Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

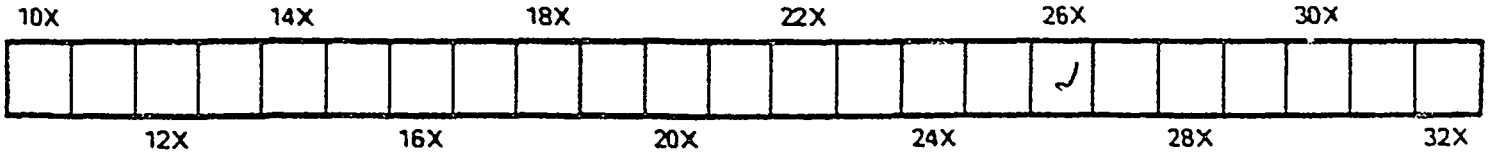
- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality of print varies/ Qualité inégale de l'impression
- ☑ Continuous pagination/ Pagination continue
- ☐ Includes index(es)/ Comprend un (des) index

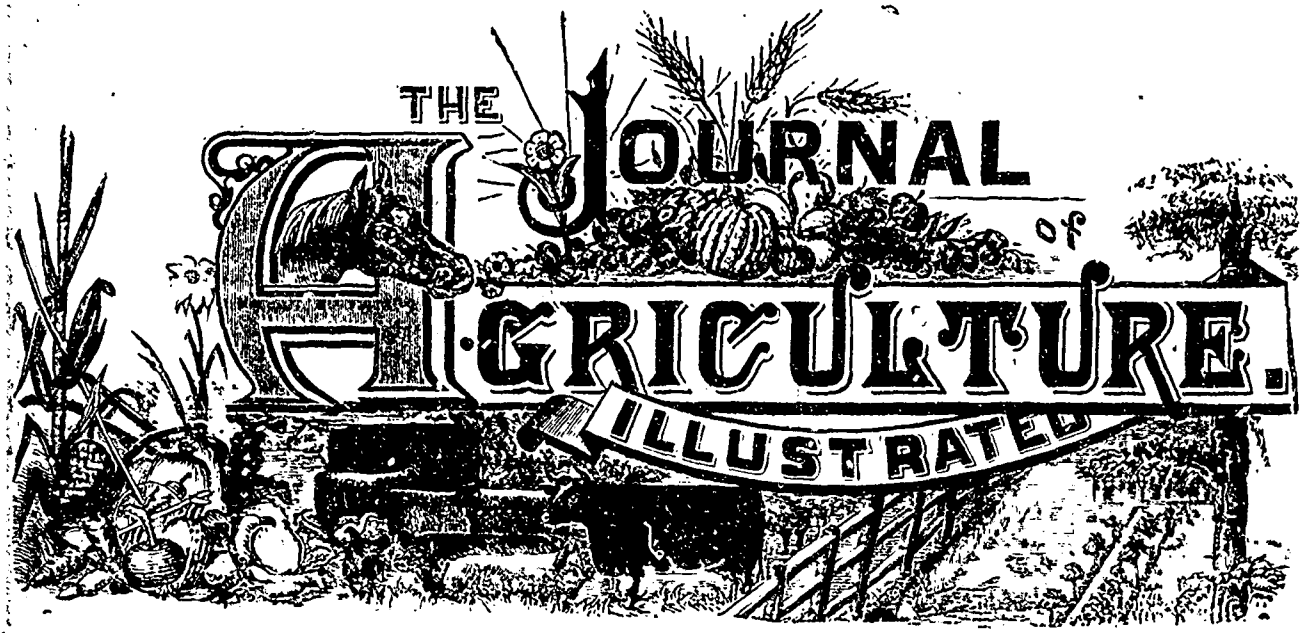
Title on header taken from:/ Le titre de l'en-tête provient:

- ☐ Title page of issue/ Page de titre de la livraison
- ☐ Caption of issue/ Titre de départ de la livraison
- ☐ Masthead/ Générique (périodiques) de la livraison

☐ Additional comments:/ Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.





Published for the Department of Agriculture for the Province of Quebec, (official part) by
EUSEBE SENECAL & FILS, 20, St. Vincent St. Montreal.

Vol. X. No. 7. MONTREAL, JULY 1888. $1.00 per annum, in advance.

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, Box 109, Lachine, Que.—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

Table of Contents.

Advice to Farmers on the Improvement of their Buildings.

The province of Quebec is relatively young; the soil is as yet hardly cleared; but in spite of this, the farms of the older parishes are exhausted, and no longer return remunerative crops. Hence, it is clear that, after a long succession of abundant harvests, we have neglected to restore to the land, in the shape of manure, the necessary elements of plant-food, and the soil, fertile enough in the days of our forefathers, looks for a prompt restitution of what we have taken from it, that is, an abundant supply of fertilising matters, of manures of all kinds, to restore it to its original fertility.

Our farmyard manure must be increased both in quantity and quality: hence, arose the idea of building dung-pits to receive both the liquid and solid droppings of our stock. But to increase the manure in quantity and to improve its quality, the stock must be properly fed, and their meals must be given them in an appetising and digestible form, in order that the forage of all kinds may be utilised, and a greater quantity of the inferior products of the farms thereby consumed. The only way in which this can be done is by cutting the straw, &c., into chaff, and scalding it, for which purpose it has been proposed to erect small boilers which would serve at the same time to cook the food for the pigs. (1) (No good to cook anything but the potatoes *for pigs*. A. R. J. F.)

And herein lies one of the secrets of securing the thrifty condition of our stock, and the production of abundant supplies of milk even in the midst of our rigorous winters. By this means, the spring whence milk, the raw material of the dairy industry, is derived will send forth its streams more abundantly, and insure to our beloved country a longer a of prosperity. If the promised land displayed to the Jews a view of future blessings, since milk and honey abounded therein, we, also, may look forward to a prosperous time to come. Here, too, roll along abundant streams of milk, and with an abundance of milk, the honey will not be difficult to secure. Each of us holds in his power a small though valuable mine, and to utilise it nothing remains for us to do but to profit by the lessons of experience, and to study seriously the teachings of those distinguished agriculturists who have placed the fruits of their investigations at our command. To farm our land in

(1) We will shortly give a description of our practice at Varennes, where all the water was heated for the stock by means of the cooking-stove :a most economical proceeding. E. A. B.

accordance with better principles than those that have hitherto guided us; to improve the plans of our buildings so that the cattle may be more suitably lodged, and to increase thereby the quantity and quality of our manure: these are matters of the highest importance.

I am a farmer, and not a little desirous of increasing my prosperity. I am anxious to improve the condition of my buildings in accordance with more modern views; but my barn, though pretty old, is in good repair, and I should not like to destroy it, either for old memories' sake, or because my pocket will not admit of a great outlay in rebuilding it. Poor old thing! It is in such good condition; I cannot bear the idea of demolishing it! What am I to do? Mr. Barnard, said I to myself, who has such a complete establishment at Three-Rivers, and who has so thoroughly studied all the best systems of constructing farm-buildings, will surely give me good advice on the matter,— advice which will,if published, be of immense use to many men in my position.

With these ideas, my dear Sir, I take the liberty of enclosing you the plan of my barn, and beg you to show me how to alter it in the best possible fashion. Should you find it possible to join economy with improvement, you will confer a great favour upon me, at the same lightening the calls upon my purse, which, I fear, will otherwise be heavy.

You will see by the plan that the barn is 90 feet long by 26 feet wide, including a cowhouse, 33 feet long, two threshing-floors, two bays, and a sheep-shed. Connected with the cowhouse, to the east, is a fowl-house. The stable is at present separate from the cowhouse, but my aim is to have all the animals under the same roof, that the dung of horses, cattle, and sheep, may all go together into the cellar. I intend to build a small boiler-house (Take care about your insurance. E. A. B.) on to the cowhouse, a piggery communicating with the dung-pit, a shed for the surplus dung. and preserve the fowl-house and sheep-shed as they are at present. I have a threshing-machine, driven by a good horse-power, to which I intend to attach a chaff cutter. To all this add, if you please, those numerous details necessary to render my buildings complete and at the same time economical to work, details with which you are far better acquainted than I can pretend to be.

At present, I will not enter into the question of building a silo, though I hope to have one before long, seeing that it does not appear to me that it should form part of the barn. I have plenty of inferior hay, wheat-, oat-, buckwheat-, pease-straw, and especially of rye-straw, and chaff (*balles*). I hope you will show me how to mix these diverse materials in the best way to produce an abundant supply of milk.

AGRICOLA, ST. N.

REPLY.—Our learned and skilful correspondent, from whom we should like to hear more frequently, is desirous of altering his system of cattle-feeding with a view to the improvement and the better preservation of the manure. To this end, he wishes to have all his stock under one roof, and to keep the dung under one shed. As a cheese- and butter-factory has been established in his parish, he proposes to devote his farm to supply it with an abundance of milk. His building, which we have seen, is solidly built, but too narrow. It rests on a good stone foundation. With very little difference, this fine erection resembles exactly the ordinary barns of our rural districts, so that the requisite alterations of *Agricola's* farm-buildings can be advantageously made wherever farmers, with the same advantages, wish to profit by them.

The building is on ground-plates (*soles*). It should be raised four or five feet throughout its length, and on each side should be raised a good shed, which would support the main building, making it, as strong at least, as it was before. At fig. 2, we show the same building, raised as above, and a shed serving for a horse-stable and a prolongation of the floor. If the building is to be raised throughout its length the sheds must be equally continued on each side, for the purpose of strengthening it. Besides, they will be useful for many purposes, and before long will become indispensable, as soon as the crops shall be doubled in yield by the increased supply and improved quality of the dung, which reduplication cannot fail to take places in every field that has been improved. Our correspondent speaks of a silo. The continuation of the hinder shed would give him an excellent site for the silo, 20 feet and more, between the two floors. It would be no longer necessary, as it is now, to throw the straw out as it is threshed; all the carts and implements would find plenty of room in such a shed; and, in addition, it would more than double the capacity of the building, which now is too small. At fig. 3, with explanations, we see a plan of the proposed new building, with a stable on one side, and a manure shed on the other. Above this, the piggery, with an open boarded floor to let the urine escape. At one end, the calf-stalls, and at its side the food-mixing room. We fear that the Insurance companies would charge double rates for the boiler-room, unless it were situated at some distance from the barn.

To throw the manure from the horses, &c., into the pit by means of traps under the mangers may not suit our correspondent's views. We have done it for many years without the least inconvenience, always taking care to keep, in this division, quiet horses, oxen, &c.

At our farm, the dung-cellar is floored with beaten clay, and the posts rest on a single large stone, sunk in the ground, with a block of cedar on it. These posts have been already spliced once in 28 years,and can be spliced again at a trifling expense.(1) Thus, it is not absolutely necessary to make a stone foundation, unless it be required for the purpose of retaining the liquid flowing from the manure when it is above the level of the ground. In that case, a 3 or 4 foot wall, with a lining of beaten clay, as shown at fig. 3, becomes necessary.

It will be easily understood that no water should find its way into the yard or the dung-pit. The farmer has no time to spend in carting rain-water on to his land, even if that water were mixed with the manure. The pit and shed for manure, then, must be made water-tight, whether the water falls from above or rises from below. Our correspondent's hen-house is a perfect little bijou. The one we give in our engraving is at the service of those who have not one already.

