. However, as one hundred fifty degrees does not injure the fodder, a rainy day does not call for uncomfortable, nasty, heavy work. The heat is ascertained simply by introducing the thermometer to a depth of about fifteen inches. After some layers are put in, the settling down—without any trampling at all except on the edges—is enormous, fully twelve inches per day. This explains why it takes thirty days to attain a height of sixteen feet.

"We shall use three feet of muck to weigh down the ensilage. The bottom of silo being on a level with, and adjoining the cellar, the muck will find its way over the manure *when dry*, as the heat of the silo should dry it somewhat. Earth is a better *seal*, evidently, than stone. We have been feeding green buckwheat, with well-formed grain, just coloring, to our cows. They have done wonderfully well on this food alone. I shall experiment on the same food for ensilage, in connection with Canadian (very early) fodder corn. The feeding ratio of buckwheat is given as 1:3. This richness must have something to do with our five and three-fourths pounds of butter to one hundred pounds of Canadian Jersey milk and that from common scrubs for about one-half.

"Fall rye and clover, with buckwheat and Canadian corn fodder, shall supply our entire cow diet next year, if all goes well. I then expect two crops of fodder yearly on very poor sandy soil. Should the manure and fertilizers prove insufficient in quantity, some rye and some clover will be plowed in to carry our manure supply further on. Yet, we are so far north, and so situated, that frosts are to be dreaded in the latter part of August. Our second crop must therefore be ready *then* for the silo. Very few farmers in America, can be so closely pressed by a short season. My aim is to manure heavily *the growing crop*, fall rye and clover, thus losing no time in putting our corn in the ground after the early cut fodder is ensilaged. The drill, sowing three rows of corn, with fertilizers, at a time, becomes wonderfully valuable in such precarious circumstances.

"Our seeder is comparatively a simple affair, although it looks cumbersome. It is *not* to be patented. It strikes me a common carpenter and blacksmith can make it very well.

"Respecting my manure cellar, I cannot see how any loss of liquid could happen. Although the Kemp distributor—an extra large one—is driven into the cellar by a heavy pair of horses the six inches of beaten clay stand the strain thoroughly. The wheels sink at most three inches. When the whole cellar has been cleaned out, we have only to scrape the top of the clay about one-half inch (outside of wheel-tracks to get at the clean, slaty blue of fresh, plastic (wet) clay, showing, it strikes me, evidently, that the manure did not even get in that far. But, once more, I expect you some day to investigate this and other subjects here, with scrupulous care, for I am searching for the *right way*, and, no mistake. For many years past, I have fed no roots to my milch cows. I cannot afford to grow them here at a profit as stock food.—Moreover, with cow-hay (clover and mixed grasses) at $8 a ton, and straw at about $2.50 I am satisfied with prepared food that is cut fine, mixed with bran and crushed grains, the whole *heated* by steam after salting and thorough wetting. Mr. Jenner Fust, in the English *Journal*, objects to *cooking* food for cows. Well, I am, with all due respect, still in favor of producing *heat* in the cows with refuse farm fuel, sooner than with costly crushed peas and oats mixed with oil meal. Our principal, if not only, aim, is in the production of excellent butter; and the more winter-butter, the better.

"There is no doubt that the manure produced in winter is considerably drier on our prepared food, than that from grass. As our cows sleep in the stables all the year round, we have now a large excess of urine in the cellar, the more so that the pile is not yet three feet deep. In the spring our pile averages about seven feet. It is then a spongeous mass from which the liquid does not drop. But it may be different this next spring, as we shall now feed forty-five pounds of ensilage to each animal through the winter.

"Our dairy—remember, *we get* the top price in our local market—is close upon the stables, Dutch fashion, and within fourteen feet of the manure cellar. Would you believe there is positively not the least smell in this dairy? Here, again, I expect your careful scrutiny.

"My aim, all through this, is to obtain the greatest amount of work on the smallest expenditure of time and money. With our situation, as above, the steam engine works the Laval Centrifugal, the churn, pump, &c., and also drives, in the barn, the straw-cutter, thresher, &c., &c., the attendant being close to all his machines.

