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
- [x] Bound with other material/ Relié avec d'autres documents
- [x] 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
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [x] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [x] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

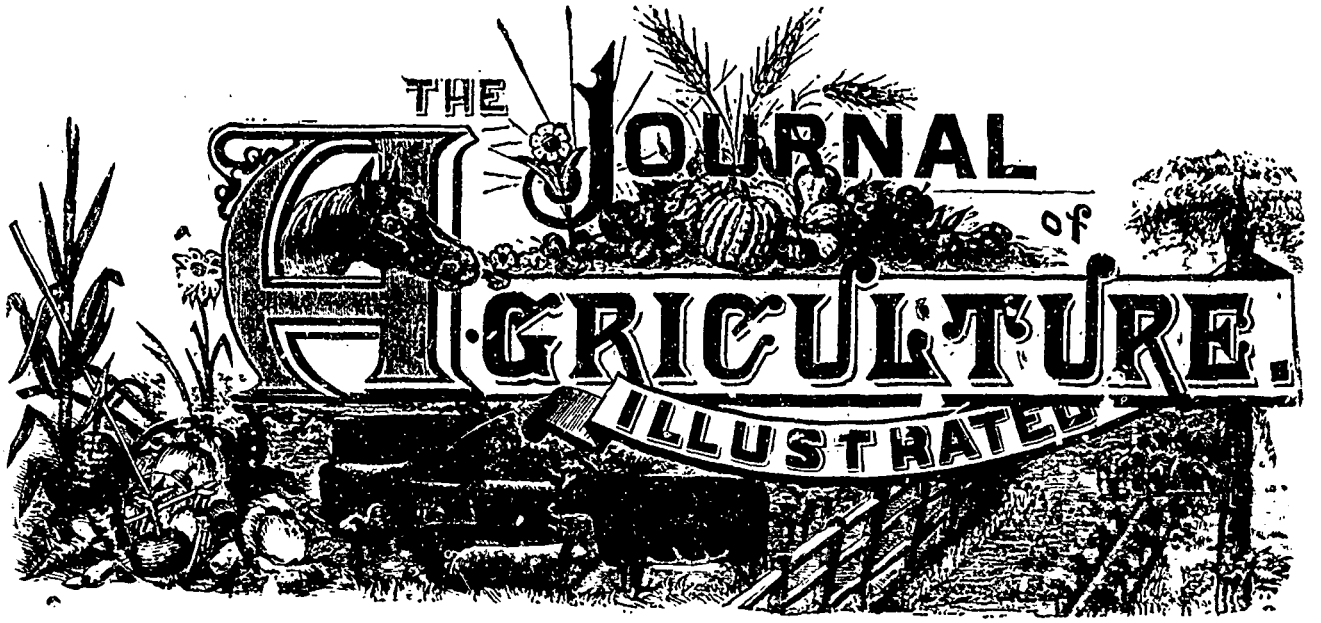
Title on header taken from:/ Le titre de l'en-tête provient:

- [ ] 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.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
								✓			



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. 10. MONTREAL, OCTOBER 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.

SINGLING ROOTS.

The following are the addresses of the Revd. abbé Chartier and others, on the cost of singling an arpent ($1\frac{1}{3}$ of an acre) of mangels—emphatically not of sugar-beets, but cattle-mangels The address was delivered at the meeting of the Dairymen's Association, at St. Hyacinthe last January, in French, but I believe the translation is perfectly faithful.

A. R. J. F.

I have lately seen in the English edition of the *Journal d'Agriculture* a criticism on certain statements I made last winter, at the meeting of the Dairymen's Association at Three Rivers.

In the first place, I did not intend to lay down the law to any one. I only stated how much the cultivation of root-crop costs us, and, to speak with exactitude, how much the mangel-crop cost. I spoke of nothing else, because we have not succeeded in growing any other roots than the mangels, turnips having always failed with us.

Then, talking about ensilage, I said, that for my part, I would give up growing mangels, since I found that corn, cut green and ensiled, well kept, proved to be of the same value, weight for weight, for milch-cows, as mangels. Having weighed the mangels which we were giving to our cows, and the silage weight for weight, we found that when we fed on silage after stopping the mangels, the milk of our cows did not fall off; and after a few days of silage, it increased.

Whence, I conclude, that for our purpose, corn being much less costly to cultivate than mangels, we ought to abandon the growing of mangels and cultivate corn.

Mr. Jenner Fust, who is a great amateur of roots (and I think he is right, having been born in England where they use large quantities of roots for the stock), was not pleased. He thought I was declaring war against root-growing. But that was not my intention. If, in reality, we could grow roots at the cost he mentions, I should be the first to return to their cultivation; not exclusively, for I hold firmly to fodder-corn ensiled, but I should grow roots, especially for the sake of providing cattle-food during the months of October and November.

Mr. Jenner Fust asserts that an arpent of mangels can be cultivated, i. e., all the work of hoeing, singling, and *ébourriage* (the word, perhaps, is not French, but it is in use among us), for three dollars an acre. The seed is not in question. I wish to submit this matter to the meeting, in case there should be any one among us capable of teaching us the mode of this cultivation which, unfortunately, is not given.

M. Guèvremont, a pupil of Mr. Jenner Fust, at Sorel, declares that he has grown mangels, and all the work cost him was $3:00 an acre (1).

(1) May I be permitted to say that M. Séraphin Guèvremont's

To me, these are unheard of things. Since I have been superintending the farm of the Seminary at St. Hyacinthe, I have had occasion to employ men of different working capacity. But for four years, I had in my service a most industrious Frenchman, one who knew perfectly how to do farm work, how to use the hoe, was never troubled with a pain in his back; a man who worked from four o'clock in the morning till seven at night, and who never stopped except for his meals, and twice a day for the time he took to fill and light his pipe (not to smoke it). Well, this man was never able to single (*éclaircir*) an arpent of mangels in less than six days.(1)But, I am speaking of work throughly well done. (2)

For, if you want to succeed in the cultivation of mangels, to get a return that will repay you for your trouble, you must leave each plant separate: and that is a serious piece of work. If you leave two plants touching each other, you will have two mangels as big as your finger.

Now, at Three-Rivers, I stated that I could not cultivate an acre of mangels for less than twelve dollars. Remark that I do not speak of the preparation, sowing, etc., but only of the work done after the seed is sown. At the Seminary farm it is easy enough to know what work costs, for we have to pay for all that is done. It is not the same with a man who has a family. He gets a good deal done by his wife and children of which he keeps no account. But he who cultivates a farm entirely by paid labour, can easily, if he pleases, find out the entire cost.

Now, striking an average (it is possible that, in some seasons, the cost I speak of has not been so great, for in some years weeds do not grow so fast as in others) of the last six years, mangels have cost us twelve dollars an acre to cultivate.

I do not mean to say that this is the universal cost. But if any one will offer to undertake for me the care of an arpent of mangels after the sowing is done for three dollars, I will thank him, and return to the cultivation of mangels for a certain length of time.

Some one in the audience there may be who has discovered the secret of singling by chopping out (à la tranche) or otherwise, the rows of mangels.

We have 96 rows on the width of an arpent, and a man takes six days to go over these rows and single the mangels. We must not conceal from ourselves, that for mangels, hoeing with the horse-hoe will not suffice. The hand-hoe must necessarily be used, for with the horse-hoe, the mangels are in danger of being cut. Besides, to grow a paying crop in a rainy season, three hoeings at least must be given, if we wish to prevent the grass from taking possession of the land and injuring the crop.

The Cultivation of Mangel-wurzel.

M. CASAVANT.

Mr. President and Gentlemen.—I shall not detain you long; I am only about to say a few words on the cultivation of mangels, in support of the address of M. l'abbé Chartier.

account is as follows; v. November number of the *Journal of Agriculture*, 1887, p. 171:

Two horse-hoeings	$1.00
Two women—chopping out—1 day, at 60 cts	1.20
Two " singling by hand after the chopping out	1,20
	$3.40

To which M. Guèvremont adds: "I think this is the extreme possible cost." Mr. Chartier adds above in his address: Il trouve moyen, avec *deux* femmes, de sarcler un arpent de betteraves dans une journée. M. Guèvremont, on the contrary, says "two women chopping out, and two women singling after the chopping out": I believe that two and two still make four. JENNER FUST.

(1) Six days of 13 hours each, exclusive of meals! equal to 7½ days!!!

(2) So, certainly, was M. Guèvremont.

M. Chartier tells us that Mr. Jenner Fust, in the *Journal of Agriculture*, asserts that mangels can be cultivated for $3.00 an arpent. It would be of great use to the country, if the secret of so cheap a style of cultivation could be revealed to our farmers.

A short time ago, I had the pleasure of meeting M. Denis, agricultural superintendent of the Berthier sugar-factory; he told me that he put the cost of the cultivation of an arpent of mangels at $12, including the singling by hand. So that his valuation is lower than that fixed by the abbé.

For my part, I think the cultivation of mangels might be done for $8 or $9 the arpent. It is absolutely necessary to give the land two good *grubbings*, for a superficial stirring is not enough. If the upper stratum of the soil is not broken up sufficiently to admit of the air penetrating into the subsoil, the crop will not be as large as it ought to be. To save a few dollars of outlay, and, on the other hand, to lose half the crop, is not economy. What is needful is to get the greatest return possible.

M. Chartier fixes the cost of this cultivation at not less than $12 an arpent. I have no doubt that when it is carried on under the superintendence of others besides the proprietor, it costs still more. By doing the work ourselves, something may be saved. But, at all events, we cannot calculate on getting it done for less than $8 or $9 an arpent. (1)

As to the nutritive value of mangels, there is an enormous difference between the different kinds of the root. The great beet, which is called the field-beet, is I am certain no better than ensilage. But if you grow the little white beet, which yields from 15 to 20 tons an acre, you will find it much better in quality. It is very different from the other, so that all depends upon the species of beet you grow.

For my part I should not advise people to give up root-growing. As M. Chartier said, they are very useful in the months of October and November, when the silos are not ready, and the summer-swath (coupe d'été) has failed. There would then be a good lot of forage at the season when the pastures fail, though the cows still retain their milk-giving powers, and this milk is the richest of all the season. It is then that roots are of the greatest use.

In a word, I only spoke to support M. l'abbé Chartier.

M. DENIS.

Mr. President and Gentlemen.—I am not here to make a speech of any kind, and still less to make a fine speech. I am going to speak of the beet-crop. I came to this country to promote the cultivation of the sugar beet.

The lecture, so practical and well expressed, that the abbé Chartier has just delivered, confirms me in several conclusions which I have drawn during the six years I have been in the country.

Still, $12 for hoeing and putting in order an arpent of beets seems to me to be an exaggeration; though not so great an exaggeration as the *Journal of Agriculture* asserts it to be. For this work, women and children may serve, and their work is not so high-priced as the work of men.