Those who are interested in these matters are requested to read the subsequent article on farm-buildings, and to let us know as soon as possible what they think of what we have stated. The questions asked are new and by no means easy to answer. We do not pretend to solve perfectly all the difficulties which present themselves in practice, but we will do our best to study them out thoroughly.

ED. A. BARNARD.

From the French.

FARM BUILDINGS.

One of our friends, a *curé*, wishes to build a model barn, to contain 3,000, to 4,000 bundles of hay, and the grain-crops, &c., of an ordinary farm. There must be room in the stable for 6 horses; in the cowhouse, for 10 head of cattle of different ages; in the sheep-shed, for 20 sheep; 3 pigs and 50 fowls, will also be kept. The same building, being attached to a presbytery, must afford shelter-room for the carriages and

(1) The spliced timbers should be solidly bolted—18 feet high in the square, i. e. under the roof. A. R. J. F.

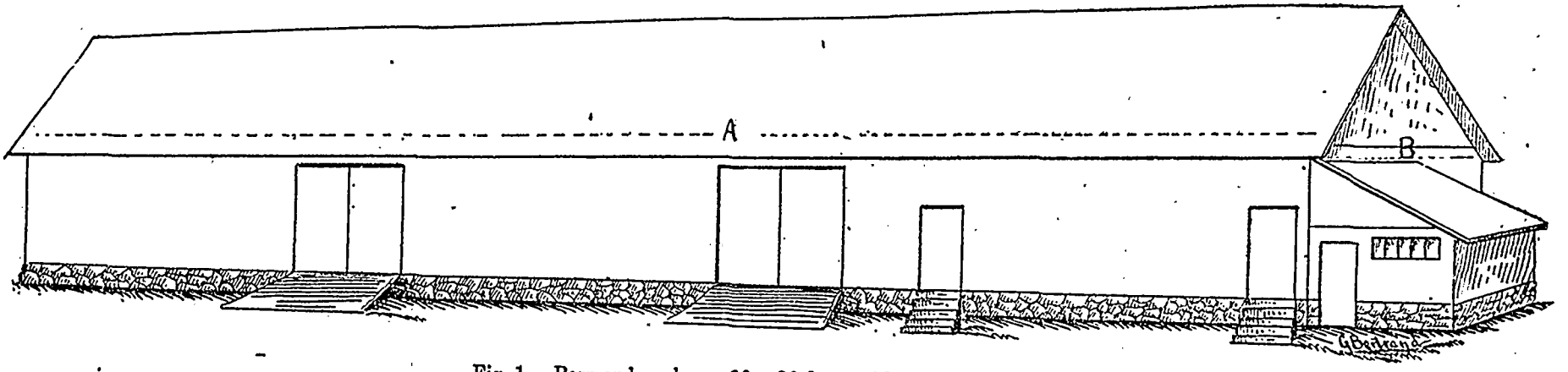
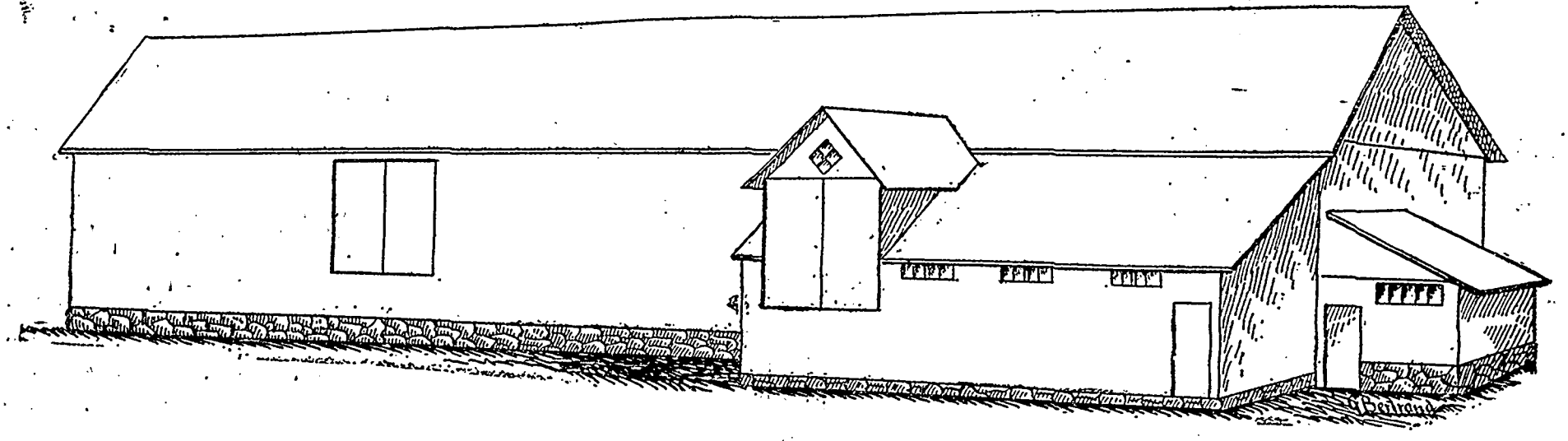


Fig. 1.—Barn and cowhouse 90 x 26 feet—with annexed fowl-house.



The same raised 4 to 5 feet, with stable and sheds for manure, pigs, &c.

Fig. 3.—*Section of the cowhouse raised 4 or 5 feet by lengthened and "entès" posts, with lean to the west for a stable and dungshed; to the north, pig-stry, &c., above the dung-shed.*

A. 4 feet passage between the beasts.

BB. Mangers with troughs, as exhibited at Qebec.

C. Foor, 4½ feet long.

D. Dung-troughs—10½ inches wide at bottom.

E. Passage in rear of cows.

F. Wider passage in rear of cows—serving as an alley to feed the horses by.

G. Hole by which to throw the manure into the cellar. The flooring of the stable should be laid with a space of one inch between the planks, to allow the urine to run freely into the cellar, the floor of which should be made of beaten clay—HH.

I. Stable.

J. An opening throughout the length, so that the fowl-house may be lighted and warmed by the light and heat of the stable.

K. Fowl house.

LL. Ventilators.

M. Dung-cellar.

N. Dung-shed.

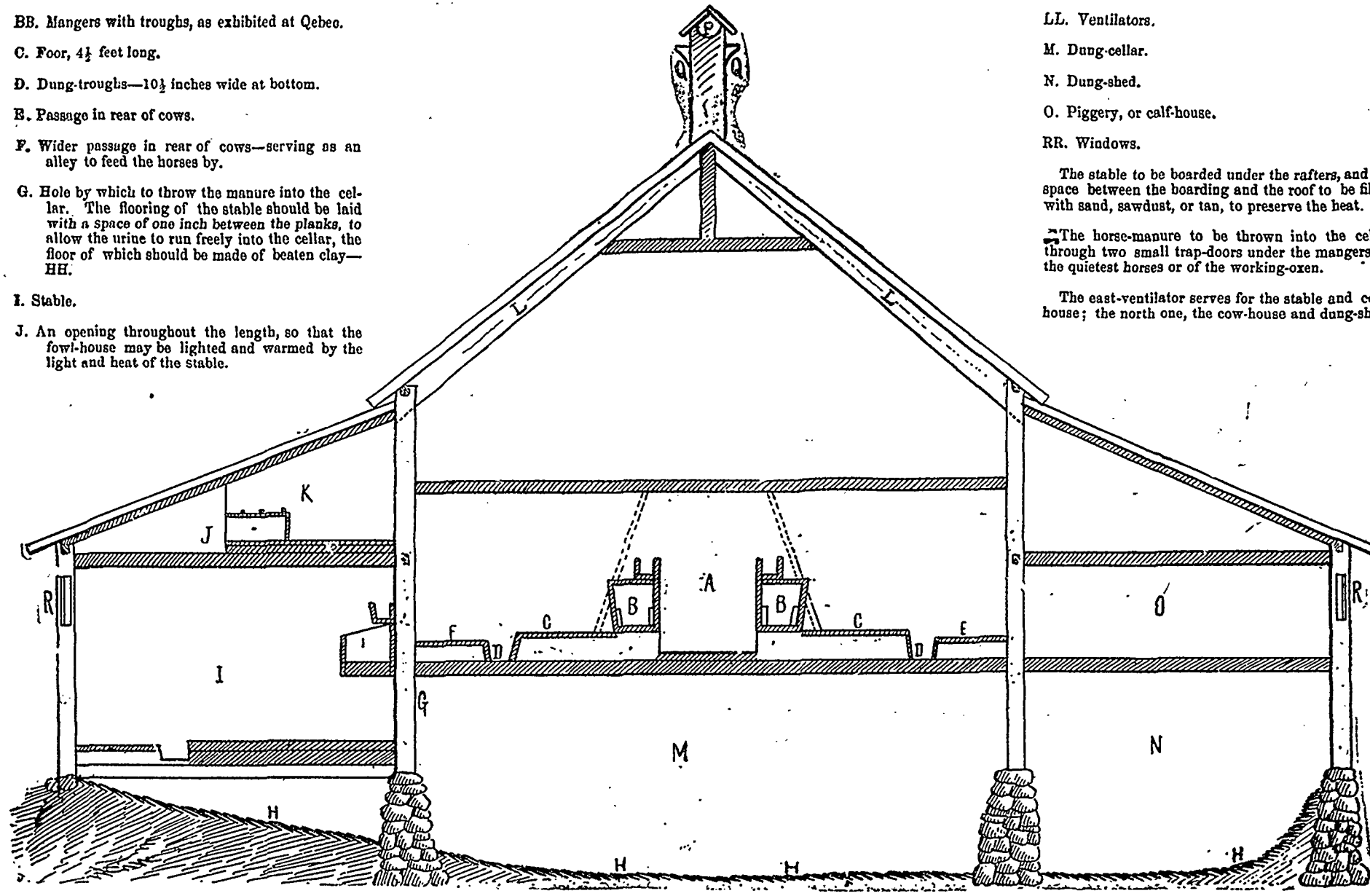
O. Piggery, or calf-house.

RR. Windows.

The stable to be boarded under the rafters, and the space between the boarding and the roof to be filled with sand, sawdust, or tan, to preserve the heat.

The horse-manure to be thrown into the cellar through two small trap-doors under the mangers of the quietest horses or of the working-oxen.

The east-ventilator serves for the stable and cow-house; the north one, the cow-house and dung-shed.