"On the whole, my barn is somewhat of a curiosity, with a deep cellar and yet not a single foundation stone. We have the lumber and timber on the farm; our farm hands make all ordinary repairs and additions such as silos, butter factory, &c., without need of extra skilled labor. This barn and cellar I built some twenty-five years ago. The cellar was, until two years ago, used first for roots and, when there were no more roots grown, for general purposes. The posts, starting from the cellar bottom to the peak of the barn, were *repaired* last year for the first time. All they needed was a splicing at the bottom of about five feet.

"This letter is already too long. Later on, I may describe my calf pens and give fuller details, if agreeable.

ED. A. BARNARD."

Mr. Barnard says of his seed-drill (mentioned above), in another letter:

"It works splendidly, sowing broadcast, or in drills, grain as well as beet seed and corn, and also small (clover or other grass) seeds, all separately, of course, but in one operation. It is simply a two-horse roller and seed-drill combined with a fertilizer attachment."—*Dr. Hoskins, in Vermont Watchman.*

Montreal Horticultural Society's Report, 1885.

We have just now perused the very excellent report of the Montreal Horticultural Society, for 1885. The progress made, especially in fruit culture, during the last twenty years, in this province, is really wonderful. And yet, being given the difficulties to be overcome: the very great changes of temperature, the extremes of cold and heat; the continued droughts which often prevail during our particularly short growing season, the progress made in fruit culture in twenty years is but a small beginning of what can be hoped for in the near future.

All we could find room to say here in favor of this report would not do it justice. We strongly advise all interested in horticulture generally to read this report with care. In fact it deserves to be studied by all who take an interest in fruit culture or in flowers in Canada.

We particularly commend the winter meetings of this society, which is thus becoming truly Provincial in its scope. We hope to be able to announce in advance the dates fixed for such meetings, and we would wish they were attended by

representatives from all parts of the province. They are in fact Horticultural Conventions where the most difficult problems in fruit culture, and horticulture generally, are studied out and solved when possible.

The Montreal Holticultural Society appoints an important portion of the Managing Committee of the newly incorporated Botanic Garden. This, their latest annual report therefore contains Professor Penhallow's most interesting first report, as manager. The *Montreal Botanic Garden* is already in existence, with about 75 acres of the North Eastern portion of the Montreal Park, and with already several thousands of live plants, from Canada to Russia. The work done in this first year of its existence is truly wonderful and gives great promise of future usefulness. The citizens of Montreal owe it to themselves and to their families to make this institution a success. And yet the advantages to be derived are not local only. They are truly Provincial and even National. Let us hope that encouragement in proportion to its general usefulness will not be wanting to our Montreal Botanic Garden.

The Montreal Horticultural Society's last report is signed by the late Henry S. Evans, for so many years its secretary, and to whose untiring efforts so much of the Society's success is due. The loss of such a citizen is truly a public calamity.

ED. A. BARNARD.

BUTCHER'S WASTE.

I can buy here for 25c a head the entire offal of oxen, including blood, head, liver, heart and feet. The waste from sheep is often added *free*. Ten oxen are now killed weekly. I am told as many as 25 are killed weekly in summer.

I have many facilities on the farm, such as small steam engine, steam pump, &c., to make good use of such waste. What would you advise me to do? I cannot afford any considerable expenditure in plant at present, outside of shed room near engine, which I can spare.

Ammoniacal water.

The ammoniacal water from the gas works is also wasted. What is it worth? How much can I pay for it to carry 5 miles? I would mix it with a compost of forest leaves of which there is an abundance quite close to my exhausted fields. I suppose this composting can be done in early Winter?—E. A. B.

Answers.—(1) As to the use to be made of *butcher's waste*, with sulphuric acid at a prohibitory price, all I can recommend is as follows:

Break up the heads with an axe, or a sledge-hammer, and mix the pieces, with the liver, blood, guts, &c, with earth, or ashes preferably, at the rate of two loads of earth to one of the waste into a flat topped conical heap. Keep the mixture moist, but not wet, and turn twice. In about six weeks, the heap, which will heat a good deal, will have mouldered down into a fit state for application to the land, and should be applied in the drills for fodder-corn, if no roots are grown, at the rate of from nine to twelve loads per acre. I should burn the feet in the engine-furnace and crush them, as they are very refractory. Can't the people eat the hearts? I do, and the head too.