In France, we pay for singling by hand (*l'arrachage*) $24 the *hectare* = nearly three arpents. Here, I calculate it should cost a little more. For hoeing, you would have to pay $8 or $9, and I suppose you might single them by hand for $12.(2)

I do not come here to make any claim to support for the sugar-factory; but you will understand that I cannot allow this occasion to pass without saying something about it. The factory is in the hands of men of means, men on good terms

(1) Well, M. Guèvremont, if his expenses are paid, will, he tells me, be very happy to go next July, to St. Hyacinthe and show the farmers how I taught him to do the work. A. R. J. F.

(2) Yes, but M. Denis is speaking of sugar-beets.

with each other, a thing that has never been the case before; and it is under the management of an experienced director, who has gone to Europe to buy the implements and vessels wanted for the manufacture of beetroot-sugar. I trust we shall be able to fetch beets from this side of the country. To enable us to start, we wanted a small bonus from government, and we hope that in the coming session—at least M. Mercier gave us to understand as much—we shall receive a small grant to enable us to pay a high price per ton for the beets. Certain farmers complain that we do not give enough for the beets, and they complain, as well, that they are not familiar with their cultivation.

Gentlemen, I am not accustomed to public speaking, and I feel that you must have soon found that out. But I hope that your kindness will rise to the level of my incapacity.

Shortly, I thank you; I am confused by your goodwill and kindness, and will no long detain you from listening to addresses much fuller of instruction than anything I am able to set before you.

L'ABBÉ CHARTIER.

From certain remarks that M. Casavant made, the meeting may be under the impression that, when I said that I had given up the cultivation of mangels for that of corn, I meant that I had thrown aside the cultivation of garden crops (*jardinage*). I did not at all mean that. We used to grow quantities of mangels—enough for our cows during the whole winter; I found that it was more economical to grow corn which, according to my experience, has the same value, weight for weight, as mangels. And when I speak of *betteraves* (*beets*) I mean *la betterave des champs, la betterave à vaches* (*mangels*); I do not speak of the *sugar-beet* (*betterave à sucre*).

I do not wish you to be under the impression that I want to put corn into the place of all other kinds of garden-crops (*jardinage*). At the Seminary, in spite of the change pointed out, we still have quantities of garden-crops, though we no longer grow turnips.

After reading these addresses, I had of course no difficulty in understanding the extreme reluctance of the farmers of French extraction to embark in the cultivation of root-crops. According to M. Chartier, a Frenchman, working 13 hours a day, took 6 days to single an arpent, which is equal to about 9 days of 10 hours to the imperial acre; but as this man was an extra good workman, M. Chartier does not expect to get his work done so cheaply by the ordinary farm-labourers of the country.

Now, let us see what the cost of the operation is in England.

I wrote, last June, to the editor of the Agricultural Gazette, the leading farm Journal published in England, and laid the case before him. In reply, I received the following:

Cost of hoeing Mangold. Swift and True—"Your Frenchman no doubt had a way of his own. We know that in Scotland two women will single an acre of swedes a day, and that three to four women may always be relied upon to do their acre a day. Again, the usual price for singling turnips or swedes would be 5s. 6d. ($1.32) per acre, and 8s. ($1.92) for doing the work twice over, and 10s. ($2.40) for doing it three times. That is, we should contract for first, second, and third hoeings, all to be done for 10s. an acre, in England. In Scotland the drill rows are 27 in. apart, and in England from 18 in. to 20 in. apart. Mangold is rather more expensive to hoe than swedes, but only fractionally, and we perfectly agree with A. (*Jenner Fust*) that two women gapping out the rows with 7-inch hoes, followed by two more women singling the bunches, could finish an acre in one day of ten hours. We think they could do more than an acre if each woman completed her own work of both gapping and singling."

"Your Frenchman" refers of course to M. Chartier's man. I agree with the editor's opinion that "four women could do more than an acre a day if each completed her own work of both gapping and singling;" but I had not time at Sorel to teach them how to single with the hoe without stooping too much.

It is not to be supposed for a moment that the English are naturally handier with tools than the Canadians. The latter are decidedly the sharper in learning anything they desire to learn, and before I left Sorel, I could show four French-Canadian women who could and did use the hoe in singling roots as well as any Scotchwoman I ever saw.

After all, there is no use in talking any more on this subject. The fact remains that what M. Chartier says cannot be done in one day by four women is done every season in England, and has been again done this summer by M. Séraphin Guèvremont's *bande* on his farm at Sorel.

DE OMNIBUS REBUS.

Box 109, Upper Lachine—August 31st, 1888.

Sheep.—"We admire the flock of the flockmaster," says an American writer, "whatever we may thing of his judgment, who declared in the course of a heated argument on the tariff: I would raise sheep, sir, if they had no wool at all on them"! I do not go so far as the enthusiast, but I am convinced that there is money in mutton both here and in the States. An amiable sheep breeder, who is evidently of the opinion that "there is nothing like leather," rejects with scorn the proposal to improve the native sheep by crossing with English rams, and insists upon the value of the merino as a mutton sheep. Another, from Vermont, says that the Cotswold is *the* sheep for the purpose. Every one for himself! The one breeds merinoes and the other Cotswolds, both wool- and not mutton-sheep. If the wealthier of our people desire to see mutton of good quality on their tables, the Downs must be chosen as the parents of the future.

Drainage.—Professor Kedzie, of the Michigan Agricultural Station, lately read a paper at a meeting of the society, on "Drainage in relation to flood and drought," an extract from which will be found on p. 156. The professor seems to hold the theory that certain soils are impermeable to water, an idea that I thought an English engineer, Parkes, had exploded 45 years ago. There is no such thing as a "surface soil impervious to water." Is not a clay of the stiffest quality wetter, three feet below the top, in autumn than in summer? There are no clays here, as far as my observation goes, equal in tenacity to our English Oxford and Lias clays, and these are so far from being impervious, or impermeable, that the first operation necessary to their improvement is drainage. So to say that "when the surface soil is impervious to water, it is manifestly a matter of indifference whether the subsoil is tiled or not," is absurd. The surface water can and does reach the tiles, and, as is clearly perceptible all over England, floods are occasioned by the rapid discharge of the rain-water though the drains. A mere inspection of the Valley of the Thames two days after a heavy fall of rain, would convince the most sceptical that drainage causes floods. Fifty years ago, before there were anything but open ditches in common use, water lay in the furrows of the heavy uplands of Gloucestershire, Oxfordshire, and Berkshire, for four or five days before the ditches discharged it into the brooks, and the brooks into the river; but even before I left England, thirty years ago, so greatly had the system of drains prevailed, that 24 hours

after the heaviest thunderstorm, there was no water visible on the land, and the river began to swell by the middle of the second day.

SOILS THAT NEED DRAINAGE.

All soils that are not readily freed from excessive moisture, where the spaces between the particles of soil are full of water for any considerable length of time after rainfall, or full of spring water, need drainage. All clay soils with no underlying strata of sand or gravel sufficiently near the surface to receive down through the soil and carry away the excess of water, need drainage, whether the surface be level or rolling. Low, level lands need drainage to rid them of surplus water, and rolling lands need it to protect them against surface wash and that they may be enriched by the fertilizing elements brought to the earth by the rainfalls.

The fact is, that where the water does not readily pass down through the soil, it is proof positive that beneath at some depth is a tight bottom holding the water. We frequently have heavy rainfalls. If the soil remains saturated with water for any considerable length of time, the growing crops under water perish or the leaves become yellow, even if the plants live. By sufficient under-drainage the water passes quickly down through the soil to the drains below, the soil retaining only the necesssary amount of water, no more and no less. Thus one important reason why we should drain is that we may retain in the soil only the necessary moisture for plant growth.

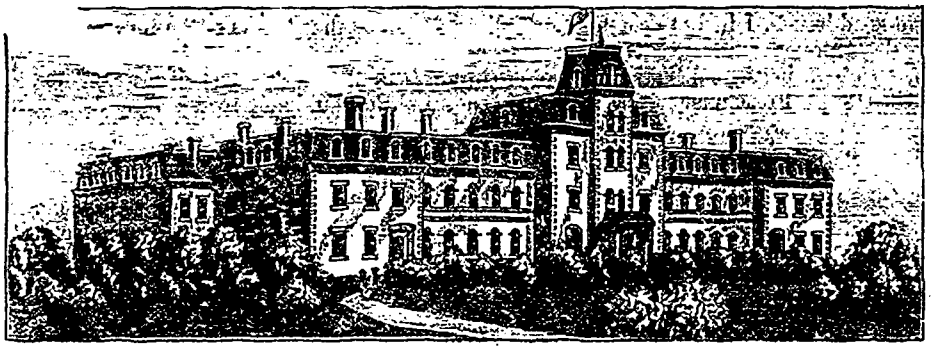
The heat necessary to plant life is an important factor in the growth of our crops. We often speak of cold and warm soils. The soil which is saturated with water, and from the surface of which the water is being removed by evaporation, is spoken of as "a cold soil," because evaporation is a cooling process. On the other hand, if the soil be open and porous, the water passing readily down, leaving the soil free to absorb the heat of the sun, we designate it as "a warm soil."

The storing of heat necessary to plant growth depends upon the soil being open and porous, and clay soils can be made so only by sufficient drainage, for the reason that heat cannot pass down through water. If the soil is full of water the sun cannot warm it. If the soil be drained, the heat absorbed increases the temperature from 8° to 15°. Corn will germinate at 55°, while at 45° it will rot in the ground. It is not surprising, then, that corn fails to vegetate in cold, wet springs. The increased temperature not only promotes the germination, but the growth of crops. The planting or sowing may be done ten or fifteen days earlier.

PART OF FARM, FROM SOUTH WEST.

A drained soil becomes a great laboratory, in which is prepared the necessary supply of food for the growing crop down as deep as the tile is laid. The water passing down through the spaces between the particles of soil and through the pores of the drain below is followed by the air freighted with fertilizing elements, which are absorbed by the soil, forming other combinations with the elements of the soil, and in this way preparing an inexhaustible supply of plant-food in nature's great storehouse.

The roots of the plants find their way down through the same spaces, crevices, and pores through which the water finds its way, and take up the needed supply of food, selecting such as is suited to their growth and well being.



THE COLLEGE.

Winter vetches.—*Quis*, who writes from Holliston, Mass., asks the Country Gentleman for information as to the writer vetch (*vicia sativa*). Among the replies *Quis* receives is the following one: The crop is most valuable when used at the beginning of winter, and for such use should be put in from August 20th to September 1st, in the latitude of Albany.

Well! It may be so in the latitude of Albany, but in the latitude of London, on the richest soil and with the most perfect preparation, there would not be keep for a lark an acre before the subsequent May. *Winter-vetches or tares*, so called not from their affording food for stock in winter—which they do not do—but from their standing the winter in England and producing forward green-meat in spring, are useless in this climate.