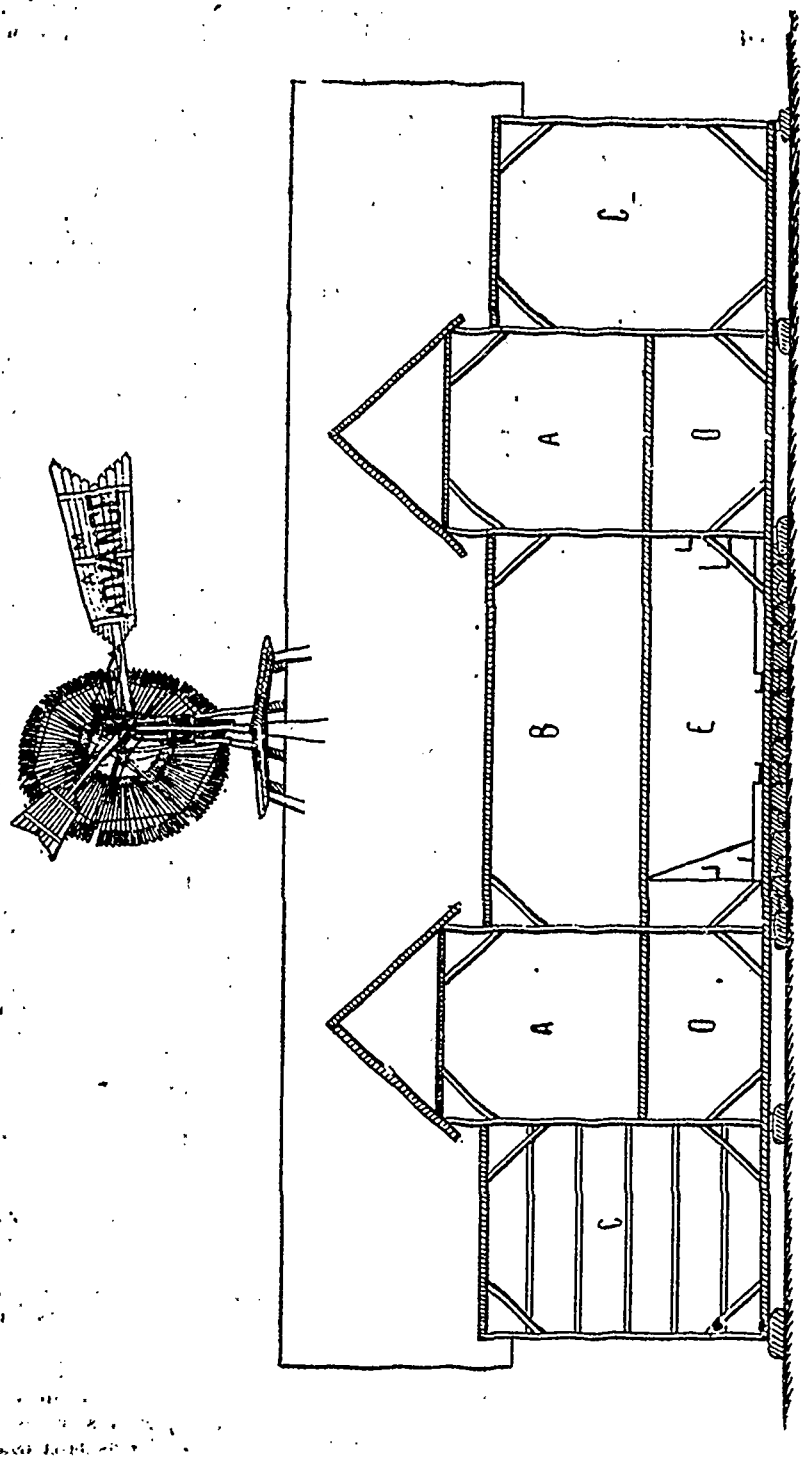


Fig. 4.—Barn, &c.—Building 18 feet high—90 x 30.

AA. 12 feet high and the same in width.
B. Hay-barn.
CC. Bays or silos.
DD. Cart-shed, sheep-shed, piggery, &c.
E. Stable and cow-house, 7½ feet between floors.

the fire-wood. Our friend thinks all this can be done with a building 72 feet x 30 x 12.

This does not seem possible.

In fact, the stable and cowhouse will occupy *at least.*	22' x 30'
The fowlhouse, sheepshed and piggery.....	10' x 30'
The cart-lodge.....	18' x 30'
The wood-shed.....	10' x 30'
	60' x 30'

Thus, there will only remain for the one threshing-floor ..... 12' x 30'

72' x 30'

It is true that there would be a hayloft 60' x 30', which might be divided in two by the threshing floor, but there would be no other place for the grain than the hayloft itself, which would hardly be convenient, even for the small quantity of grain in question.

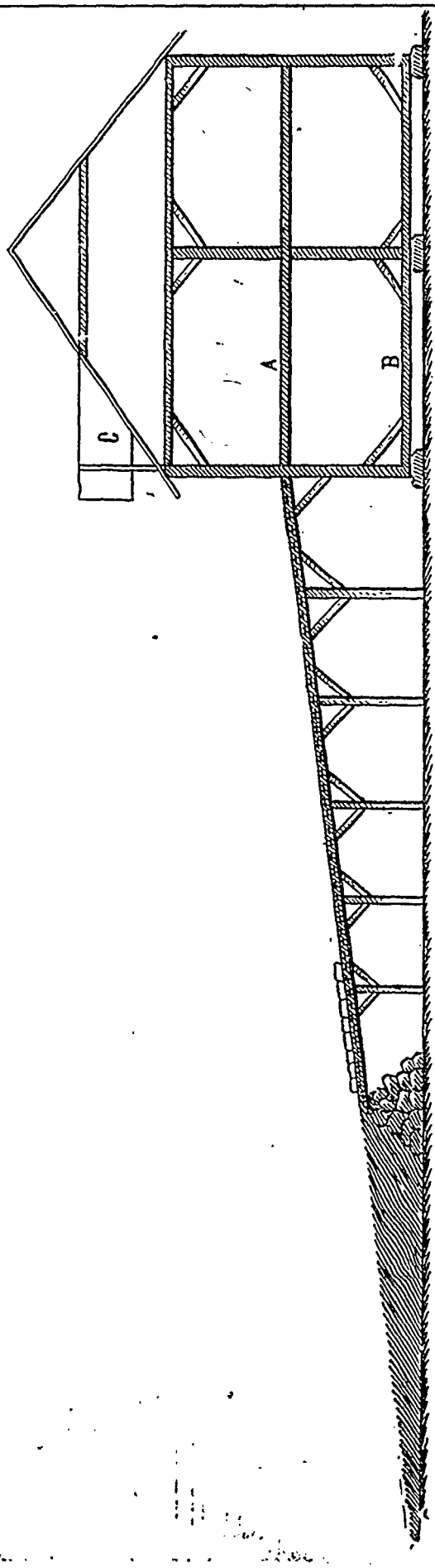


Fig. 5.—Same from the side, with incline to threshing floors; one in eight. C. Raised porch to admit larger loads.
A. Floor 9 feet from the ground. B. Floor of stable, &c.

If the building were 18' feet high instead of 12' it would be a very different thing. In that case there would be plenty of room.

We must not forget that a building of 18 feet in height will hold at least twice as much as one of 12 feet, on account of the additional weight of hay or grain which enables much more of these crops to be stowed in the same space. If we remember that in both cases the same frame and roof are required, and that to obtain double the space all that is necessary is to employ posts 6 feet longer, and the boarding round it, we shall be convinced of the indisputable utility of the alteration we have suggested.

As to raising the threshing-floors, and building a road-way to them, it seems to us that this improvement is everywhere necessary, whether the height of the building is 18 feet or only 12. Those who saw the model cow-house which we had built at Quebec last year will admit that there is nothing easier. The advantages are numerous: 1. The carts are unloaded with ease and in much less time; 2. the building is completely filled without loss of time or space, and thus the whole of the part below the floors is thrown open to be used as cattle-houses or cart-lodges. These raised floors are especially useful when grain is being threshed. The straw does not require raising to a great height; and the chaff and broken straw can be laid away under the floors.

As to the raised road-way to lead to the floors, the gradient should not be more than 1 in 8. Part may be made of earth, up to a height of 4 to 6 feet. An easy job, if done with the horse-scoop, which implement every good farmer ought to possess. The rest is made as shown in the engraving, fig. 5.

In a building of 18 feet high, it would be easy to place the stables and cow-houses on a level with the raised floors. In this way, a cellar for manure could be secured extending under the whole of those apartments. In this case, there would be no flooring to this part of the building, the bottom of which should be covered with a layer of beaten clay, raised all round the sides, and hollowed out in the middle to retain the urine. See engraving and explanations, fig. 3.

Our correspondent proposes to make, at some future time, a silo, and to use a chaff-cutter, &c. We therefore show, in the centre of the proposed barn, a well constructed windmill. So perfect is this mill, that it adjusts its pace according to the force of the breeze, and stops of its own accord when a gale arises. Mills are to be had of various horse-power. They answer for all purposes: threshing, sawing, chaff-cutting, grinding, &c.

We refer our readers for a description of the piggery, the sheep-shed, and the manure-pit, to the engraving p. 101. We think good use might be made of the vacant spaces under the raised road-way.

By making the flooring of the road-way double—break-joint fashion—and laying tarred-paper between the two floors, placing little spouts across it, in different places, to carry off the rain, which otherwise might find its way through the flooring, this sort of shedding might be made to answer as a receptacle for cord-wood, implements, carts, &c. It might also be converted into a root-cellar, as described vol. X,(1887), p. 58, of *Le Journal d'agriculture.*

We say no more to-day on this subject, hoping to receive the opinion of some of our correspondents on the matters treated in the two above articles.

ED. A. BARNARD.

(*From the French.*)

Bulletin No 2. University of Minnesota Experiment Station. pp. 22.—Siloes and Ensilage.

A very interesting report on the above matters was issued by the Experiment Station of the University of Minnesota

in the month of April last. The conductors of the station seem to have gone to work in good, honest fashion, without bias one way or the other, and their failures are reported as frankly and freely as their successes. The silocs seem to have been built with great care, and one peculiar part of the construction seems worthy of remark: the sides do not extend to the bottom, but stop short an inch and a-half all round. Before filling, a strip of tarred paper is folded lengthwise and doubled, so that one-half of it will lie against the wall, and the other portion on the floor: it is held in its place by a strip of board. This makes an air-tight joint, when the pit is full. When the silo is empty, the board and the paper are removed, and there is a circulation of air all round the sides of the silo, between the stone-wall and the lining of matched boards, which keeps the wood-work dry, and adds greatly to its durability. The lining is 2 inches from the wall, and the air-chamber provided by this mode of construction seems to have preserved the silage from freezing during the two past winters, though the silo is built on the north side of the barn, and has been exposed to a temperature of—40° F.

The Ensilage crop.—Three and a-half acres of self-drained clay-loam were selected and, after receiving thorough cultivation and 20 tons of well-rotted farmyard dung, sown with corn in rows 45 inches apart, and 4 grains to the foot. The seed was deposited two inches deep, *well rolled*, and 9 days afterwards the rows of young corn were visible. Harrowing with the smoothing-harrow, and horse-hoeing followed, "and the crop was hand-hoed once, to remove the weeds from between the stalks." And while feeling quite delighted at seeing cultivation so thoroughly carried out, I cannot help remarking how desirable it is that some one should teach the farmers of this continent how to use their exquisitely constructed hoes. The hoe used in my part of England is a clumsy tool enough, but with it a Kentish labourer *edge-hoes*, with ease, an acre of pease, beans, potatoes, or roots, a day. By *edge-hoeing*, I mean that he cuts up all the land, with its weeds, that has not been touched by the horse-hoe; striking his tool along the rows and between the plants, so that when he has finished, the field has been moved in such fashion by the horse- and hand-hoe, that not one particle of the ground remains unstirred: he walks of course, with the row between his feet. Now, in the table giving "the cost of growing one acre of ensilage corn—see p. 7 of this report—the expense of hand-hoeing is set down at four dollars an acre!!! Have I not a right, to say if a Scotchwoman can single 2½ roods of turnips in one day, and a Kentish man can edge-hoe an acre of potatoes, &c., in the same time, the American farmer wants somebody to teach him to use the hoe? As the wages paid during this experiment were at the rate of $1.33 a day—see the same table—it follows that it took a man three days to "hand-hoe, to remove the weeds from between the stalks," or three times as long as it would take him did he understand his business.