A rendering establishment might also be combined with pig-feeding. I should advise as follows: The pigs will eat the guts, blood, liver, and heart, uncooked. The heads, feet, &c., you might place in a covered wooden tank, with q. s. of water, and boil by means of a pipe from the engine-boiler. The liquor cooled, the fat might be skimmed off, and the soup, &c, given with a mixture of meal to the pigs, or reboiled with corn, which would save grinding. I say with corn, as the meat would supply an enormous quantity of nitrogen. Of course you could cook the hearts and livers as well, but I do not think you would gain much by the process.

Have you a tub to receive the exhaust steam of your boiler? I used to feed my boilers with water at 175° F. by that simple means. It should be covered tight, with a safety valve of a pound pressure. A wonderful saving of fuel.

(2) It is impossible to value ammoniacal water from the gas-works without a knowledge of the percentage of ammonia therein contained. The strength varies very greatly in accordance with the quality of the coal used. The usual quantity required for an acre of land varies from 200 gallons to 250 gallons, or in a rough way, about two puncheons. As there is probably no demand for it in the inquirer's neighbourhood—at least at present—I should think that a small fee would induce the workmen at the gas-works to fill the puncheons for nothing, as the manager of the Sorel *usine* promised to do for me. Composting the liquor with leaves would do very well, but I prefer applying immediately to the *bare* land by means of a trough pierced with holes. In heating with the leaves, there would be much waste of ammonia, unless a good covering of mould were placed on the heap. Unless the gas-works spoken of are large, it will take a week or more to fill a puncheon, so no great quantity can be secured before winter. A. R. J. F.

THE APIARY.

Shipping Bees and Hon y.

EDS. COUNTRY GENTLEMAN—While attending the fairs this season, I met a bee keeper who was berating the express company. He had sent a colony of bees to be exhibited at the fair, and the express company had "smashed it all up." This he finally modified to "broke the combs all down, and the honey ran out and drowned the bees." He had sold the hive and contents, and the purchaser had "strained" the honey and secured forty pounds! This, of itself, was almost an explanation. No colony of bees should ever be shipped with forty pounds of honey in the hive. Enough to last them on their journey is all that is necessary. A strong colony, confined to its hive, and disturbed, in warm weather, generates a large amount of heat, and combs that are heavy with honey are almost certain to become so soft as to break down, unless they are very old and tough. The bee-keeper whose bees melted down said: "I have had little experience, and I thought I would bring a colony of bees to the fair, and perhaps I might meet some other bee keeper and learn something." I thought he had learned at least one lesson. As he was inexperienced, he perhaps selected a swarm of the present year, the combs of which were new, tender and full of honey, and the bees probably given no ventilation, except at the top of the hive. The weather was really summer weather, and the probabilities are that the combs would have broken down, even if the hive had been handled in the most careful manner.

When I first began shipping bees and exhibiting them at fairs, I gave them upward ventilation only, but soon discovered that, in hot weather, or if the bees are to be confined any great length of time, there must be openings in the *bottom* as well as the top of the hive, in order that there may be a current of air to carry away the superabundant heat. Not only is an abundance of ventilation necessary, but there is also needed plenty of *room*. There should be a space of three or four inches both above and below the combs. In the heat of the day the bees cluster in these spaces, returning to the combs at night, or if the weather turns cool. It has been many times recommended that sticks be thrust down between the combs, at the ends of the frames, to prevent the combs from sliding about and swinging against each other, but I have had better success when no sticks were

used, the frames being fastened simply by nailing their ends with inch and a half finishing nails to the rabbet of the hive. (The heads of the nails should be allowed to project one-fourth of an inch, in order that they may be readily drawn out.) When fastened in this manner, the frames cannot slide about, neither can they swing together enough to injure the bees, while their not being fastened at the bottom allows the frames to move slightly under the influence of a sudden jolt, which assists the combs materially in sustaining the shock without injury. When sent by express, it is not very material which end of the hive is placed forward, but when sent by freight, it is an essential point, as the car is always started with a jerk, and, unless the combs are parallel with the track, they are apt to be swung together or broken out.