There is, however, a vetch or tare, which, sown in spring, affords a plentiful and valuable supply of cattle-food about 8 weeks from sowing. The seed of this is much larger than the seed of the winter-tare, and consequently more should be sown to the acre. If sown alone, 3 bushels will not be too much, but, as my readers know, I prefer mixing with pease and oats.

All the way along the Intercolonial, I saw an immense growth of a species of wild vetch which, in many parts, formed a good half of the hay-crop. I hope to receive a few pounds of seed, and I shall get some careful man to sow it next September with a sprinkling of fall-rye. There is no fear of its not surviving the winter, and cultivation may improve it considerably.

Fertilizers.—The State of Georgia seems to have a good sense of the value of chemical manures, and to take great pains to keep the manufacturers up to the mark. There, the increase of the number of tons made annually is something marvellous:

Inspected	1875-76.....	55,316 tons.
"	1881-82.....	125,427 "
"	1885 86.	160,705 "
"	1887-88.	208,007 "

COTTAGES.

As all manures offered for sale in the state must be submitted to inspection, a pretty severe check is kept upon the purity.

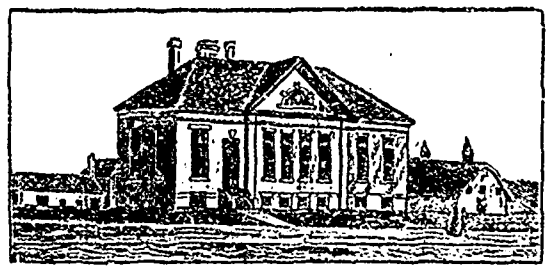
I do not believe that the whole of the Dominion consumes, half as many tons of fertilizers to-day, as the one State of Georgia used in 1875.

This system of inspection seems to have answered its purpose, for whereas the average per centage of phosphates in 1875 was 11.16, the per centage of the same constituent in 1887 was 30.74.

Montreal Horticultural Society.—I have just received the Thirteenth Annual Report of the above society, which is principally occupied with an account of very successful meeting, at Quebec, last winter, of the Fruit-growers' Association of the Province of Quebec. Papers were read by different members on apples, plums, and cherries, and discussions ensued thereon. There is one cheering prospect: I think a notable increase of French-Canadian names can be discerned in the list of members of the society! I reckon nearly forty members of that nationality, and perhaps, in course of time we shall see as many English-Canadian names in the list of members of the Dairymen's Association.

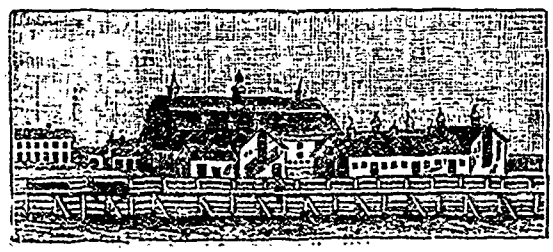
Tobacco in England.—It seems that tobacco-growing in England is, as all who knew the climate anticipated, a complete failure. The cost, per acre, of the cultivation was enormous, varying from $100 to $500! The latter expenditure was made on a farm I once occupied at Chesterford, Essex, and a finer piece of gravelly loam does not exist: if tobacco cannot be grown to perfection there, it cannot be grown to perfection anywhere in England. The yield varied from 1,100 lbs. to 1,600 lbs. an acre, and report says that German tobacco, of better quality than any English exhibited, can be bought for 5 cents a pound. Taking the average produce returned as 1,400 lbs. an acre, and the average expenditure as $250, we have a clear loss of $180! The season in which the experiments were made was one of unusually high temperature for England. This year, I expect to hear a woful tale of the planters' losses, for it has been raining there continuously the whole of the later summer.

Below Quebec.—I passed the month of August at Little Métis, 200 miles below Quebec, whither I was seduced by re-



LABORATORY.

ports of unlimited brooktrout-fishing, which reports were true as regards former days, but absolutely unfounded on fact as regards the present time. On my journey by rail (1) (Intercolonial), I found, as I expected, everything very backward. The grass only just cutting, though it was dead ripe—hay standing, in fact—and the grain was, with the exception of the rye, not in ear! In the neighbourhood of St. Charles' Junction, there seemed to be some decently fertile soil, with a good many small streams suitable to irrigation, but from what I found to be the immense length of the winter, irrigation, except for strawberries, &c., is an impossibility. No water-meadows can be made to any purpose unless the flooding can be continued from the first of October to the 20th of November, and recommenced, at latest, by the 10th of April.



FARM BUILDINGS.

At Ste. Anne de la Pocatière, the farming did not seem better than elsewhere. The crops were foul, and stunted in growth, and what hay was down looked badly managed, lying exposed to the sun, instead of being gathered into beds preparatory to cocking for the night. I see my note is: Haying only begun; grass as dead as nits. Farming *awful* all the way!

At Métis I was very much struck with the almost entire absence of the potato-beetle. The haulm looked as healthy as it used to look in England 50 years ago, when I remember shooting pheasants in October in potato-fields with the haulm as green as grass. The Métis potatoes are of very superior

(1) July 27th.

quality and keep sound and fresh in the *caveaus* till the new ones come in. I ate old potatoes of capital quality on the 7th August! The old pastures—if I may use the term—are full of white-clover, but very poor in grasses, consequently the milk, though pretty rich, is short in yield. Swedes, of which there are two or three half-acre patches, grow luxuriantly, but are very badly cultivated. The only root-crop, properly so called, I saw was at Leggatt's Point, about two acres in extent, swedes and hybrid turnips, and if the management had been decent, there would have probably been a yield of 30 tons, = 1200 bushels, an acre. The growth of tops and their healthy appearance, and the quality of the bulbs were perfectly delightful to a passionate lover of root-growing like me. What a pity, land and climate evidently suiting roots, that none are grown! Corn cannot take their place here, for it is hopeless to attempt its cultivation—I saw some in Turriff's hotel garden 14 inches high with the ear formed!

If the land were summer-fallowed once in five or six years —which it is n't—I could understand how the farmers below Quebec get on, but the entire absence of all fallow-crops, except potatoes, and the enormous proportion of grain crops, puzzle me. The land, to have endured this scourging so long, must originally have been of first-rate quality, but the present yield is evidently unsatisfactory. In the second concession at Métis, I saw one or two pieces of wheat that might give 18 bushels an acre, but a dozen or more that would not yield ten. No barley, oats really shocking to look at, and not likely to ripen before the end of October, if then. *Blé d'outarde*—wild-goose wheat—ears an inch long—about one head where there ought to be forty. A good many sheep kept—45 ewes and lambs together on the 25th of August! Lambs ought to have been weaned a month previously: ewes suckling lambs so late will be in bad order for wintering.

On my return journey—August 27th,—I found that the crops had made very little progress. A great deal of hay was lying cut—all abroad—and most of it utterly spoiled by the rain—dark brown instead of green. After passing Arthabaska, on the G. T. R., things improved.

The climate of Métis may be judged of from this: I, who never wear a great coat, except travelling in a sleigh, on the coldest day of winter, was glad of a fire on 22 out of 27 days I passed there!

Hops.—On August 25th, hop-picking began on the farm of the Messrs Dawes; same date as last year. As this season is at least ten days more backward than last season, I was not surprised to find the hops come in quite unripe. Crop very poor.

Fodder-corn.—A magnificent piece of fodder corn, sown where the root-crop failed, on Dawes' farm. Unfortunately, instead of being drilled 27 inches apart, and then in the rows 4 seeds to the foot—this was put in with the grain drill—about 6½ inches between the rows—with, I fancy, about 2½ bushels to the acre. Consequently, though the bulk is enormous, it is all scrawled about, and the quality will be very poor. Cattle on the Dawes' farms are doing well since the rain came at the beginning of August, at which period the manager feared they would be obliged to be brought into winter quarters. The soil here is precious leachy stuff, and rain vanishes too soon after it has fallen.

Sunday harvesting.—I was delighted to see that the Archbishop had given permission to his flock to harvest their crops on Sunday. The permission was not given, I presume to think, on account of any tenderness for the pecuniary interests of *Pierre et Jacques*, but because the food of the nation was at hazard. Many years ago—in 1850, if I remember—my brother, some time Bishop of Dunedin, being then a curate in Cornwall, found that, owing to the persistent rains, the harvest of his parishioners was in danger of being a complete failure. One Saturday morning, the rain ceased, a bright sun, with a brisk breeze, accompanied with a rising barometer, gave hopes of a fine following day: but that day was Sunday! What was to be done? Naturally, my brother, though the curate-in-charge, did not like to take upon himself to give advice on a point that might excite considerable prejudice among a certain class; so, very wisely I think, he "mounted his hack, and was off in a crack" to Archdeacon Bartholomew, of Totnes, and laid the case before him. He, the Archdeacon, immediately telegraphed for advice to the Bishop of Exeter, the Diocesan—Dr Phillpotts, commonly known as *Henry of Exeter*—an immediate reply was returned by the energetic prelate, couched in these words: "Tell the farmers to carry their crops as hard as they can all day." And they did it too! And I see, by the county-reports, that farmers in England do not wait now-a-days for permission of Archdeacon or Bishop to save their harvest, as the following example from Lancashire, the moistest county, in England shows: "The showers continued more or less last week up to Friday. Saturday and Sunday were fine, and moderately warm. A good deal of both seed and meadow grass had been waiting housing from the previous Sunday, the owners not caring to get it in on the Sabbath, but on Saturday last it was scaled out of cock, and some of it secured that day, although it could scarcely be dry. Sunday was fine, but to the weather-wise there were signs of coming change, and the glass was low, so the farmers evidently remembered the saying that the Sabbath was made for man, not man for the Sabbath, and both in this district and in Westmoreland a quantity of hay was housed on that day."

Grapes.—I was over a vineyard here yesterday, September 1st, and judging from the state of the berries, though they are of the Champion variety, I do not think there will be a a ripe bunch this side of October 1st! As this is the earliest ripener of all, I fear the vineyardists will have but a poor crop this year. (1)

Mutton-making.—Incited thereto by the experiments on pig-feeding conducted by Professor Fleury, of the University of Wisconsin, and Professor Sanborn, of the Missouri Agricultural College, by which, my readers will remember, it was proved (what nobody doubted) that nitrogenous food produces more lean meat than non-nitrogenous food, the Cornell University has been experimenting in a similar manner on sheep-feeding.

From a flock of 100 lambs, six months old, Down-Cotswolds, six were chosen, equal as nearly as possible in size, weight and form.

October 10th. Having been shorn, the six lambs were fed alike on hay, corn-meal, and bran till the 11th November, when they were separated into two lots of three each, in such a way as to make the total weights of each lot as nearly equal as possible.