I confess I should not like to conduct experiments in Minnesota, for, "in the latter part of July, the *chinch-bugs* swept over the farm, destroying many of our experiment plots of grain and grasses." Fortunately, the corn-plot was too forward to suffer.

In 1886, the distance between the rows of corn was 25 inches, 4 grains to the foot, and the yield, with the same treatment as in 1887, was 22 tons an acre. With drills at 45 inches, and 3 grains to the foot, the yield was 35 tons an acre, and a much larger proportion of the stalks bore well matured ears of corn, which were in "the milk" when cut.

Harvesting.—The corn when cut averaged 13 feet high. It was too heavy for any machine, so it was severed by hand, and laid in open bundles on the ground, to wilt, for about 36 hours, during which time it lost about 17 % of its moisture. The yield of *green corn*, determined by careful weighing of the whole crop, was 35 tons an acre, so that the ensiled corn off an acre would probably weigh about 29 tons. The time occupied in the operation from beginning to cut to the filling of the last load into the silo, was 13 days, of which, as far as I can judge from the rather queerly expressed passage about it, only the afternoons were devoted to filling. It was evidently acid silage, as there could not have been time to allow of heating before covering in.

Silo No. 1 was filled to the depth of 16 feet, with 142,600 lbs. of cut fodder, which gave 35 lbs. to the cubic foot. After levelling the top, it was covered with planks, placed side by side, so arranged as to leave one inch space on the top of the silage naked, to allow of easy settling. This was then covered with two thicknesses of tarred building paper, and over this a covering of inch boards and the whole weighted with 130 lbs. to the square foot. On December 1st, the mass had settled 4 feet, = one-fourth of the original depth. No more settling ensued, and on March 30th, a cubic foot of the silage, taken 6 feet from the surface, weighed 43 lbs., showing a loss of 10,504 lbs., or 7 %, in curing. (1)

Silo, No. 2, was filled in the same manner as No. 1, with 76,000 lbs. of the same kind of corn, and the balance with silage corn from other experiment-plots. This was packed and covered the same as No. 1, but *not weighted*. The extent of subsidence was 3 feet 6 inches.

Early in December, both silocs were opened, and their contents examined. No. 1—silage *perfect;* not a cubic inch injured; as bright under the covers, round the sides, and in the corners, as when put in. Light brown in colour, slightly acid to the taste, and the odour agreeably vinous.

In silo No. 2, the unweighted one, the contents were decayed for the first 12 inches from the top, and nearly as much round the sides. The silage had a strongly acid smell and taste. The sound interior was readily eaten by the stock, but not with the relish or productive results as the contents of No. 1.

Cost of growing one acre of ensilage.—The average distance from the field to the silocs was 1,000 feet:

Carting and spreading 20 tons of dung.....	$5.50
Once ploughing.....	1.00
Harrowing and rolling.....	1.00
Planting	1.00
Seed 2 pecks.....	1.25
Cultivating 4 times.....	2.00
Hand-hoeing and weeding.....	4.00
	$15.75
Equal per ton.....	.45

On this, I have to observed that there is no value put on the "20 tons of *well-rotted* farmyard manure!" This ought to be worth, when ready to go on to the land, at least $1.50 a ton, and allowing one-third of it to remain available for future crops, an addition of $20.00 should be made to the above total. Again, no rent, rates, or interest, or wear and tear, depreciation of value, are mentioned. Four dollars an acre would not be too much for these charges. I doubt very much if an acre of land can be *ploughed* for a dollar, the man's wages alone being $1.33 cents a day! I see one of the correspondents of the Rural Vermonter boasts of the acti-

(1) It strikes me that the increased weight of the cubic foot does not necessarily show a loss in curing Pressed hay weighs at least 100 % *more* per cubic foot than it did when in built, and yet is has lost little or nothing of its contituents not even water by being pressed. Ed. A. Barnard.

vity of Vermonters in general, and of one in particular, who ploughed 3 acres of land with a pair of horses in nine hours forty-five minutes. Perhaps it is running over the land in this fashion that has brought the farmers of the State in which this is said to have occurred into such a state of poverty as Dr. Hoskins describes so feelingly in that paper.

However, the manure and rent &c., being added to the *total cost* of growing an acre of silage, as given above, the amount we arrive at as representing the real cost is $40.25. We saw that after allowing for the loss of water when the crop lay "in open gavels to wilt and dry out a portion of the water," the crop as converted into silage could not have exceeded 28 tons to the acre, which would cost for manure, cultivation, rent, &c., $1.43 a ton, or more than three times as much as the Station calculation made it out to be! All these experiments are conducted in a very one-sided fashion —not intentionally, of course—but we shall never reap any benefit from state-aided stations until the managers are selected from perfectly unprejudiced men—a class very difficult to find at any time. One should ask oneself the same question, before beginning an experiment, that is asked by the counsel when a Juror is objected to on a panel: Have I formed any opinion as to this question that is about to be submitted to trial? For instance; I—*moi qui vous parle*—I should not like to begin a trial of the relative productive powers of the Jerseys and the Guernseys. I feel that, however much I might try to be fair in my dealings, if a doubtful point arose in the competition, all my earnest desire to act uprightly would be overpowered by my—prejudices, if you like to use the word. And so of other matters.

Cost of harvesting and filling.—The capacity of the chaff-cutter employed in the preparation of the silage was 50 tons a day, and the cost of wages, teams, coal, &c., amounted to $21.56 for the ten hours during which the work was carried on daily; making the entire expense equal to 43c a ton! Here, again, no charge is made for interest of money—cost of the silo, of the engine, the chaff cutter, &c.; and, as a very old employer of agricultural steam engines of the best construction, I must be allowed to say that 400 lbs. of coals is a very small allowance for ten hours work. Anyhow, this 43 cents a ton, added to the $1.43 a ton which we saw was the true expense of the cultivation, brings the real cost of the silage to at least $1.86 a ton, instead of, as given in the report, 88 cents!

Mr. Fisher, in his address to the farmers of Huntingdon, said that he estimated the value of good corn-ensilage at one-third of the value of a ton of hay = $2.66. So, even at my computation, three times the cost of a ton of ensilage being only equal to the value of rather less than three-fourths of a ton of hay, a crop of ensilage of 28 tons of wilted corn to the acre must be one of the most profitable crops grown on the farm. (1)

Of all the kinds of corn grown for the experiment, the best seems to have been the "Canada Flint." The following analysis is worth reading:

Canada Flint corn. Table No. 3.

Per centage of digestible matter.

Albuminoids.	Fibre.	Carbhydrates.	Fat	Yield per acre of digestible matter, 6,706 lbs.
2.94	3 92	24.33	86	

(1) I am supposed to be opposed to the silo-system. This is a mistake I only wish to prevent people from rushing too quickly into a system which may induce them to hope for impossible profits from an acre of land, and to neglect other equally valuable crops for the sake of one which is doubtless very fasionating. Mr. Sprague, of the Ontario Agricultural Association, puts the value of a ton of ensilage-corn at $7.00!!! A. R. J. F.

The enormous per centage of albuminoids and of carbhydrates in this corn leads the managers to the following conclusion: "The very high per centage of Carbhydrates found in the *Canada Flint* in comparison with the other varieties of Flint-corn, would indicate the presence of some unusual conditions rather than extra feeding value, and these facts (*what facts?*) can only be determined by a repetition of the experiments." So they reject the Canada-Flint altogether, not even noticing that its albuminoids are also greatly in excess of all the rest. (1)

"The tests of the laboratory and the feeding-stables do not agree as to the value of ensilage." And the eyes of the *agronomes* are beginning to be opened to the same idea as regards swede turnips!

Well, the experiments above noted seem to have been highly satisfactory, and I hope they will be continued for several years. It is a most difficult pursuit is this of conducting experimental stations, and those at the head of them deserve great credit for the patience and energy they display in their work. Nothing can be more pleasing to an experimenter than to find that he is on the right road, but most annoying contre-temps will occur, and upset all his calculations. Chinchbugs, grasshoppers, &c, devour his plots, and plants seem to take a perverse delight in behaving badly. For instance; here is an experiment tried with two kinds of mangels, the Norbiton Giant—a long red and a monstrous cropper—and the orange Globe—a moderate cropper, but of first rate quality.

Mangel Wurzels.	Weight of each root in oz.	Pounds per acre.	% of sugar.	Gravity of juice.
Norbiton Giant	41¼	60,258	5.5	1.044
Golden Globe	83	119,064	4.1	1.020

The above is the analysis for sugar: the following is the analysis of the same roots considered as food for stock:

Name of variety.	Analysis of the green root.		Analysis of the dry substance				
	Per cent. of water.	Per cent of dry matter.	Per cent crude cellulose.	Per cent ash.	Phosphs in ash.	Albuminoids	Starch, sugar &c.
Golden Globe	87.8	12.2	7.43	11.12	.45	16.63	64.82
Norbiton Giant	88.7	11.3	7.93	12.55	.36	16.62	62.90

Thus the weaker cropper doubles the yield of the giant mangel, as well as beats it in every valuable constituent: containing 1 % less water, less crude fibre, less ash, but more albuminoids, more carbhydrates, and more phosphorus in the ash. I should have expected the yield of the long-red-mangel to have been, on the Minnesota Station soil—a self-drained clay-loam—at, least 50 % heavier than the yield of the orange globe.

DE OMNIBUS REBUS.

June 8th, 1888.

Agriculture in Britain.—I see by my exchanges that farms are in demand again in England. A trustee, too, of

(1) We are glad to state here that the Quebec flint corn is to be extensively tried and thoroughly analysed at the Minnesota Experimental farm during the coming season. ED. A. B.

my acquaintance has been asked to use his influence with the agent of an estate to procure a farm for a would be tenant! Rents have been, in most cases, judiciously lowered, and the farmers having reaped such an abundant crop of wheat last year, and being encouraged by the improved price of meat, seem to be in better spirits.

Cheese.—Never has the stock of old cheese in England been so closely worked up as this year. The last April market at Nantwich, Cheshire, only showed five tons on sale, the smallest quantity ever known at an April fair. No doubt the fodder-cheese from Canada and the United States will have pulled down the price from its highest, but I see by Hodgson's report that good new is still worth from $9.00 to $9.50 a ton. Butter is low here, as a rule, but *eatable* stuff at the grocery shops of such men as Gordon, Crawford, &c., fetches 30 cents, a good price enough for the retailer, who, I hope, gives the farmer 25 cents for his share. Mr. Reburn, of Ste-Anne, gets, I believe, 30 cents for his, but Jersey butter, worked up by such painstaking people, ought to sell well. If any one would start a fair sized farm for the production of soft-cheese, butter, porkers of 60 lbs. weight fed on skim-milk and barley- or corn-meal, and short-wool sheep—any of the Downs; Shropshires, Hampshires, South, or Oxfords. (1) all of the best quality, he would soon gain a connection among the richer people of Montreal, and, if he understood his business and would keep strictly to his implicit bond, he could not help doing well.

Jerseys.—Talking of Mr. Reburn, I see his stock sold well at the combined sale at New York in May. He got an average, according to the Country Gentleman, of $283 on his five best, "and showed some splendid animals. The Green Mountain Stock Farm Company sent 15 heifers, in calf to Prince Randolph, a young bull "combining the individual blood of Mary Anne of St. Lambert's, Eurotas, and Jersey Belle of Scituate," which averaged $146,66 a head. Five or six years ago, what would breeders of this description of stock have said to such prices for such pedigrees? In England, the highest averages of the best herds of Jerseys offered this spring run about $130 to $160. They have never had a *boom* in Jerseys in England. *The* favourite dairy-cow is, now still more than ever, the highly bred milking-Shorthorn.