One hundred colonies of bees were sent to the exposition at New Orleans, and in order to get them into the car, it became necessary so to place ten hives that the frames were cross-wise the track. These ten colonies were dead when they arrived, while the others were in fair condition. A placard attached to the hive should request that everybody will "Please handle with care and keep out of the sun." When sent by freight, "This end forward" should be the reading upon another placard, so attached that when the request is obeyed, the frames will be parallel with the track. Unless the distance is short and there will be no transfers, it is seldom advisable to send bees by freight, unless some one can accompany them. If shipped at a time when there is much unsealed brood in the hives, much of it will perish, unless the bees are furnished with water—the bees robbing the larvæ of their food to quench their thirst. If somebody accompanies the bees, he can sprinkle them daily. If sent by express or freight, and no one goes with them, the best that can be done is to place a large sponge under the wire cloth, at one corner of the hive, and saturate it with water. If the bees are going a long distance, it might be well to attach to the hive a request that the express agent will moisten the sponge daily at noon. Colonies very strong in numbers seldom bear shipment so well as weaker ones—a medium-sized colony often containing more live bees, when reaching its destination, than a very populous one.

Large crates should be avoided in shipping comb honey, as a heavy crate is much more likely to be "dumped" than a smaller one. A crate should be light but strong. The honey should never be depended on to keep the crate in shape, but vice versa. Crates only one tier of sections high are best; if higher than this, and any of the upper sections are injured, the honey runs down and daubs the lower sections. Small crates are more saleable than large ones. There should always be glass in at least one side of a crate, in order that always who handle the honey may see what is being handled; this will secure more careful handling than to cover the crates with cautionary placards. When placing the crates in the car, they should be so placed that the combs are parallel with the track, the same as in shipping bees; this, however, is not so important as in shipping bees, as the combs are much smaller, some thicker, and there are no bees present to heat them. One disadvantage is, that the combs are new and tender, but there is not much danger of breakage, if the combs are well attached to the sections. Reversing the sections when nearly finished will induce the bees to attach the combs all around.

There is much less danger in shipping comb honey in warm weather, as the cold makes the combs more brittle. Much of the damage done to comb honey in shipping is done by the freight handlers in unloading it, and it is well for the shipper, if he has a large lot, to have his railroad freight agent mark on the margin of the way-bill the following: "Please notify consignee before unloading;" then the consignee can see to the unloading himself.

Extracted honey should be shipped in kegs that will not contain more than 150 pounds, larger packages are more difficult to handle, and more apt to be injured, and the honey lost by leakage. To prevent barrels from leaking, they are sometimes coated on the inside with wax or paraffine. The barrel should be warmed, and the wax as hot as possible. The hotter the wax and the barrel, the thinner will be the coating of wax. As soon as the wax is poured in, the bung should be driven in, and the barrel rolled about in different positions, so that the wax may touch all parts; then the bung can be taken out, and the wax poured out. In my opinion, it is poor policy to use second-hand barrels, or those that need waxing; better use good, new packages, that need no waxing. Kegs of spruce, holding 100 pounds, have given me the most satisfaction. They should be scalded out with hot water before putting in the honey; but no wooden package should ever be *soaked* with water before putting honey into it, for the reason that honey has the peculiarity of absorbing the water from wood with which it is in contact. Have the barrels or kegs as dry as possible, the hoops tightly driven and nailed. After honey has crystalized in a keg or barrel, it will, of course, bear almost any kind of handling without danger.

Both comb and extracted honey can be more safely sent by freight than by express; especially is this true in shipping comb honey, for the reason that express matter must, of necessity, be handled so rapidly. At our last State fair, I heard three men bemoaning the damage to their comb honey by express companies, while all the honey sent by freight was in fine condition.—*Country G.*

W. Z. HUTCHINSON.

Genesee County, Mich.