Lot 1 began on a daily ration of 1½ lb. of linseed meal—whether old or new process is not mentioned, though the point is important—and 1½ lb. of coarse wheat-bran—roller or not is not mentioned, though that point is important.—Later on, in order to make the nutritive ratio still narrower—whatever that may mean—one pound of cotton-seed-meal was substituted for one of bran.

Lot 2 received 3 lbs. of corn daily.

Both lots had good mixed timothy and clover hay, but only as much as they would eat up cleanly.

(1) Grapes are still sour, Sept. 19th.

Both lots fed well up to the end of December when lot 2 were evidently tired of the unvaried ration of corn, and had to have their ration reduced to 2 lbs. a day, and later on had for three days nothing but hay, as they refuse to eat their corn-meal. When, however, on the 1st of March, *four pounds of mangolds were added to their ration*, they recovered their appetite, and ate their full weight corn-meal again. Another proof, in my opinion, that the value of the root-crop is by no means to be determined by the chemical analysis.

It was evident by March 1st that lot 2 would not become fat enough or have sufficient development, without some change in the ration, to compare with lot 1; so a change of ration became imperative. Table 1 shows that the added root ration not only toned up the digestion of lot 2, and enabled them to consume more corn meal than they could without it, and to make a gain of 2% more in one month than they had in the two previous months, but it also shows that lot 1 was greatly benefited by the addition of roots to their food. Their average gain for the four preceding period was 11¾%. The addition of the roots apparently increased it to 16%.

The average gain of lot 2 for the same period was 7½%. The addition of the 4 pounds of roots increased this to 13%.

The gain of the oil meal—bran—and cotton-seed-fed lambs, from November 11th to March 1st, was 57% of their gross weight; the gain of the corn-fed lambs for the same period was 20%!

The upshot was, that the 1st lot seemed to have a greater proportion of lean than the 2nd lot, but as the fat was not dissected out, no exact figures could be given. To my mind the experiment seems to prove nothing that was not familiar to every sheep feeder a hundred years ago: what is the almost invariable ration given to every fatting flock of sheep when folding off turnips in England? Either a pound of oil-cake, or a pint of horse beans cracked, with clover-chaff: all three highly nitrogenous foods.

However, as showing the value of the mangel, I rejoice that the experiment was tried. For it was evident by the 1st of March that both lots were tired of their food and a "kick" was wanted:

Increase of lambs from February 1st to March 1st.

Lot 1	6%
Lot 2	6%

Then the 4 lbs of mangels were given, and the increase of the next month, or rather of the next 35 days, as the experiment ended on April 25th was:

Lot 1	16%
Lot 2	13%

which reduced to the month of 30 days would stand:

Lot 1	8¾ %
Lot 2	7 %

Several coloured photographs, like those given of the pork experiment, follow, but they are not worth the expense of reproduction. I should mention that the nitrogenous lot drank about 10 lbs of water a day, and the non-nitrogenous lot about 3½ lbs!

JENNER FUST.

THE PHYSIOLOGY OF DIGESTION.

By Dr. COUTURE, V.S.

As I wish to treat this question from a practical point of view, I shall avoid the use of scientific terms; the expressions I make use of shall be those that are understood by every body, and I shall speak only of what may be useful to you in your every day business.

THE IMPORTANCE OF UNDERSTANDING THE PHYSIOLOGY OF DIGESTION.

You know, gentlemen, that in order to make a machine do its work properly, it is necessary to understand its parts, individually, and their particular use.

Now, an animal is a complicated machine that cannot be made to work profitably, or at least without danger to itself, unless its organs, and their proper functions are, at least superficially understood.

The animal machine comprises several parts or organs, such as the organs of digestion, of respiration, of circulation, of reproduction, etc.

These different organs are connexions of each other, or rather they are one and indivisible (*solidaires*). If one of them gets off the rails, the others suffer from the error.

But the one that, under the ordinary circumstances of life, presides over the others, is in fact the organ of digestion.

It is the stomach and the other organs of digestions, whose duty is to furnish the other parts of the organism with the food necessary to their existence.

You see, then, the importance of understanding a little, at least, about the mechanism of these organs.

Let us see, 1st, what the phenomena of digestion are, and then, 2nd, what practical deductions are to be made from them.

The first process of digestion takes place in the mouth, the second in the stomach, and the third in the intestines.

Mastication.—This is a very important point. It is more so to the horse than to ruminants, on account of his having only one stomach and that a small one. Behind the ear, there is a gland called the parotid gland. During mastication, there exudes from this a great quantity of saliva which mingles with the chewed food, and is indispensable to its preparation.

An hour and a quarter are required for the proper grinding of a quarter of a bundle of hay, and to its being mixed with its suitable amount of saliva.

This is not enough when the teeth are irregular, when the animal is old, or if it has a gluttonous appetite.

If the mastication is imperfect, the food does not undergo the proper transformation, and settles in the great intestine, where it remains.

Insalivation.—According to Colin, the *salivary glands* of a horse in good health and endowed with a good digestion produce during the mastication four times as much saliva as the hay given to hi . For instance: for 15 lbs of hay, 60 lbs of saliva; ⅓ more for oats, i. e. 5⅓ times as much. For instance: for 10 lbs of oats, 53 lbs of saliva.

While an animal is not eating, the glands secrete 2 ounces an hour: 4½ lbs. in 18 hours; or a total of 117 lbs for the 24 hours. (1) You see, then, what an enormous quantity of saliva is necessary to the proper functioning of the digestion.

Of what use is the saliva? 1st, it facilitates the thorough trituration of food; 2ndly, it serves to dissolve the starchy matters which it transmutes into dextrin, and thence into glucose; 3rdly, it converts the fatty matters into an emulsion.

The cereal grains contain the following percentages of starch and fatty matters:

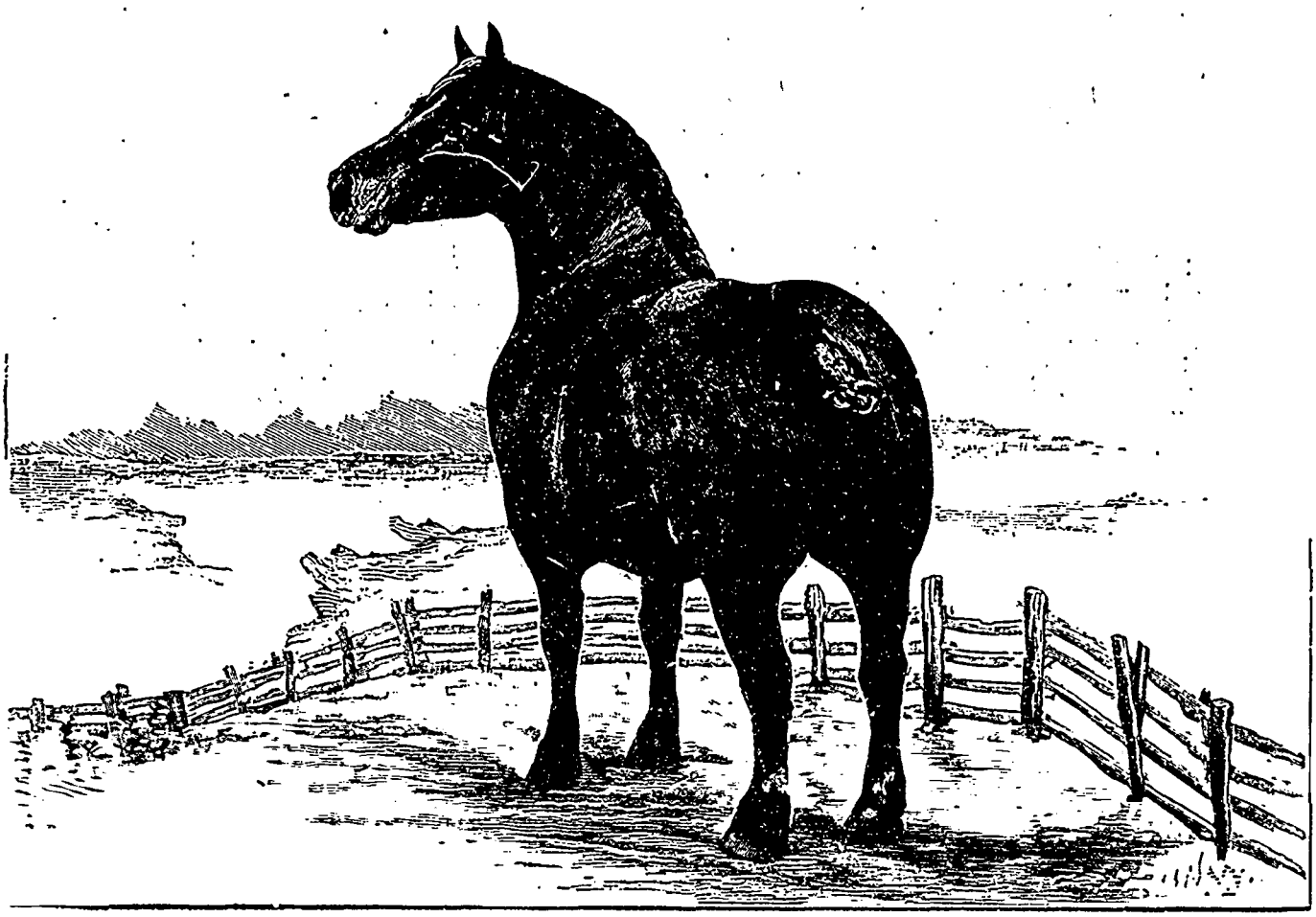
Albuminoids.		Starch.	Fat and oil.		
9.80	=	Maize.....64.....	6.62	=	71
10.50	=	Barley.....60.....	2.00	=	62
11.25	=	Oats.....62.....	6.00	=	68
14.40	=	Wheat.....63.....	2.00	=	65
8.80	=	Rye.....65.....	2.00	=	67
11.10	=	Bran.....61.....	5.50	=	67

Suppose, now, we take the case of an animal, a horse or a

(1) Including, I presume, the saliva secreted during the mastication of the food. A. R. J. F.

hog, that does not masticate its food sufficiently. A great deal of the starch and fatty matters passes into the stomach without having been transformed by the saliva; when arrived in the stomach they do not find the necessary solvent, and, consequently do not undergo there any transformation; from the stomach they pass into the intestines, which do indeed secrete an alkaline fluid, but not in sufficient quantity to cause the needful transmutation of the food, if it has not been sufficiently masticated. And this unprepared part of the food either accumulates, as in a warehouse (*en dépôt*), in the great intestine, or is expelled in an undigested state and is wasted.

In the case of the ox, there is this difference. The food does not require so much mastication while the animal is eating. Observe this: *while the animal is eating.*



PERCHERON STALLION SANS-PAREIL 6822 (96663). Property of W. L. Ellwood, De Kalb, Ill.