Floats vs. plaster in stables.—The Rural New-Yorker advises every farmer to keep a barrel of plaster constantly in the stable for use *back* (*sic*) of the cows. Dr. Hoskins, who, like me, has no faith in the absorption of ammonia by a dry substance like ground sulphate of lime, recommends the use of South Carolina phosphate, in the form of floats, or finely levigated, instead. "This is not a disinfectant, but by scattering a handful every day upon the manure of each cow, the value of the manure would be increased at a trifling expense. Floats cost, delivered at most stations in New England, $16.00." No doubt the intimate mixture with the dung for perhaps months would tend to make the phosphoric acid sooner available for plant-food; and, as Dr. Hoskins justly observes, as the dung and urine of well fed cows is over-rich in nitrogen for nearly all farm-crops, the manure would become much better balanced by the cheap addition. Unfortunately, the urine is in general allowed to soak through the floor of our stables and cow-stalls, so there need be no fear of our farmyard dung containing too much nitrogen.

Experimental torture.—Do not people yet understand than an experiment is an essay to determine a certain given problem in a *positive or a negative way?* I pity most sincerely any manager of an experimental farm, whether the funds for its functionment are furnished by Government or by private subscription. "I have been there," as the slang phrase runs. This is *à propos* to a remark made in the Ottawa House the other day by Dr. Landerkin. "Another matter," said he, "is that some of the roots at the Experimental farm were allowed to rot for want of ventilation!" If this is the way members of the Opposition are going to pick holes in the Government establishment, all I can say is that I do not envy Mr. Saunders his position.

Snow: is it a manure? It is very commonly believed here that snow has, *in se*, a manure-value. I often hear it remarked: We shall have good crops this year, for there has been plenty of snow. Rain contains about one part in a million of ammonia, and melted snow is still richer in that valuable matter. To test the value of different manures on various soils, numerous experiments have been carried out by the Bath and West of England Society during the last few years, and, among others, I cite the following, by Mr. Story-Maskelyne. He laid out 12 *plots* (why will the U. S. people call them *plats?*) and on one of these snow drifted to a considerable depth, leaving all the other plots bare. The produce of the snow plot was ten bushels an acre more than the rest. This, of course, would at first sight show that the snow had a considerable manure value, but, unfortunately for this theory, the explanatory remarks mention that "the severe frost caused a loss of plant on all the plots except that on to which the snow had drifted." The effect of the snow, then, was not manurial but protective, and this is probably the chief benefit which in all cases it affords to the crops.

Milk preservative.—A new and very peculiar preservation for milk has lately been invented in France. MM. A. and L. Brin, both pupils of the illustrious agricultural chemist M. Boussingault, have discovered the means of compressing oxygen, from a mechanical mixture of oxide of barium and atmospheric air, into steel-cylinders, in the proportion of 40:1. The compressed oxygen is used for the lime-light; it destroys germs of all kinds in milk, which has been preserved sweet under its influence for 15 days; and I hear that it will soon be in the market as an article of commerce.

Superphosphate.—The mistake of supposing that superphosphate causes a rapid germination of turnip-seed is often made. What this manure really does to benefit the turnip at first is that it forces the plant *after* the seed has germinated into the rough leaf, and thus gets it rapidly out of fly's way.

Nitrogen.—If, according to Lawes' experiments on wheat manures, it takes 4 lbs. of nitrogen to produce a bushel extra of wheat on an acre, what do the manure-merchants mean by recommending a mixed fertiliser for wheat containing only 2 % of nitrogen? No one can afford to aim at less than an additional 8 bushels per acre, when using artificial manure, and to obtain that increase would demand a dose of 32 lbs. of nitrogen, equal to $\frac{3}{4}$ of a ton of the manure in question, which at current prices would cost about $26.00! Manures for grain-crops must necessarily be composed of more than one constituent, but farmers should mix for themselves. Potash, on three-fourths of the land of the province, may be omitted, and nitrogen and phosphoric acid are now easily obtained, in the forms of sulphate of ammonia and the "old char" of the sugar refineries. A full dressing for an acre of wheat of these two fertilisers combined would cost:

(1) The Oxfords, though very good mutton, are, I fancy, too large for a first-rate *family-trade*. A. R. J. F.

150 lbs. of sulph. am.....	$5.60
200 lbs. of old char.....	1.60
	$7.20

The old char having its phosphoric acid in an insoluble state, I shou d sow on the autumn furrow, and the sulphate of ammonia might be harrowed in with the wheat in spring. Where land is in good heart, 100 lbs. of the sulphate will produce a great increase of crop without any other manure.

Lachine farms.—The 27th April saw the first sowing of the year in this place: barley after potatoes, on the autumn furrow. Seed me nt to be 3 bushels to the imperial acre, but fortunately the seeder (combined broadcast and drill) would not sow so much: the seed being small four-rowed barley, 2½ bushels on ground in such good condition would have been ample, and that was about the quantity deposited. The machine was out of order, consequently the seed fell behind the grubber-teeth and no amount of harrowing would cover the whole in. This was altered the next day, and a great difference was visible in the number of grains left above ground. Why on well farmed land people who have a drill won't use it I cannot understand. It must surely be an advantage that the seed is all buried and at the same depth! A much better chance for it all—especially barley for the maltster—to ripen at the same time. Hops just starting under the mulch. On the 28th, Messrs. Dawes' sale came off: a most disappointing affair. With the exception of a car-load of Herefords and Angus-polls sent to Prince Edward's Island, as nice a lot of young thoroughbred cattle of the above breeds as one would wish to see went for butchers' prices. Dr. McEachran told me, by the by, that the Angus are of no use on the ranches. They are too fond of home, hang a out the buildings, and will not forage for themselves. The Cochrane ranch has been very fortunate this spring: no losses to speak of, and the calves have done well.

May 8th, the land having been manured and ploughed last autumn, the drilling up for potatoes was begun on Cross's farm. Too much haste, I fear, as the land after grubbing and harrowing cut up what we call in my part of England "livery"—same root as *sliver*, I suppose—and will be hard and harsh—steely—when it dries. The next day, potatoes were planted with the machine, which deposited them fairly, but required great attention. On the 11th, long red mangels were sown, but as the land, ploughed three times in the fall and dunged plentifully, was only stirred and harrowed before being drilled up, it was by no means in a fit condition for sowing. Men were poling hops; and the barley and oats all sown. Milch-cows out at grass—good for them, but bad for the future productiveness of the pasture.

May 14th, my mixture for green-meat sown: 1½ bushel of pease, 1½ bushel of tares, 1 bushel of oats and two pounds of rape per acre. Rather a misfortune! Mr. Tuck, the manager, tells me the pease were bad—in fact they never came up at all! (1) On this day, 150 lbs. of sulphate of ammonia was sown on an acre of the red-mangels—as the mangel-seed never came up, except here and there, and what did germinate was unable to get away owing to drought, this dressing had no effect, the drills being split and resown June 3rd. This was, of course, much too late, and swedes ought to have taken their place. May 16th, appeared the first cockchafer of the season.

May 18th, land being drilled up for swedes on Cross's farm. Soil too clung, but sown the next day, with 3 lbs. of seed to the *arpent*. The drill for turnips and mangels is all right in the North of England and Scotland, where the land is heavy, the sun comparatively weak, and the climate moist; but to sow these crops, in a hot, dry climate like this, on drills, *unless they are well flattened down before sowing*, is, in my opinion, a fatal error. Dung is not scarce on these farms; the land is very porous; the exposure to the mid day sun extreme, and to sum up what I have to say in one sentence: if in the South-East of England our root-crops do better on the flat than on the raised drill, so, I think it is a fair conclusion, they would here, where the climate is much drier and hotter. I have no objection to drills for the economising of manure, but I infinitely prefer flat-work, unless, as I said before, the drills are flattened down level, or nearly level, with the roller. Three-fourths of these swedes never came up. Those that lay under the shadow of a hedge-grown fence, and in some of the moister parts of the field, showed themselves a little, and yesterday, 20 days from the date of sowing, here and there one was showing its head in the other parts. But to plough in the manure in the autumn, and to drill up grubbed land in the spring without a cross-furrow, when the land is in too moist a condition to work kindly, is not the way to get good root-crops. A piece of permanent pasture looks well, barring the clover, which is all gone—frost-bitten—Hops look blue, and are very backward.

A Canadian sowing a large piece of sweet-corn, a yard apart each way, three kernels in a hill! Showed him his error, and he corrected it at once. Some of these people encourage one very much, particularly those who have had a little education.

What is the great fault of the Lachine farmers? They are in too great a hurry! May 31st, early potatoes, on Cross' farm, harrowed, with saddle back harrows. I prefer the chain-harrows. They make neater work, pulverise more, and cover more land at once. Grain looks well, but no wonder, for the land is chokefull of dung: there are about ten thousand loads of it in mixens now; some of it 18 months old, which is not economical.

ARTHUR R. JENNER FUST.

(1) Neither did the rape! A. R. J. F.

CORN MANURES.—Sir John Lawes, in the new number of the Royal Agricultural Society's Journal, reviews the results of ten years' experiments in the continuous growth of wheat and barley in one of the Society's trial fields at Woburn. He remarks first upon the wonderful influence of climate upon crops treated in every respect in the same way year after year. For example, from the two unmanured plots the yield of wheat was three times as much in one year as in another, and again, on the plot manured with nitrate of soda alone, the yield one year was 10½ bushels, and in another 41 bushels per acre. As to the manures applied to the wheat crop, speaking generally, Sir John Lawes says mineral manures alone added nothing to the yield, while nitrogenous alone increased it on the average by seven bushels per acre. When minerals were added to the same amount of nitrogen as that which gave the increase just mentioned, there was a further increase of seven bushels; and when twice the quantity of nitrogen was applied with the minerals a third increase of nearly seven bushels took place. The average increase when 200 lbs. of sulphate of ammonia had been applied was at the rate of 7½ bushels per cwt. of the manure, and it was at the rate of six bushels per cwt. when nitrate of soda, 275 lb. per acre, was put on. If such results could be insured in ordinary farm practice, the profit would be considerable; but they are not obtained as a rule, because land is very rarely kept so free from weeds as it is—of course, at great expense—in the Woburn field. In the case of barley the variations of yield due to climate are not as striking as in that of wheat, because the latter crop is not subject to the vicissitudes of winter; yet the difference between the highest and the lowest yield on one of

the unmanured plots is 20 bushels. On the other hand, the effect of nitrogenous manure was much greater upon barley than upon wheat, for where 200 lbs. of sulphate of ammonia had been used the increase in the barley crop was at the rate of 10½ bushels for each hundred weight of the manure, and it was at the rate of nine bushels per hundred weight where 275 lbs. of nitrate of soda had been applied. The addition of minerals made comparatively little difference to the barley yield, while doubling the quantities of nitrogenous manure named above made a further increase of seven bushels per acre.

Propagating Plants—Cuttings.

I am now busy propagating all manner of plants; I want to get this work done early so as to lighten the work as the spring advances.