LIQUID MANURE.

As with other expenses, farmers are finding it necessary to curtail their outlay for manures. Indeed, from this cause, a very great change is already apparent on many a farm that looked greener and fatter a few years ago. The poor returns obtained from the use of purchased manures, as well as of feeding cakes, during recent years, have led many a farmer to dispense with them almost if not entirely. The only dependence, in such cases, for keeping up fertility is the economy of home-made manures; and to make the most of these just now may be the means of saving many a farm and many a farmer from utter ruin.

The liquid manure, we will not say on some, but on most farms, is not so carefully looked after as it might be. There is probably no kind of manure so generally neglected, yet none so deserving of attention; for although a large portion of what is produced in most farm-yards is absorbed by the litter, and consequently profitably applied, far greater quantities of it are permitted to run to waste. We have no means, without experiment, of ascertaining the actual amount of urine voided by the animals of different kinds and ages when fed on different kinds of food, and a mere estimate would not serve our purpose. It is well known, however, at this season of the year, when all the sheds are filled with cattle—and their food, especially turnips, is of a very watery nature—that the quantity of urine voided is very large, and sometimes even assumes uncomfortable proportions. How to get rid of it, and utilise it, has occupied no little thought, and in doing so, some have succeeded admirably. Acres upon acres might be manured with it on every farm, instead of its being, as it too often is, allowed to flow to waste, or wilfully drained into the nearest brook.

That an article considered of so much importance should be so much neglected, is not easy to be accounted for. The difficulty in handling it has, no doubt, been the main ob-

stacle; but in these days of cheapened labour this objection may be dismissed, as the wages of one man employed solely in collecting it where any quantity of stock is kept, would be repaid two or three times over. We shall welcome any new process in utilising so valuable a material; and the £400 prize offered by the Highland and Agricultural Society ought at least to draw scientific attention to the subject; but we need not wait for any new scheme before taking action for ourselves. It may be years, or it may be never, before we know how to handle the liquid as easily as a solid, and it will be best to do the duty that lies nearest us, by saving every drop of it in the best way we can.

With plenty of litter, very much of the liquid can be absorbed; but straw is a very scarce article on many farms this winter; consequently a more than usual quantity of the urine goes down the sewer. But it will even pay to use litter for the sole purpose of absorbing the urine; and where bedding is at all a benefit, as it is, in comfort to the animals, if straw cannot be had, something else should be provided. Moss litter is a good substitute, and those who have bedding to buy, and can make use of the manure, will find this cheaper than straw from the greater quantity of liquid it will absorb. Again, on many farms any amount of dry, mossy soil is obtainable, and a quantity of this carted to the stables, and dusted in behind the cattle will save a very great deal of the urine, and makes a capital top-dressing for any kind of crop. A large, deep pit at the lowest part of the steading, filled with dry earth, and having the liquid from the stables and cow-houses drained in to it, makes an excellent compost that will well repay the cost of cartage. Securing the liquid, and carrying it in that state to the field, is another way of making good use of it. A deep tank, with good drainage to it, and a water-cart, are all that is necessary; and we are sure that by any of these, or other means more practicable, a great portion of the substance of the farm which is now wasted may be retained.

Ag. Gazette, England.

NON-OFFICIAL PART.

AN AWFUL DOOM

of any nature is usually avoided by those who have foresight. Those who read this who have foresight will lose no time in writing to Hallett & Co., Portland, Maine, to learn about work which they can do at a profit of from $5 to 25 dollars and upwards per day and live at home, wherever they are located. Some have earned over $50 in a day. All is new. Capital not required. You are started free. Both sexes. All ages. Particulars free. A great reward awaits every worker.

A GREAT REMEDY FOR CATARRH.

In another column of this paper will be found an advertisement of a Catarrh remedy, of which a sample is sent free to any sufferer of this terrible scourge. B. S. Lauderbach & Co., the proprietors, are a responsible firm and those who write them will receive prompt attention and square dealing.

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