The process is conducted this way as regards the ox:

The ox has four stomachs, three of which are preparatory.

The food is taken, masticated a little, and then swallowed in great lumps, which fall into the paunch or *rumen*.

The paunch is never empty, containing invariably about a hundred pounds of food.

The meal finished, the beast lies down and ruminates, i. e. gnaws; thus the food is regurgitated into the mouth from the paunch, in balls of about 3 to 4 ounces in weight, and is there remasticated perfectly, and once more swallowed.

One part of each ball (cud), after having been swallowed the second time, goes at once into the fourth stomach, where it is ready to be digested; the other part falls into the second, thence goes at once into the third stomach, where the conversion of the starch and sugar is completed, and at last into the fourth stomach.

The three first stomachs contain alkaline fluids, that is, fluids of like constituents with the saliva, and playing the same part in the process of digestion as it does.

Rumination.—Rumination never goes on unless the animal be at rest, and in good health. It ceases in moments of excitement, and at the slightest signs of sickness it is arrested.

How to compel the animal to masticate.—Greedy cattle never chew their food enough. In the horse, this defect can be remedied by mixing his oats with bran (1); in the ox, by mixing his grain with chaffed hay and straw, or by giving the coarse fodder first and the grain afterwards.

Digestion in the stomach.—We must remember that the horse has only one stomach, and that a small one, only holding about 4 or 4½ gallons. Besides, it only acts as an organ of digestion to half of its extent, the left *sac* exercising no influence on the food.

What happens in the horse's stomach when the animal eats his usual meal: 8 lbs. of hay and 10 lbs. of oats?

This is what happens:

The 8 lbs. of hay, diluted with 32 lbs. of saliva, form a mass capable of filling the stomach three times; for, in order

(1) Or, as is invariably done in England, with chaff composed of ¾ clover-hay and ¼ straw. A. R. J. F.

to fulfil properly the function of digestion, it only retains ¾ of what it can hold.

By the time the horse has done eating his food, the stomach has emptied itself twice, retaining only the third and last portion of the food.

The meal only lasts, at most, two hours; the first two *batches* remain only 40 minutes in the stomach.

The rapidity with which the greater part of the mass of food represented by a ration of 8 lbs. of hay passes into the stomach may not be an inconvenience, provided the *mastication* and *insalivation* have been sufficient. For hay only contains 7 % of matters upon which the gastric juices exercise their influence—the albuminoids, to wit, as legumin, casein, albumen, &c.

The other constituents:

Starch, gum, sugar, the analogous matters on which the saliva has already worked a transformation, must finish their conversion in the intestines. And the same with the fatty matters.

Thus, if the first part of the work—mastication and insalivation—has been properly done, the short stay of the food in the stomach will be sufficient to allow of the dissolution of the albuminoids the food contains by the action of the gastric juices.

But, if the hay, from any cause, be imperfectly triturated, or insufficiently insalivated, the action of the gastric juices will be insufficient, and the matters intended to support the body will quit the stomach without having been properly converted.

The action, then, of the gastric fluid is chiefly exerted on the albuminoids. Now the more albuminoids any food-material contains, the longer ought it to remain in the stomach. *Oats*, which contain much more than hay, would pass out undigested, did they not remain longer in the stomach than hay.

But as oats are five times less bulky than hay, they remain there five times longer.

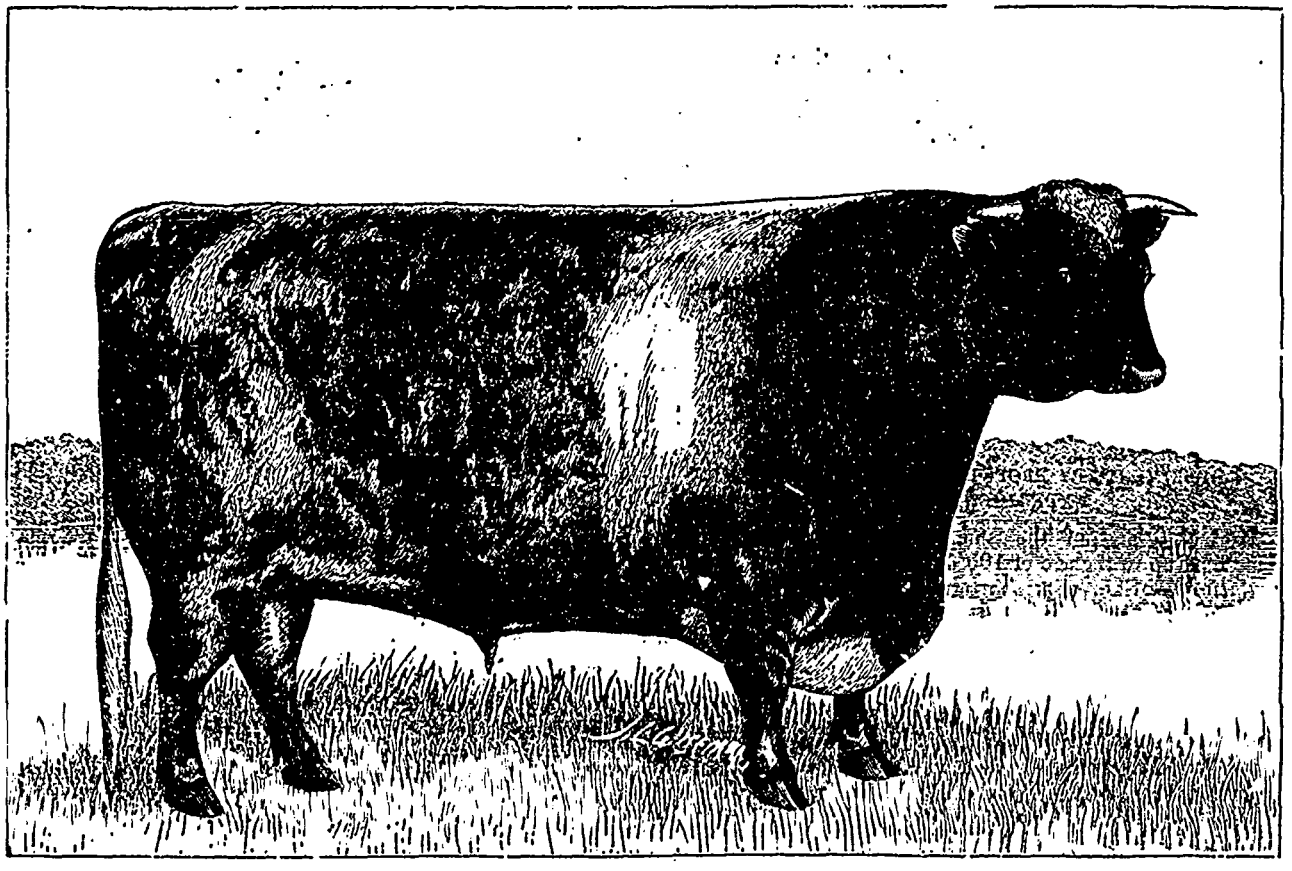
The ingestion of the feed of oats must not be followed too rapidly by the ingestion of the ration of hay, lest the latter should push the former into the intestines before its digestion be perfected.

Practical deductions.—From what I have just said the following practical results may be deduced:

1. For the horse:

A. Give the hay before the oats.

B. Do not give any more hay too soon after the oats.



SHORTHORN BULL 32490 SIR ARTHUR INGRAM.
The celebrated English prize winner, bred by Mr. Linton, Sheriff Hutton, Yorkshire, England.

C. Do not let the horse drink after having eaten the feed of oats.

D. Let him drink after he has had his hay, in order to remove from the stomach any obstructive matters and disperse them into the intestines, where the digestion is finished.

For cattle:—

A. The first mastication need not be so complete, since during rumination the food will be chewed again; and, besides, the fluids of the paunch are alkaline.

B. But, if from any cause, the chewing of the cud is suspended, digestion cannot go on, since the food, having only been once masticated, is not sufficiently prepared.

C. Therefore, since rumination is at a standstil, suspend

all bulky food, substituting in its place, mashes, and food in a liquid form generally.

Cooked and raw foods.—Does not this teach us something in connection with feeding pigs?

How should a fatting pig be fed? On raw or cooked food? You shall give your own answer to the question.

If the pig's food is cooked—I speak of grain, corn, barley, &c.

1. The pig does not eat so much—this is not convenient, for it is desirable that the animal should eat as much as possible in a given time.
2. He eats faster—consequently mastication is imperfect.
3. In consequence, the food enters the stomach insufficiently prepared. The albuminoids are not properly converted, and, of course, only partly absorbed—result, waste.

On the contrary, if dry grain be given:

1. The grain is eaten more slowly—better masticated.
2. The pig eats more.
3. The food is in a better state of preparation when it enters the stomach.
4. The albuminoids are thoroughly converted.
5. Entire absorption takes place.
6. No waste of food.
7. Pig fattens faster.

Professor Henry carried out 27 experiments at the Experimental Farm of the State of Wisconsin. Twenty-six of these go to prove the truth of what I have just stated: that pigs fatten faster, and with less cost, on raw than on cooked food. Only one experiment turned out differently from the other 26.

I think it my duty to relate you another series of experiments, made under the same professor, for the purpose of discovering if it were possible to make lean or fat pork at will, and which of the two was the more profitable to the feeder.

EXPERIMENTS BY PROF. HENRY, AT THE WISCONSIN EXPERIMENTAL FARM.

He took 6 pigs, of the same litter, and fed them on the same food up to the age of 100 days.

Ration. — Skim-milk, buttermilk, corn-meal, and shorts, (Pollard ?; Trans.) given in the same trough.

At the age of 100 days, they were divided into two lots of three each.

Lot *A* received 1 part of dried and pressed blood.
6 parts of shorts.
14 parts of skim-milk.

Lot *B* received all the corn it would eat.

Each lot was treated exactly alike. The experiment lasted 136 days.

Total amount of food consumed by both lots:

Lot *A*.—3302 lbs. of skim-milk = 8 lbs. a day, each.
1415 lbs. of shorts = 3½ lbs. a day, each.
236 lbs. of blood = 10 oz. a day, each.

Lot *B*.—1690 lbs. of maize = 4 lbs. 3 oz. a day, each.

The digestible matters contained in the food of these pigs was:

	Albuminoids.	Carbo-hydrates.
Lot *A*.....	428 lbs.	823 lbs.
Lot *B*.....	153 lbs.	1193 lbs.

The total amount of nutriment is within 100 lbs. of being equal in the food of both lots, that is, lot A = 1251 lbs.; lot B = 1346 lbs.

The albuminoids form the muscular part or lean meat.

The carbo-hydrates—starch, sugar, fat, &c.—serve to support the animal heat, and to make fat.

We see then, that Lot *A* was fed for the production of lean; Lot *B* was fed for the production of fat.

At the end of 136 days, the pigs were killed, and the blood carefully preserved.