I have three kinds of propagating beds—first, a bench in a warm house, near the glass, and with some two inches deep of sharp sand on it. Here coleuses, alternantheras, iresines, and most soft-wooded tropical plants of ready-rooting nature strike readily; second, a bench in a middling (night temperature 55° to 60°) warm house, and which gets bottom heat from the boxed up pipes underneath, but is open at top—here I have carnations, marguerites, libonias, stevia, and the like, but almost anything will root well on this bench; third, a bench in a cool house, (temperature 45° to 55°,) and on which is a two to three-inch deep bed of sand, but there is no bottom heat. Here I have chrysanthemums, double-flowered sweet alyssum, double feverfew, and other things of a "cool" nature.

In selecting cuttings, take stout, stocky, short-jointed young wood; weak, spindling wood makes poor cuttings and hard to root, and they are poor plants when rooted. Do not pluck cuttings from wilted plants; if the plants are wilted, give them a good soaking of water and let them plump up before you secure any cuttings. And from the moment you pluck your cuttings till you insert them and water them, do not let them wilt in the least; indeed, more than that, never let them flag at all before they are well rooted, and even not then.

While cuttings of some plants need no making whatever, others do need it. Carnation "cuttings" should be plucked from the plants, and without any cutting whatever, unless it be to shorten the "grass" a little, and inserted in this way. Ageratums, lobelia, coleus, alternanthera, sweet alyssum, and other ready-rooting plants—indeed, almost all plants that emit roots from the nodes between the joints—need no making whatever; merely cut them off and dibble them in. If the cut has been made at a joint just under the leaves, it will be better to rub or pluck off these lower leaves, and thus remove the chance of their rotting in the cutting bed; but in gathering these cuttings, I cut just above a joint, or in the middle between the two joints, and in this way do away with the bother of removing the lower leaves. But in the case of pelargoniums of all sorts, fuchsias, marguerites, stevias, libonias, lantanas, abutilons, and many others, we can only expect good success when we "make" the cuttings in the ordinary way, by cutting under a joint and removing the leaves from that joint. And it is a good plan when making cuttings to remove the prominent flower-buds that may be on them, and which are common on geraniums, fuchsias, cytisus, lantanas, heliotrope and streptosolon.

Cuttings, when raised in large quantities, are "struck," dibbled into sand beds on the benches; but when in small quantities, they are raised in pots, pans or flats. For coleuses and other ready rooting things, the bench is the best system, but for cytisus, polygalas, soft-wooded heaths, and the like, I prefer pots because I can move them about, keep them moist or dry, light or shaded, close or ventilated, as their individual conditions may require, and without subjecting the other sorts to treat them all alike conditions.

My benches are made of narrow boards, with small apertures between them to admit of ready drainage of water from above and admission of heat from below. On the bench is a layer, ½ inch deep, of sifted coal ashes, then about two inches deep of sharp sand, the whole well watered and packed very firmly. Into this bed, in straight lines, and row after row, dibble cuttings, from 1 to 3 inches apart each way, according to the kind of plant and size of cutting. The cutting should be so firmly inserted that in pulling it out gently by the leaf, the leaf will break away rather than the cutting pull out.

In using pots, pans or boxes for cuttings, have them thoroughly drained; then fill up with sharp sand and pack it very firmly before inserting the cuttings.

When the cuttings are put in give them a good watering, gently, from a fine-bore water-pot rose, and shade from sunshine; and till they are well rooted keep them well watered. Enough to just moisten the soil is not enough. I give the cutting beds good soakings, so that the water runs out through them, and I find that the cuttings keep up healthier and root better, and there is far less likelihood of moulding or rotting off than would be the case in beds kept merely moistened.

Almost all cuttings should be kept shaded till they are rooted. Scarlet pelargoniums and most succulent plants may be—indeed, after they are in for a few days, are—benefited by exposure to moderately full light. Then, again, in the case of fleshy plants, as begonias, that like a little shade all their lifetime, if we kept their cuttings as closely shaded and moist as we do roses or carnations to begin with, most of them would rot off. The shade is all right, but the close, moist atmosphere, for them, is wrong.

In the window garden we must use a warm, shady window for propagating plants in, and particularly observe that it is not opened before the cuttings are rooted. Use pots, pans or boxes as already referred to. And, from this time on till April, it is a good plan to secure cuttings from our several window plants that can be readily propagated in that way, and insert them in the soil in the pots around the parent plants. The cuttings will root well enough in the moist loam

Propagating ivies, oleanders, carnations, and many other plants, by sticking the ends of the slips into bottles or saucers kept filled with water and set up in a sunny window, is a way often practiced and successfully, too, by amateurs. But there is a little risk in removing the water-made roots to common earth.

Sticking cuttings in hot-beds before April is not advisable; indeed, the amount of damp or steam in hot-beds is unfavorable to cuttings.—*Country Gentleman.*

Horticulture at the Geneva Station.

The Report of E. S. Goff, Horticulturist of the New-York Agricultural Experiment Station, a volume of 300 pages, is copiously filled with practical matter on gardening, and shows the industry and ability with which this part of the business of the station has been conducted.

The work which is here reported includes a large number of experiments with the cultivation of potatoes, with more than a hundred sorts of those most commonly known. The average yield of merchantable potatoes of all these sorts was 129 bushels to the acre, (1) the Green Mountain yielding the most, or a little more than 385 bushels per acre. (2) In contrast

(1) A *poor* crop indeed—138 imperial bushels, or 3½ tons. A. R. J. F.

(2) Equal to 10 tons—a *good* crop. A. R. J. F.

with these, Brownell's No. 55, Buffalo Bill and Crane's Keeper yielded none that were merchantable. Experiments were made to test the comparative productiveness of seed taken from the most productive and the least productive hills of any sort. The result was that the largest tubers from the productive hills used as seed gave the largest crop, and the smaller tubers from the same hills gave the next largest crop; while the largest tubers from the small hills came in third, and the smallest fourth. This was not the invariable result, but it was so in a great majority of instances. Again—in the trials which were made with whole potatoes, and by cutting the seed, the cut pieces weighing the same as the whole ones, there was no difference on an average in the product. Exposing the cuttings to the air for a week or ten days before planting, did neither harm nor good; but a longer exposure proved injurious and lessened the growth."

FEEDING RATIONS

PRACTICAL AND SCIENTIFIC.

By a Scottish farmer.

The article upon "Feeding Rations" in your issue of the 16th inst., suggests the question whether there is yet a sufficient basis for "principle"—represented in this case by Mr. Lloyd—dictating in such a very exact way to practice. The chemistry of manures has suffered much at the hands of its friends, and it would be a pity if the science of feeding, from which much may be expected in the future, were as much dragged by the premature theories of its professors. Experience of feeding seventy to ninety bullocks for the butcher yearly has taught me that the judgment of practical feeders, as shown by the market price, is a better index of the relative feeding values of different concentrated foods, such as linseed cake, rape cake, and cotton cake, than the ordinary chemical analyses made at present, though of course the latter have their value in detecting adulteration. Moreover, I know practical men whose "master eye can fatten their cattle" more quickly than I can, though my rations are probably nearer those indicated by scientific data. It is in this sense that I understand Professor Wrightson, when he says that he cannot teach "adept" farmers more. He could not be sure of teaching them anything about feeding that would put money into their pockets. If this be his experience it is certainly less exceptional than that of the gentleman mentioned by M. Lloyd, "who tried the new method of feeding his herd... until the gain amounted to £500 a year on that one farm alone."

It would certainly be a great gain if experienced feeders were so far educated as to enable them to see how far science and practice agree, for when they became interested in the subject they could lend the most valuable help in advancing the science by explaining the cause of seeming discrepancies. They would become wise by learning not their own ignorance only, but also the many points about which science is at present ignorant in this matter. Roughly speaking the cause of the difficulty in getting sufficient reliable data on this subject, is that success depends more upon knowledge of the peculiarities of the individual animal than upon a unit or two of difference in the "albuminoid ratio." It is all very well to arrange the food scientifically, but every practical feeder knows that fattening oxen often "stick up on their food"—as they say here—and you have got to change it for a little, and study the appetite and digestive powers of each, and the state of their bowels, &c. If the scientific farmer is fortunate enough to get a really good cattleman, who is interested in the animals, and manages to keep their appetite always fresh, he will find it wiser not to force such a man to use scientific rations weighed out to a pound for each beast daily. This is especially true in these days of pleuro when one cannot always get a great choice of store cattle, and has sometimes to take those that have been hungered in their youth, and whose digestion ever after needs a deal of pampering.

Many scientific reasons may be given to show that it is not wise to base hard-and-fast rules on the German data. I may illustrate these by reference to Mr. Lloyd's paper in the Almanac of the *Live Stock Journal*, of which his more recent letters are a development. The danger lies in Mr. Lloyd's position as a chemist and evident knowledge of the literature of the subject he discusses, and interest in it. Had Liebig's mineral theory been propounded by a less man it would have done less harm. First: In the table on the composition of feeding stuffs (page 124 of the paper above referred to), the nitrogen existing as amides, nitrates, &c., is entered as if it existed in the form of digestible albuminoids, and in this Mr. Lloyd follows some of the German authorities. Now, so far as we at present know, the amides have no claim physiologically to be classed with albuminoids, while the nitrates and ammonium salts, *e. g.*, in mangolds, may be even injurious. Mr. Lloyd (p. 125) analyses, by reference to his table, a ration of 84 lbs. swedes, 14 lbs hay, and 3 lbs. linseed-cake, and finds that it contains, with other constituents, 2.592 lbs. of so-called digestible albuminoids. But it would only contain about 1.6 lbs. of *true* digestible albuminoids, and so far as our present knowledge goes it is only these that contribute to the formation of nitrogenous tissue in the animal body. Then Mr. Lloyd makes up another ration to his scientific standard; it consists of 10 lbs. meadow hay, 10 lbs. oat straw, and 10 lbs. clover silage, 5 lbs. linseed-cake extracted and 5 lbs. maize meal, and he says that this contains 2 74 lbs. digestible albuminoids. It would contain about 2.2 lbs. of *true* digestible albuminoids, but if this is the necessary and right amount, then the first ration mentioned above, with only 1.6 lbs., is very deficient, and, far from being the same as the second ration, as indicated by Mr. Lloyd, would require 2½ lbs. more linseed cake added to it to make it as rich in albuminoids. Now, a difference such as this, got simply by a more scientific method of calculation, shows that chemists are not yet justified in making up such very definite rations, taking off a pound of one kind of cake and adding a pound of another, and so on. Secondly, M. Lloyd's method takes no account of the condition of the food as to its bulk, and the amount of water it contains. The mixture he gives of swedes, hay, and cake contains a fair amount of succulent matter, whereas the other ration does not. Some scientists agree with M. Lloyd that it makes no difference whether animals drink the water they require or get it in their food, but I think farmers will be slow to accept this theory in its entirety, and they have definite evidence in support of their view gained by experience.(1) They could point, for example, to the second series of sheep-feeding experiments at Rothamsted, when a much greater amount of nourishing constituents was required to produce 100 lbs. increase in live weight than in the first series, though the albuminoid ratio in the latter was somewhat nearer Dr. E. Wolff's standard quoted by Mr. Lloyd. Thirdly, Mr. Lloyd bases all his advice on average analyses, and these are in many cases most misleading. For example, I have no doubt that the 84 lbs of swedes and 14 lbs. of hay per diem, if grown on good land in the east of Scotland, without any cake, would fatten as rapidly as the same amount of roots and hay grown in the west, on poorer land and with a different climate with 3 lbs. of linseed cake added. Lastly, and more generally, it may be a true econo-

(1) Here is another instance of practical knowledge being of more value than theoretical. We *know* that swedes are worth more for food than the chemical analysis allows. A. R. J. F.

my to push forward bullocks rapidly for the butcher, and thus redeem the time, even though it be at the expense of what would appear from standards, based largely upon maintenance diets, to be a waste of food. Moreover it depends on the relative price of nitrogen in the food how far it may be an economy to give more than the minimum of this constituent required with the view of enriching the manure.