Three sections were made, 1. at the neck, 2. between the 5th and 6th ribs, 3. across the flank. The sections of the pigs were photographed, and the annexed engravings show the results of the experiment; and very striking they are.

This is the difference between the two lots:

The live-weight of lot *A* is 19 °/₀ greater than that of lot *B*.

The dead-weight of lot *A* is 21 °/₀ greater than that of lot *B*.

The kidneys, spleen, and liver of *A* are from 32 °/₀ to 42 °/₀ greater than those of lot *B*.

The blood of *A* 55 °/₀ greater than that of *B*.

The bristles and skin of *A* 36 °/₀ greater than those of *B*.

The large back-muscles of *A* 64 °/₀ greater than those of *B*.

Of all the meat that could be cut from the carcases of lot *A*, 38 °/₀ was fat, of lot *B*, 46 °/₀.

The bones of *A* were 23 °/₀ heavier than *B's*, and the thigh bones of *A* were 62 °/₀ stronger (by the testing machine) than *B's* bones.

Practical conclusions.—It will be seen from these quotations that in animals fed on too fattening food, i. e. on food too rich in carbo-hydrates, the bones, the muscles, and the internal organs, diminish in volume, the blood, especially diminishing by one-half.

Consequently, their constitution is considerably weakened. If attacked by sickness, they have no power of resistance. Should a contagious disease affect them, they immediately fall victims to it. Their legs fail them. Rheumatism worries them, and, lastly, their fattened carcases are less valuable since they weigh less.

And these further considerations must be borne in mind:

The breeding sows must receive food fit to sustain the skeleton, the bones, and the muscles, as well as to harden the constitution, such as skim-milk, buttermilk, bran, pease, and green clover, with a small proportion of maize, &c. The piglings, too, require food pretty rich in albuminoids. When they are weaned, the following will be found suitable: 2 parts of milk, 1 of pollard, 1 of maize. If they are pastured on clover, their frame will show increased growth.

When the fattening time comes, pigs may be forced on maize, if fat pork is wanted, and on albuminous food, as bran, pease, and flesh (*Eugh! Trans.*), if lean is preferred.

Hence we find, that *boars* should not have food too rich in carbo-hydrates, since with such food their frames would be less, their constitutions weaker, and their progeny delicate.

Milk, a few pease, bran, and flesh, are the best things to feed *boars* on.

As to the horse.—Another result from what precedes is, that the best of all foods for the horse is a mixture of bran and oats, which, of all the cereals, except wheat, contain the greatest amount of albuminoids, and sufficient carbydrates to be economical.

Now, as the food of the horse must be regarded as furnishing, not fattening supplies, but muscular force, stoutness, energy, and the durability of the muscles, that food that contains the greatest proportion of albuminoids—oats and bran—must be given to him.

But wheat, you will say, since it is richer in albuminoids than oats, will be fitter horse-food than oats. Not at all. For besides the constituents of the other cereal grains, oats contain the *black principle* (*principe noir*), which is the stimulant par excellence of the horse. Nothing, then, not even wheat, can be substituted for oats for horses.

Cooking destroys the black principle.—This principle is destroyed by cooking. Consequently, oats must never be either boiled or scalded.

Thus, the greater the speed required of your horses—on

the race-course or on the road—the heavier the labour, the greater the quantity and the finer the quality of the oats must be.

If you want to fatten a horse quickly, give him thickish mashes of corn- or barley-meal, and linseed-cake.

Fattening cattle.—How many people know how to fatten cattle? Or, rather, how many do not know how? Alas, the greater number of those who turn their attention to this branch of agriculture.

To make fattening beasts profitable, it must be done as fast as possible; and this is true of the fattening of all kinds of stock.

Take the case of two men who, the same day, put up to fat a bullock apiece, the two beasts being each of the same age and build, and each in the same condition as his fellow.

A gives his beast only hay: 3 bundles a day = 18 cts.—18 cents.

B gives
- 1 bundle of hay..... = 6 cts.
- 3 lbs. of bran..... = 3 cts.
- 4 lbs. of oats..... = 4 cts.
- 3½ lbs. of cake.. ..... = 5 cts.—18 cts.

As the hay only contains 7 °/₀ of albuminoids, and 37 °/₀ of nutriment,

	Albuminoids.	Carbo-hydrates.	
And the bran contains.	11.90 °/₀	67 °/₀ = 73 20 °/₀	of nutriment.
And the oats contains..	11.25 °/₀	62 °/₀ = 73.25 °/₀	" "
And the cake contains.	8.00 °/₀	77 °/₀ = 85.00 °/₀	" "

it follows that the beast who only received hay has been fed on food that only contains 37 °/₀ of matters serving to form fat and to support the animal heat, while the other has received rations that, in a smaller bulk, contain from 73 °/₀ to 85 °/₀ of nutritious matters. And both rations cost the same sum. That is, if *A's* bullock takes 5 months to attain to a specified degree of ripeness; *B's* beast will reach the same point in three months.

Which of these two methods will pay the better?

This brings me to another point: the choice of beasts for fattening.

Some beasts fatten well; others fatten very badly.

Can one judge, by inspection, beforehand, which beasts will pay for fattening, and which will not? Decidedly.

Here is a farmer looking out for beasts to fatten. He will choose, in the first place, those that are nearest to the ages of two or three years; the older they are, all things being equal, the more difficult are they to fatten. (1)

He will not pick out beasts that are too poor, for they would have to be kept fattening too long, and there would be too great loss of "the food of support." (2)

He will select those with fine limbs, and with fine heads and tails, with well rounded ribs, that is, with the barrel well springing from the back-bone and round; with the withers (*plates we call them—Trans.*) back, loins, and rump wide; the twist, too, ought to be well let down, or, in the vulgar tongue, it ought not *to be cloven too high* (fendu trop haut). The body should be as large and the legs as short as possible. The skin must never be too dry, nor stick too tightly to the ribs. Lastly, choose in preference those beasts that share in the blood of the Shorthorns, of the Herefords, or of the Angus.

An especial mark of an unkindly fattening bullock is that he has a depression behind the shoulders which seem as if they were girthed in (*sanglées*); such, never mind what breed they belong to, are bad feeders, and bad beef-makers.

Fatten badly, too, do all beasts with long legs, with small bodies, with flat sides; and those that have coarse heads, legs, and tails; as well as beasts that are narrow over the plates, the back, the loin, and the rump: so too do all old beasts. (1)

If the feeder will be guided by these simple rules, in making his purchases, he will find it answer his purpose.

(*From the French.*)

What Dr Couture means by "the black principle" (le principe noir), I confess I do not understand. Every real horseman knows that in some mysterious way, oats suit horses as their daily food, in northern climates, better than any other grain. Barley is said—erroneously I believe—to be too heating for them; and yet, in Arabia, the horses of the desert tribes are fed on "the golden barley of Yemen, mixed with spices, and a small portion of a dried sheep's flesh." All our hard-working horses in England have a double-handful of cracked beans with each feed of oats. We do not grow horse-beans much in this country, but pease would answer the same purpose: one weekly allowance for ordinary slow draught-horses is 6 pecks of oats and 2 pecks of pease or beans. But the *black principle* is what I want the scientific term for, if Dr Couture will have the kindness to send it to to me.

A. R. J. F.

(1) Hum! doubtful. A. R. J. F.
(2) This depends upon prices.

OUR ENGRAVINGS.

Sans Pareil.—Percheron stallion.

Agricultural College, Guelph.—Illustrations of the farm and buildings of the Ontario College of Agriculture. *From the Farmer's Advocate.*

Sir Arthur Ingram.—Shorthorn bull—a celebrated winner of R. A. S. of England prizes. *Farmer's Advocate.*

Ste-Therese de Blainville, 19th July 1888.

Arthur R. Jenner Fust, Esq., Lachine.

Dear Sir,—After a partial trial last summer of the soiling system I decided to adopt it altogether this year.

And in order to insure plenty of green fodder I followed the advice you gave in the Journal this spring and sowed a field of oats, peas and vetches in the proportions you named and regret to say that the feeding of it does not give the result I expected as my cows are falling off considerably in their milk How can you account for it. (2) My present feeling is that I would not care about trying that crop another year.

So long as the cows were fed grass only the flow of milk was good but shortly after commencing the mixture a slight difference was noticeable in the milk pail which difference unfortunately goes on getting bigger.

My mode of feeding is as follows: first thing in the morning they get a feed of the mixture. After breakfast about 7.30 they are slopped and get a feed of grass. At noon another feed of the mixture, between 3 and 4 they are let out into the yard where they are watered and get a feed of grass, are put back into the stable about 6 to 6.30 and are given another feed of the mixture. That makes 5 feeds a day and they get all they can eat each time. Since they have had the mixture they are putting on flesh at the cost of milk. During last winter a practical dairyman gave me credit for getting more out of my cows than any one he knew, but I am afraid he would not say as much just now.

If you have any time to spare I should be very pleased if you would spend a day with me. I will show you some of the best farms in this section—although our farms may not

(1) Oh, dear no! A. R. J. F.
(2) I cannot account for it in any way.

be so highly manured as those above Lachine, many of them are kept in first class order and are worthy of a visit.

Yours truly, Chas. D. Tylee.

The mixture has been used regularly by milkmen at Sorel for 3 years, and they swear by it. It will certainly help to make flesh, and if the milk is less in quantity it should be decidedly richer in quality. Theoretically, the mixture is perfect, but I do not build on that; as I have always found it good in practice. Why omit the rape? A. R. J. F.

Mr. Martin John Sutton has weighed the hay from his experimental plots at Dyson's Wood, upon which we reported in our issue of August. The details given related to the B set of experiments, as by far the most trustworthy, because the least affected by the unfavourable character of the season. In reality, there are two sets of experiments with eighteen plots, six of which were brought into the trial a year before the remaining twelve. Five of the plots were manured in 1886 and not in 1887. During these two years, as our report showed, the greatest aggregate yield was that obtained from the use of 3 cwt. superphosphate and 2 cwt. kainit, and this dressing gave also the best pecuniary result, costing only 15s. 9d. But this year, manures were again applied, as in 1886, and, as was to be expected, the nitrogenous manures have given the most hay. It was so in the first year, though not in the first and second together. The plot which has now given the heaviest yield of dry hay, 35 cwt. 2 qrs. 21 lb. per acre, is No. 3, which had 1¼ cwt. of nitrate of soda applied to it, while next with a yield of 34 cwt. 3 qrs. 7 lb. of dry hay, comes Plot 5 dressed with 1 cwt. sulphate of ammonia and 2 cwt. kainit. The plot which received 3 cwt. superphosphate, 1 cwt. nitrate of soda, and 2 cwt. kainit, was in the third place, while the one which stood first in the two years' comparison is fourth. It will always be so. In the year of manuring, nitrogenous manure will always carry off the palm as far as mere bulk of produce is concerned, and it is only by considering the after-effects that observers of the experiments see the disadvantage of using these stimulating manures on pastures intended to stand.