There are other points that might be referred to, but the above are enough to show that no hard and fast rules can yet be laid down in the science of feeding. Most scientists who are also pratical farmers will agree with me that the "Düngerlehre" may be more safely acted upon than the "Fütterungslehre." If those interested in the science of agriculture would record some original work they would advance the science far more than by theorising from German data. Those who are confined to their laboratories can, like Stutzer in Germany, Ladd in America, and others, devote themselves to improving our present methods of analysing foods, and to using these improved methods to determine the different value of foods grown in different districts and under varying conditions. But perharps the most valuable aid is to be expected from the farmers themselves when education spreads. If enough of them could be induced even to weigh their cattle when they put them up to feed and again when they sell them, and record this along with a rough estimate of all the foods used, we should in the course of a few years get a mass of information which if properly examined and averaged would yield valuable results. We should get a sort of practical analysis more to be depended upon than our present laboratory ones, not only of concentrated feeding stuffs, but also of the more bulky ones that are grown on the farm, and in the course of time the conditions under which these foods could be produced, with a maximum of feeding power, might be indicated.

In the meantime I do not know that any more scientific advice about feeding should be given to the farmer than this —Check your judgment and test your success by weighing your cattle as stores and occasionally after, though, of course, not so frequently as to seriously disturb them.—CORRESPONDENT.

NITROGEN AND MODERN FARMING.

It is recognised now as a truism that the store of nitrogen in soils is reduced by tillage and corn-growing, while it constantly increases in land that is laid down to grass. Pastures and prairies are all storehouses of organic nitrogen, and even temporary pastures conserve that costly element in proportion to the length of time they remain unploughed. In the course of the Rothamsted experiments it was found that the removal of twenty unmanured crops of hay from the old pasture No. 8 had not prevented a considerable increase of the stock of nitrogen. (1) Every practical man should master at least the elementary facts in regard to the wasting of the nitrogen in arable land, and especially during wet seasons, and its conservation in pastures, and by certain forage crops which prevent it from being washed out of the soil. He should understand the composition of feeding stuffs, and that the feeding of maize, which contains less than 10 per cent. of albuminous compounds, cannot possibly produce such valuable manure as the feeding of cotton-cake, which contains 40 per cent. of albuminous compounds, The Woburn experiments in 1881 misled a number of persons solely in consequence of want of knowledge. In Stackyard field, in that year, the crop of roots proved as heavy after manure made by the feeding of maize as after manure enriched by feeding cotton cake; and the cause was not far to seek, subsequent experiments having proved the existence of a large store of unemployed nitrogen in the soil.

We strongly advocate experiments by practical farmers on such points as the value of feeding stuffs and manures; but in testing the comparative values of different kinds of manures by means of field experiments in arable land, *the soil should first be exhauted*, or the trials may be vitiated. The relative values of maize and cotton-cake were ascertained at Rothamsted by applying to a pasture manures which had been made by the use of 500 lb. of maize in one case, and by the same quantity of cotton-cake in the other case. The latter gave 1½ cwt. of hay more than the former for each 100 lb. of cotton cake employed. It is for that reason that Sir John Lawes feeds cotton-cake largely on his pastures. He has laid down forty acres of new pasture on his home farm to meet the times, and in spite of the dry climate of Herts, we have never seen a good sod formed more satisfactorily.

There is no end, so to speak, to the storage of nitrogen in the roots and thick sod of an old pasture. But in the case of arable land, and so far as the wants of next season's crop may be concerned, it is useless feeding a soil with that particular element of which it already contains a sufficient supply. We have known a dressing of dissolved bones fail to increase the crop of turnips in the case of a field on the green sand formation while the same dressing on the same farm, on another formation, was always used with good effect. The superiority of cotton-cake over maize, as a manure, is always strikingly manifested on poor or exhausted land, but not in the case of such soil as that of Stackyard field at Woburn, the fertility of which is sufficiently established by the fact that it yielded seven good crops of barley in succession, the last of which exceeded thirty bushels per acre.—H. E.

(1) In the *Proceedings of the Royal Society*, vol. xliii., is given a summary by Sir J. B Lawes, Bart., and Professor J. H. Gilbert, of their own more recently published results bearing on various aspects of this subject, together with reference to the results and conclusions of others which have recently been put forward In their earlier papers Messrs. Lawes and Gilbert concluded that, excepting the small amount of combined nitrogen annually coming down in rain, and dew, the source of the nitrogen of our crops was substantially the stores within the soil and subsoil, whether derived from previous vegetable accumulations or from recent supplies by manure; and recent Rothamsted investigations show that in those experiments soils and subsoils down to the depth at which the action of plant-roots has been proved, there exists a store of about 20,000 lb. per acre of already combined nitrogen. And while it is true that many soils will contain much less there are many, especially good garden soils, which contain a much larger amount of inherent fertility. The history of both agriculture and horticulture throughout the world, so far as it is know, clearly shows that a fertile soil is one which has accumulated within it the residue of ages of previous vegetation, and that it becomes infertile as this residue is exhausted.—*John J. Willis, Harpenden, in Gardeners' Chronicle.*

When land is once contaminated with "foot root", this disease is sure to make its appearance to a greater or less degree each season, particularly when the sheep are being well fed. One of the simplest and best methods of checking it is to make a strong solution of sulphate of copper (blue vitriol) or of McDougall's sheep dipping composition—either will answer the purpose. Place this solution in a long narrow vessel that will hold water, and make the whole flock pass through it, one at a time; then put them immediately into a dry place, the floor of which is sprinkled only with slaked lime. The process is only of use in the earlier stages of the disease. In cases where the feet are already extensively diseased, it is necessary to catch each animal so affected, pare away the hoof so that the diseased foot can be thoroughly dressed with one of the many substances advocated for that purpose. Pure carbolic acid, butyr of antimony, or sulphuric acid and Stockholm tar, are among the best and most effect-

ual. The dressing requires repeating every two or three days until a perfect cure is effected. It is hardly necessary to add that, when sheep are being driven through the solution of copper, or dip, care must be taken not to let them drink, and the solution must only be of sufficient depth to just come up to the top of the hoof. Keeping your sheep in the fold would not cause, although it might aggravate, the disease.

UNCERTAINTY OF BREEDING.

A correspondent has applied to me for information upon the cause of the ill-success of his efforts in breeding good marketable sorts of sheep and pigs. He has of late years been experimenting on the production of cross-bred mutton and pork, but he can get no certain results; the progeny often shew the bad characteristics of both parents without the balance of qualities which may be expected to result from the union of differing types. For instance, he put his pedigree Yorkshire middle-bred sows to a good looking Berkshire boar, but the litter, although greatly increased in numbers, contained several pigs deformed, and several others of very coarse mould; in fact, there seemed to be no certainty of type in the produce. Now this opens up a most interesting and important question to all who are interested in the breeding of stock. It has long been known that cross bred animals have the greatest possible tendency to reversion; that is to say, that the result of a first cross often exhibits characters and markings possessed by neither parents, but which belonged to remote ancestors on one side or the other. For instance, when the common English ass is crossed with the horse, the hybrids resulting from such union are marked with well defined stripes on their legs, although these stripes are possessed by neither parent. But these markings almost certainly existed on the ancestor common to both animals. Another instance is afforded by the crossing of two polled breeds of cattle, when as a result of the first cross horns often appear on the progeny. If then the act of crossing is provocative of reversion, it can well be understood that the first result of a cross between such widely differing types as a Berkshire boar and a Yorkshire sow would be animals bearing little of the desirable character of either parent, but reproducing the hereditary defects (such as coarseness and late maturity) which the efforts of judicious breeders have almost eliminated from their improved pedigree stock But it may be urged that if this result of crossing were universal, we should never obtain cross bred animals possessing the advantages offered by both parents; that if reversion were the rule, how is it that a cross between Hampshire Down and Cotswold sheep has produced the excellent Oxford Downs? The success of judicious crossing is due to the fact that although the *first* result of a cross is usually a failure, if this animal be bred from, the offspring gradually improve and retain the good characters of the two breeds, dropping the objectionable points which the first stock of crossing developed.

SCIENTIFIC BREEDING,

which alone can be successful, is carried out by men who consciously or unconsciously apply the rules discovered by generations of observers, which govern the development of animals. If my correspondent will breed from the best looking of the litter from his Yorkshire sows for a few generations, either with Yorkshire or Berkshire blood, he will get a pig which for breeding and killing purposes is superior to either pure Yorks or pure Berks. If he continues to use Berkshire blood he will obtain a breed of Berkshire pigs with a dash of Yorkshire blood in them. Even breeds of animals which are now considered as pure have been improved by crossing the old type. For instance, the very pure bred pig of Essex has been produced by repeated crossing with both Neapolitan and Chinese blood. The Hampshire Down contains Southdown blood, and the Cotswolds are related to the old border Leicesters. The new English Leicesters or Dishley breed were produced by Bakewell probably from a mixture of Leicester blood with Lincoln, Teeswater, Warwickshire, Ryeland, and Southdown blood. In fact, a really *pure* breed of domesticated animals is unknown, and the nearest approach to purity in England is found in the preserved and yet wild white cattle still existing in some (1) north country parks.—*Eng. paper.*

THE VALUE OF SPECIAL FERTILIZERS.

EDS COUNTRY GENTLEMAN—Having decided to resume farming, I have, with my partner in business, purchased a farm of 240 acres, and have just moved here and taken possession. Having been engaged in other business for a number of years in the South, I now find myself very rusty on farming, and must depend (this year at least) very much upon the advice of others, as land, climate, &c., are all new and strange to me. I think I have a very superior farm, but one that has been sadly neglected for some years, and therefore needs abundant and prompt feeding. I find only about 150 two-horse loads of manure on the place, and judge that I ought to have 1,000, to justify me in looking for crops that will pay me to cultivate this season. Circumstances are such that I cannot obtain yard or stable manure; therefore I must resort to commercial fertilizers, and at this point I am lost. Which, if any, are good? Which is best? (1).

I have a friend who is a manufacturer of fertilizers in the South, who has kindly given me a formula that, in his judgment, is A. 1 for my use. I have unusual facilities for purchasing raw material, and the question comes, is it better to make my own mixture and know just what it is that may give such results as I shall obtain or buy from some manufacturer? (2)

My friend has devoted his thoughts to the lands, crops and needs of the South: therefore I would like to submit his formula to you, and ask a few questions. He writes me as follows:

"Three hundred pounds kainit, 500 lbs. dissolved bone, 200 lbs. nitrate of soda, 500 lbs. raw bone, 500 lbs. acid phosphate, total, 2,000 lbs. Four hundred pounds of the above would be a good heavy dressing, and fifteen tons would fully equal 800 two-horse loads stable manure."