The case is different in the rest of the B experiments, plots 7 to 18 (except No. 11, unmanured) were dressed in 1887, but not this year. Here the greatest yield is given by the plot which received 10 tons of farmyard manure, while next comes the one dressed with 3 cwt. dissolved bones, and third that which got 1 cwt. nitrate of soda and ¾ cwt. muriate of potash. Thus, as was the case with the first six plots last year, lime and potash have told in the second season, though so far behind the nitrate of soda and sulphate of ammonia plots in the year of the application of manures. Adding the yield of dry hay for the two years in the case of the set of experiments just referred to, we find dissolved bones have given the best results, while the plot which had 1 cwt. nitrate of soda and ¾ cwt. muriate of ammonia stands second, and the farmyard manure plot comes down to the third place.

Ag. Gazette.

Strawson's Air-power Distributor.

The trial of Strawson's air-power distributor, announced last week, took place at the College of Agriculture, Downton, last Tuesday. Owing to the very wet weather, the trial did not take place till towards evening, and was concluded on the following morning. After personally inspecting the machine at work, we are able to report that Mr. Strawson has brought out an efficient instrument, capable of performing what its inventor has striven to realise—a perfect distribution of various substances used in agricultural operations. It was first tried upon oats, and the trial was conducted upon the turnpike road, in order that the spectators might thoroughly inspect the result. The oats are placed in a hopper, which is to be so enlarged so as to hold six to eight bushels. The oats are allowed to feed gradually downwards, and are delivered over a wide nozzle, over which they pass in a continuous stream. From the nozzle issues a blast of air, produced by a fan actuated from the travelling wheels of the instrument, and worked up to a velocity of 3,000 revolutions per minute. The direction of the blast and of the material (oats, or whatever else is being distributed) is further directed by a flanged plate, over which the oats are blown in a fan like form, extending over a width of about 23 feet. The grains were completely separated and the ground was covered with extraordinary regularity. The machine was next filled with water, and a suitable nozzle was fitted on in place of that used for dry matter. Here the distribution of the liquid was very perfect. The water was thrown out as an impalpable spray from which nothing could escape. The machine was next charged with paraffin oil, when the effect was still more marked, as the paraffin was rolled out in a cloud of vaporous-looking fine spray, which was calculated to envelop every blade of grass or leaf of turnip over which the machine passed. The effect when finely-slaked lime was used was, perhaps, the most striking, as the lime formed a dense white cloud, and was distributed with absolute uniformity. Every blade and culm of grass was coated as with hoar frost.

The significance of Mr. Strawson's invention is most evident in connection with insect attacks and blights. Broad-casters and manure-distributors we have already, although this instrument will, we think, prove a formidable rival to some of them; but an efficient means for completely coating or spraying growing vegetation we have not as yet had.

The instrument now for the first time brought forward (for it was not perfected in time for entry at Notthingham) is superior to Mr. Jephson Rowly's machine for dusting over young turnips affected with fly. The large breadth it takes alone places it in an unrivalled position, and the perfection of the distribution and the extreme state of division of the liquid applications, both give it a peculiar interest.

The machine, to be efficient, must travel at a brisk pace, and easily covers twenty-one feet or seven yards. During its action the fan emits a noise similar to that of a threshing machine when running empty, which can be heard at a great distance. From what we have seen of this machine, we believe that its possession would give its owner complete mastery over turnip flies and other pests attacking the leaves of young growing crops. (1)

Prof. R. C. Kedzie, of Michigan, gave a paper on "Tile Drainage in relation to Flood and Drought.

The general proposition that tile-draining increases flood and aggravates drought demands careful consideration. The common time of special danger from floods in the level States of the North, is where the accumulated snows of winter rapidly thaw with warm rains while the ground is still frozen, and thus impervious to the accumulation of water. The depth of the frozen soil varies widely in the same neighborhood. On Feb 18, 1888, when the ground was for the most part covered with snow, which was rapidly melting, the writer exposed the soil by boring with a long-shanked auger to determine how deeply the soil remained frozen. The passage from frozen to free soil was almost as marked as boring through a plank. In a porous, sandy soil, which had been covered with snow all winter, and was still covered with two inches of snow, the ground was frozen 19 inches; in a clay soil near by which

(1) A most important invention. A. R. J. F.

had been blown bare of snow repeatedly, and was still uncovered, the soil was frozen 24 inches deep. In a forest where the snow was not drifted, the frost line averaged only 2 inches. When the surface soil is impervious to water, it is manifestly a matter of indifference whether the subsoil is tiled or not. The surface water cannot reach the tiles, and no flood of water can come from such tile drains.

The rapidity with which a drained soil takes up the rain when it falls after a dry spell is not to be overlooked in discussing the drainage. A tiled field will take up and strain one-fith of an inch more rainfall after a dry spell than a field destitute of the drainage. The influence of drainage is often regarded simply as removing water, but the secondary influence upon the soil, even if the tile is dry half the time, is of equel importance with the water removed.

Some have attempted to explain the fact that a tile-drained field will endure drouth better than one not drained, by asserting that the air circulating through the tiles gives up moisture to the soil, but Prof. Kedzie thought a better explanation is the increased power of drained soil to hold water in a capillary form, and, perhaps, also from its greater power to draw up water from the deeper soil by capillary action. In many rains the tile does not discharge water at all, as the increased capacity of the soil to retain water enables it to absorb the whole shower.

Surface ditching, and removing forests, may increase floods and contribute to drouths. During warm months tile-draining tends to mitigate floods by taking up the excessive rainfall and holding it in capillary form, keeping back the sodden flow that would pass over the surface of the soil if not absorbed by it, and escape by flood.

One of Canada's Booth Herds.

The Sheriff-Hutton herd of Shorthorns belonging to Wm Linton may be seen at his farm on Yonge street, in the town of Aurora, Ont., which is one of the most neatly kept and prosperous looking places we have visited in Ontario. The large manufacturing firms of J. Fleury's Sons, who manufacture almost every description of farm implements, from a wheel-barrow to a binder, employing 200 men the year round, and the extensive plow works of The Wilkinson Plow Co., give an impetus and enterprise that otherwise would not exist. Mr. Linton has been a breeder of Shorthorns all his life; born at Sheriff-Hutton, Yorkshire, England, in the heart of the great Shorthorn district, where the greatest Shorthorns that ever adorned mother earth were given birth. It was in the North Riding of the County of York where the great Dukes of Northumberland were bred, where Mr. Bates bred his Duchess, where Mr. Booth bred Bracelet, Necklace, Mantalini, Bride Elect, Queen of the Ocean, Soldier's Bride, &c., where Mr. J. Outhwait bred Vandewere and Royal Windsor, and where Mr. Linton's father bred Lord Irwin, Royal Irwin, Beau Benedict, Arthur Benedict, Sir Arthur Ingram, &c.,&., and it is from the best of those cattle that the present Sheriff-Hutton herd has sprung. Mr. L. imported seven females and three bulls in 1885, the remaining stock at Sheriff-Hutton, except two aged cows, after the distribution sale of 1879. These are all but one of the noted Sowerby family which was purchased from Mr. Richard Booth in 1837. Mr. John Booth's Marcus (2262), the sire of Mantalini, was the first bull used at Sheriff-Hutton, then follow Young Matchem (4422), Prince Albert (4791), Liberator (7140), the sire of Hudson (9223), who stood first at the Royal Show at York in 1848, and was used in the herd of Mr. A. Cruickshanks. Next came General Fairfax (11519), from Sittyton, and Magnus Troil (14880) from the same source. Earl Windsor (17788), from StackHouse, (1) brought in again the Booth blood, followed by that King of the Harem, Mountain Chief (20383), from that magnificent show cow Soldier's Bride, who won upwards of $5,000 in money and cups. He was extensively used at Warlaby. Next came British Hope (21324), from Lady Pigot's (2) herd, he was the sire of Lord Irwin (29123) which was thrice first in the Royal ring. Next Mr. J. B Booth's Sergeant-Major (29957), which was the sire of Sir Arthur Ingram (32490). He also was thrice first in the Royal ring, and won over one hundred prizes at leading shows throughout Great Britain, in fact he won more prizes and was the sire of more Royal prize winners than any other bull that ever lived; Sergeant-Major being followed by Mr. J. B. Booth's Paul Potter (38854). He was the sire of a host of Royal prize winners, such as Arthur Benedict, Beau Benedict, &c., &c. Both Lord Irwin and Sir Arthur Ingram were extensively used in the herd. Mr. Linton thinks with such a compounding of the very best blood in the present Sheriff-Hutton herd, he should stand second to none in breeding Shorthorns. With such cows as Sowerby's Queen, Sowerby's Rose, Sowerby's Gem, Miss Sowerby, and eight or ten others, nearly all roan, large, wide, deep, thick-fleshed cows and heifers, we really do not see how he can fail. The calves speak for themselves, and are a nice promising lot, such as one would expect to see from such ancestry.

We found this herd in better flesh than we had expected, for it is generally known among breeders that Mr. Linton is not a heavy feeder. He says his experience has proved that with breeding stock too heavy feeding is not advisable, a subject whereof our readers may enjoy his views from his able pen in these columns. He certainly has the animals on which to build. A grand lot they are; all they want is bringing out. Besides the Shorthorns, Mr. L. has a flock of Cotswolds and some good Berkshires and black-breasted red game fowls. Personally, Mr. L. is much respected. He is very well informed, especially on everything pertaining to Shorthorns, and his honest, candid, straightforward manner has won for him many warm friends. *Farmer's Advocate.*

In the Short-Horn divisions of the Brussels Exhibition the classification is not for ages but for teeth. Thus prizes are offered "for bulls with more than six permanent teeth," this being for those over three years old; bulls with not more than six permanent teeth" (under three years old); and "bulls with not more than two permanent teeth" (not exceeding two years old).

Colouring Butter.——At a meeting of the South of Ireland Merchants' Association in Limerick last week, the following resolution was unanimously adopted:——"That we request the farmers of the district who use artificial colouring in the make of their butter to at once discontinue it, as they find buyers in England strongly object to butter of a high colour, and they frequently give their orders to Danish and other continental shippers in preference to Irish, simply on account of the colour of Irish butter being too high to please their customers, who prefer pale-coloured butter."

THE DAIRY.

BUTTER-FAT TEST OF MILK.

Everyone who has to do the practice work connected with milk must have often felt the want of some ready means of estimating the butter fat therein, whether as a means of find-

(1) Bred by my dear friend William Carr. A. R J. F.
(2) Another old friend of mine, and one of the loveliest women ever seen on earth. A. R. J. F.

ing out the comparative yields of different cows, or for testing the quality of bought-in milk.