Our land is sandy loam. Crops this season will be rye and wheat, seeded to grass, sown last fall; oats seeded to grass; corn and potatoes to be put in this spring. Question.—For my land and crops, is the above the best formula? If not, what changes would you suggest? Will the same mixture answer equally well for each of the crops? If not, what changes would you suggest? Will the same mixture answer equally well for each of the crops? If not, what changes? (3)

I find that Lester's fertilizers are used about here. Can I depend upon them to give as good results as a mixture of my own mixing? E. C. *Poughkeepsie, N. Y.*

1. Accurate and reliable information cannot be given in advance of thorough trial, because the same fertilizers have an unlike effect on different soils and in different localities. For example, potash, and the substances which contain it, have greatly increased the crops when applied to some of the soils at the East, and in other places and on dissimilar soils have produced little or no effect. The same may be said of phosphates, which have proved valuable in some localities, and of no benefit in others. The only certain test is to make the

(1) At Chillingham, Northumberland, and Lord Tankerville's. No other I believe. A. R. J. F.

trial. If you can obtain from intelligent farmers in your neighborhood any of this information from their own experience, it may save you the time of years in making the trial for yourself. Until the value of each or of some has been tested by them or by yourself, we would not advise you to make large purchases of those substances which may not pay the cost.

2. When you have ascertained what substances are of sufficient value on your land to warrant their application, you can purchase separately such as you need, or you can buy of manufacturers the same ingredients, paying as much more for the latter as will save you the trouble of mixing. If you will procure the full reports of the New-Jersey or the Connecticut Experiment Stations, you will there find accurate analyses given of all the leading fertilizers, so that you need not be imposed on in making your purchases.

3. The formula furnished contains valuable substances, which may or may not be all well adapted to your land; probably most of them may be useful, although some of them are in a much larger quantity than may be economical and in application. But it would be a random uncertain estimate to attempt to compare them with barn manure, for any locality, for the above mentioned reasons. Their present *market* value may be given, but not the amount of good they do on any farm. At present prices, a ton of these ingredients would cost about thirty dollars, and the "fifteen tons" would amount to $450. A manufacturer should charge something more for mixing, commission, and other expenses. The "800 two-horse loads of barn manure", might be worth more to you. The best barn manure, at market rates, would be worth two or three dollars a load; poor manure not half so much.

A FARMER'S FRUIT SUPPLY

EDS. COUNTRY GENTLEMAN—Formerly our family was supplied with the small fruits from the garden near the house. The soil was heavy and liable to become hard, and it was not practicable to use horse cultivation. The berries ripened at a time when it was convenient to let the poultry have their liberty, and for these reasons a fruit plantation was established at a distance of 30 rods from the farm buildings. The place selected for use is on the south side of the highway, where the soil is a sandy loam suitable for the purpose, and where the snow usually covers the ground in winter, but does not drift, which is an important point to be considered in determining the location of a fruit garden. The plot of ground used is twelve rods in length along the road, and nearly three rods in width. Wire fencing is used along the side, so that snowdrifts are avoided, and portable board fence panels at the ends, for convenience in cultivating with a horse and in applying manure. These panels are in place only for a short time in the fall, when the cows are securing the after-feed on the adjoining meadow.

Five feet from the road fence is a row of black-caps, seven feet from that a row of red raspberries, and seven feet from that a row of currants and gooseberries. The remaining width is equally divided into three plots, to be used in yearly rotation—first for green peas, second, newly set strawberries, and third, strawberries in full bearing, to be plowed up after picking. Having tried various methods, I shall hereafter set strawberry plants 18 inches apart, in rows four feet apart. This width affords room for matted rows, and for continued cultivation with the horse through the season, and little hand labor is needed. Two such rows, 12 rods long, will, with ordinary care and richness of soil, give from 200 to 300 quarts of berries. Last year we picked 300 quarts, which proved an ample supply when fresh, and for canning and jelly, and some surplus to sell or give away.

The varieties that I now have of strawberries, black caps and red raspberries afford a continuous supply of ripe, fresh fruit for the table for full two months, and I suppose that with a better selection the time might be somewhat lengthened.

The past winter has been favorable, and very little damage has been done to strawberries or raspberries. A part of the red raspberries were bent down and held by a rail on the tips, which method proved satisfactory, as it required but little labor and the canes were not broken by snow, resuming their natural position when the weight was removed. The canes treated in this way start a little earlier and appear more vigorous than the others. I shall hereafter lay them all down in this manner, as it involves but little labor.

With rows twelve rods long and plenty of room between, most of the labor of the small fruit plantation can be done with a horse, and less than one-fourth of an acre will give a family of a dozen persons a full supply for the year, and at much less cost than if the same amount had been bought at market rates. This cheap luxury of home raised, fresh-picked fruit is within the reach of every farmer's family, as much of the labor can be done by children and invalids.

Those who raise their own fruit are doubly paid—once with the delicious berries themselves, and again by the satisfaction received in their cultivation and growth.

Lewis County, N. Y. C. S. RICE.

THE GRAZIER AND BREEDER.

DISHORNING—ITS WITNESSES.

A number of readers, who have seen the statements and opinions which have been published, pro and con., on dishorning cattle, are puzzled to determine what course to adopt in the midst of conflicting statements, and desire to know in what direction the evidence preponderates. To assist in settling the question, we give in very brief form some of the leading statements which have been made. Against the practice, we quote the following:

Dr. E. Moore, on p. 133 of the COUNTRY GENTLEMAN for 1885, says: "It is a horrible practice, cruel and unnecessary—causes more suffering than it is intended to obviate." Dr. Wm. Horne, p. 58 of vol. for 1887, says it is a "cruel infliction of pain—a useless and cruel operation"—"frightfully painful"—"to dishorn cattle is a crime." Dr. Horne remarks again on p. 58, 1887: "The operation of dishorning is frightfully painful. I know of total ruin in one case from dishorning a Jersey bull." On page 292, for 1888, A. W. Porter, who witnessed the operation on a number of cows, stated that the animals would crouch down and bellow, as though suffering intense pain, quantities of blood flowing. He thinks the operation cruel and barbarous, and cutting off the point of horn and screwing on a brass ball will be sufficient to prevent harm from hocking.

On the other hand, we have the following statements in favour of the practice:

T. B. Terry, on p. 352 of the COUNTRY GENTLEMAN for 1886, says. "The horn ought to go; the embryo horn may be killed by burning slightly, and without much pain. Many farmers in Illinois are dishorning, and a suit against one of them for cruelty, brought out overwhelming testimony in its favor; and the suit was withdrawn." E. W. S., on p. 93, 1887, remarks that "the best time to dishorn is at one month old, cut out the embryo horn with a sharp knife close to the skull, taking a little skin with it—it is not cruel; the pain is much less than castration." On p. 152, the same year, F. Perkins asserts that his direct loss from the injury by horns to cattle, has amounted in eight years to over $300, besides indirect loss: a cow hooked a heifer to death, with other di-

sasters. He thinks the removal of horns a mercy; should be done at about six weeks old; if done sooner the horns will grow again. J. B. of Princeton, Mass., remarks on p. 195, same year: "All cattle, especially bulls, ought to be dishorned at three to five weeks old. It is a very simple operation; the horns do not adhere to the skull at that time, and it is not nearly as painful as castration." C. L. H. of Minnesota, on p. 232, says that the practice is gaining favor in the North west. A farmer commenced on a cow who had hooked a fine colt to death, and found it so easily and quickly done, that he went through his herd of thirty. "The wounds soon healed, and all have done well." D. L. Davidson of Illinios, [p. 239.] "The proper time is when the animal is six or seven weeks old, the older the animal the less it appears to hurt." W. A Wood remarks on p. 261: "We have seen one pair of horns monopolize shed room enough to accommodate ten cattle." He admits that it is a cruel practice, but says that stockmen have to perform other things equally cruel for the comfort of the whole herd; but he prefers naturally hornless animals. F. Perkins says on p. 344, in answer to an inquiry, that two large bulls, four years old, and several younger ones, were dishorned, and all of them did well, and with no more suffering than a yearling; and that the failure with beginners is not sawing the horn close enough On p. 906, A. N. Curry, who dishorned every cow on his farm, says: "I intend to own a cow with horns only long enough to saw them off." H. M. Culbertson, on p. 53 of this journal for 1888, admits that it may be cruelty to the animals, but animals are not particular about cruelty to other animals, and he, therefore, favours the practice. M. D. Tallett of Kansas, p. 152 the same year, says that about 700 head have been dishorned in Ottawa county, but he has not heard of a single animal injured. On p. 312, Mrs. L. Foster of South Carolina describes the way in which she dishorned a Jersy bull, while under the influence of chloroform, and his previous behavior has given place to perfect mildness. Prof. G. E. Morrow of Illinois states, on p. 332, that the fact that thousands have been dishorned, seems to him conclusive that the danger of any serious injury is very slight. Although considerable pain attends the operation, the animals commence eating within a few minutes afterwards. But he is not an advocate of the practice.

From the testimony of the preceding witnesses, readers will feel better able to form an opinion than from the judgement of a single person. But different and adverse conclusions would be drawn from the testimony furnished. Readers will attach different degrees of weight to the same evidence. What would appear severe and cruel to one person, would be performed without hesitation by others. Men'snerves are unlike in obtuseness. What would appear terrific to some would be a matter of indifference to others. Dishorning is obviously no more severe than other operations commonly resorted to, such as docking horses, ringing pigs, amputating lambs' tails, surgical operations for diseases, and butchering pigs, which are performed at the entire convenience of the owners. But wherever dishorning is practised, it sould be done by careful and skilful operators, at the best age, and with the very best tools. More experience may determine whether the use of chloroform would be advantageous. But all kinds of bungling on the part of novices should be denounced and discarded.

EDS. COUNTRY GENTLEMAN—Our cattle are full blood and grade Holsteins, and were no more vicious than the average in any farmer's herd, but when we turned them out of the barn to water at a sixteen foot trough in the yard, we were obliged to stay amongst them all the time to prevent them from hooking one another, and with the greatest care we could not get more than three to drink at one time. It was too trying to our temper to continue, if there was any remedy. So we sent to Mr Haaff for his treatise on dishorning, studied it, and on Feb. 27 commenced at one end of the stable and did not stop until we had out the horns off from 26 head. Since that time they have been as peaceable as any cows need be, and will crowd up to the trough eight and ten at a time and drink like so many sheep. Cutting off the horns seemed to hurt them very little and only for an instant. The bleeding amounted to almost nothing—some of them did not bleed enough to make the blood drop off their faces. Some went to eating and others to drinking in less than two minutes after the horns were off. Not one has missed a single feed or shown the first symptom of any ill effect whatever and at present all are as contented and happy a lot of "mooleys" as one need,to look at.

We have dishorned quite a number of calves at from six to ten weeks old, which I think is preferable to letting them go until full grown.

St. Lawrence Co., N. Y. A. F. & S. W. CLARK.

EDS. COUNTRY GENTLEMAN—We are getting the fruits I said would surely come. One stockman had 60 cows dishorned, and in seven weeks the milk fell from 13 to 9 lbs., and he says that many of them are ruined entirely. I know of quite a number of animals whose heads are nearly rotted off. Five absolutely *breathe* through the enlarged apertures whence the horns came off. I know of 27 animals which were dishorned; five of them came near dying, two did die, and all the rest degenerated. There is no doubt of the prepotent powers of both cows and bulls being injuriously affected by dishorning. I challenge any educated veterinarian in the country as to whether or not the vital forces are destroyed to a great extent. The whole animal economy suffers by the cruel practice.

Janesville, Wis. WM. HORNE. V. S.

NON-OFFICIAL PART.