The processes with ether, alcohol, &c., have hitherto been too troublesome for ordinary people, necessitating a certain amount of knowledge of chemical manipulation. Analysis has thus been pretty much left to professional chemists, and has, therefore, not been carried out for the ordinary run of dairy farmers as it otherwise might have been. Realising this fact, the officials of the University of Wisconsin bethought themselves of trying to evolve a simpler method which would suit ordinary, commercial, and farming purposes, and the Report now before us* is a statement of how well they have succeeded. Mr. Short, one of the university staff, has been investigating the matter for the last nine months, and method he has devised is now given to the world in this paper. The theory of the process may be given in Mr. Short's own words :—

THEORY OF THE PROCESS.

The process depends on the following facts: That when a mixture of milk and a strong alkali is heated to the temperature of boiling water for a sufficient time, the fat of the milk unites with the alkali and forms a soap, which is dissolved in the hot liquid; at the same time the casein and albumen are disintegrated and become much more easily soluble. After the heating has continued for about two hours, the mixture of milk and alkali becomes homogeneous and of a dark brown colour. On the addition of an acid the soap is decomposed, the fatty acids are set free, and rise to the surface, while the albumen, casein, etc., are first precipitated and then dissolved.

Like all important discoveries, it is very simple when one knows it. Anybody can go to America nowadays, but it required a man of the calibre of Columbus to show the way. Everyone who understands chemistry will wonder how the thing was not hit upon long ago. For the benefit of those whose chemistry is hazy, and in explanation of the principles of the process, we may explain that all fats and oils are compounds of the "fatty acids" with glycerine. The best known of those fatty acids are the palmitic, oleic, and stearic. In butter there are nine different kinds known to be present, while in saponification, or ordinary soap-making, the glycerine is removed and an alkali (soda or potash) put in its place. This is done in the process under discussion by continuous boiling of the milk with these alkalies; the longer it is boiled the more exact will the results be. The next thing is to displace the fatty acid in the soap so formed by a stronger one, and a mixture of sulphuric and acetic is used for this purpose. The fatty matter so displaced floats to the top, and may be estimated by measurement of the height of the column formed in the tube. It is not claimed that the results are so exact as ordinary "gravimetric" method, but they are perfect enough for all ordinary commercial and farming purposes, while no previous training is necessary to enable anyone to carry it out correctly from the printed instructions. A further point in its favour is the cheapness of the apparatus. No special sets are manufactured yet, as the process is only now made public, but it cannot cost more than a few shillings for the graduated tubes, acid, &c. The paper quoted from is too long for reprinting in full, but in the above we have called the attention of our readers to a process which promises good results with little trouble, and we commend it to all those who have occasion to test milk.

MILKING TRIALS.

Our readers would notice a statement in our columns a week or two ago to the effect that the American Ayrshire Cattle Society had drawn up a new scale of points for testing the milk yield of cows, giving details of the same scheme, there appeared also a list of points to be awarded for the cost of production, and it is to this that we wish particularly to direct attention. So far as we are aware, this is the first time that a proper and sensible scheme for testing the milk-yielding capacity of cows has been adopted in practice by any society, and we shall look forward with the greatest interest for the results of the same. We have more than once pointed out within the last few years that this was the only way to conduct trials so as to get reliable facts, and that trials conducted as they have hitherto been in this country were quite misleading, especially when different breeds of cattle were competing. To put it another way, a cow which gave the largest quantity of the richest milk in proportion to period of lactation has hitherto been awarded the prize, irrespective of value of animal (capital invested) or expense of keep, so that there was nothing to prevent an animal which was kept at a loss, and would be ruinous to an ordinary farmer, from being decorated as champion if she only yielded well. As a matter of fact, the smaller breeds never have hitherto had a chance, notwithstanding that many of us believe, and are prepared to prove, that they are the more profitable animals for a dairyman to keep. A Kerry yielding 400 gallons per annum may be paying better than a Shorthorn yielding 600 gallons, but in a milking trial in which the milk yield only is reckoned, the latter would come out the better. In the scheme now put out, as mentioned above, this will be rectified, and we shall get facts worthy of being relied upon; and if the principle is introduced in competitions with different breeds, we shall get at the dairy value of each.

We believe the difficulties likely to be encountered in this new departure are by no means light, and that this is the chief reason why the system has not been adopted long ago. The actual daily amount of food consumed by animals must be ascertained and a money value assessed, and this will be very difficult to do in many cases unless the trial can be carried on for a sufficient length of time to allow of the effects of food being weighed and measured under inspection becoming fully apparent. The American society proposes to put competitors on oath as to the kinds and quantities of food and general treatment given for ten days before the animal comes under its jurisdiction, while each is allowed as much of everything as he desires during the trial, when a note of all will be kept. This will, no doubt, be sufficient with the majority of competitors who have honest intentions, while the inevitable "black sheep" may be deterred from malpractices by penalties or a prohibition from again competing in the future. It is proposed to give the marks in this department according as the cost of producing a pound of butter and cheese from each cow rises of falls from a certain standard. This, of course, is a matter or detail, which might be afterwards modified, but it seems the fairest way of apportioning marks, as it is obvious that to simply value cost at per gallon of milk would not give value for that of rich quality.

Another way, perhaps quite as good, and involving far less trouble, would be to simply get at the cost of keeping up an animal for the one or two days during which the trial is conducted, and award marks according as she rises above or falls below a certain standard—say, one shilling per day—the smaller the cost, the higher the marks. The other part of the trial would, of course, be conducted as at present, where quantity of quality of milk and other matters are taken into consideration. The only point to which to take exception in the scheme put out by the American Ayrshire breeders is that in which it is stated that the cows are to be milked by men selected by the association, and approved of by the owners of the animals. It is pretty certain that, if this is adhered to, it will not do the animals justice, because there is nothing

more likely to upset their milking capacity and prevent them both from secreting the milk, and from afterwards "letting it down" than to put a stranger to them, more especially in a show yard where everything is strange. Their ordinary attendants are the best persons to look after them, while there ought to be no difficulty in superintending these so as to prevent any underhand work. It is not apparent from the published statements whether or not the price of the animal is to be taken into account in valuing the cost of production. This is an item which must certainly be given attention to, as it is one that vastly concerns every farmer who goes to lay in a stock of cows. If two co[illegible] yield the same quantity and quality of milk on the same rations, but the one is worth £20 to buy, while the other is only worth £15, it is manifest that the cheaper is the better for a dairyman, and, therefore, some points must be awarded in this direction. There ought to be no trouble with this, because it would be easy enough to get owners to declare the value of an animal when entering.

Altogether, however, we hail this new scheme as a departure in the right direction, and one which, if adopted, cannot but be acceptable to the owner of the smaller and lower priced breeds, as it will undoubtedly appraise them at their real value. We hope that the example set by the Ayrshire Society across the Atlantic may be followed by those who have to deal with milk trials in Great Britain. *Ex.*

British-grown tobacco.

The report of the judges appointed to determine the award for the prize of 50 gr. offered by the tobacco section of the London Chamber of Commerce for the best specimen of British-grown tobacco was circulated on Saturday. It was found that only four exhibitors had complied with the conditions of the competition so far as quantity was concerned; but, in view of the interest which is being manifested in regard to tobacco-growing in the United-Kingdom, the judges considered it desirable to present a supplementary report on the remainder of the specimens, though not properly coming within the scope of their adjudication. They placed the four exhibits submitted to them in the following order of merit: First, Messrs James Carter and Co.; second, Mr. W. L. Wigan; third, sir Edward Birkbeck, M. P.; fourth, Mr. John Graves; and they recommended that the prize of 50 gs. should be awarded to Messrs. James Carter and Co. Detailed particulars, furnished by the growers, as to the cultivation and preparation of the tobacco sent in for competition are given, together with remarks of judges on the various exhibits. Closing their report with certain "general observations," the judges state that, speaking generally, "no one of the four samples eligible for the prize is in any respect valuable for trade purposes, or even merchantable, presuming that no duty was chargeable upon the article. Still, it was evident that well-grown tobacco-leaf can be produced upon English soil, though, of course, this admission in no way takes account of the cost of production..... With regard to the prospects of tobacco-growing on a remunerative basis in England, we share the opinion that, even under the most favourable conditions possible, such a crop cannot be made to pay, and that in most seasons it must be an absolute failure and heavy loss. The climate of this country, to begin with, is less favorable than that of Kentucky or Virginia, and the cost of production will be found far greater here than in the United-States. Until the curing of tobacco is perfectly well understood in the United Kingdom, the finest leaf that can be grown will be absolutely wasted and useless."

SEA-KALE.

WHERE IT IS FOUND AND HOW IT IS USED.

This favorite vegetable derives its name from having been originally found growing wild upon the sea-coast, where its tender shoots, blanched by the drifting of the sand, were occasionally eaten by the families of the poor fishermen. It was not seen in a London market, until about a century since. In Exeter, at one time, the roots fetched as much as 2s 6d. each, but when tried at Covent Garden, the labels attached to them having been accidentally defaced or lost, kale was carefully set aside as a suspicious looking and, probably, poisonous root, in case it should be eaten by some guileless purchaser Sir William Jones, who lived at Chelsea some time in the middle of last century, highly appreciated the excellencies of this delicious and delicately flavored esculent, and endeavored to reintroduce it to the markets, with a moderate amount of success. It was always in favor amongst the Scottish people, and may now be found in most Continental markets, more especially in France. An old French author vilified sea-kale as the "Chou marin sauvage d'Angleterre"; having possibly tasted a bitter specimen of kale, he opined it fit only for uncouth and uncivilized palates; but when blanched and well served, it equals, if it does not surpass, asparagus in delicacy of flavor. The young shoots and unopened leaves are the best parts of sea kale, but the larger leaves may be scraped and served like asparagus, and will also be found useful for soups. Forced kale is most delicate in mid winter, when other kinds of fresh vegetables are difficult to obtain. It should not be exposed to the action of light, as that renders it strong and bitter; therefore, after cutting, keep the heads in the dark, or carefully covered; dress when young, crisp and tender; if allowed to become stale and discolored it is comparatively worthless. Sea-kale is remarkably easy of assimilation, and as it abounds in alkaline properties, it will be found one of the most nutritious, as well as the lightest, esculents which can be taken by the sedentary, or by any who suffer from dyspeptic tendencies. Sea-kale is generally eaten plainly boiled and served on toast with melted butter poured over. An excellent sauce for sea-kale may be made by rubbing from two ounces to a quarter of a pound of butter is sufficiently oiled, stir in the yolks of two eggs, or one, if for a small quantity of sauce; flavor with a squeeze of lemon juice, serve with the sea-kale, but do not pour over. Cold sea-kale may be cut up into pieces, dipped in batter, and lightly fried. This friture forms a palatable side dish.—*British Journal of Catering.*" (1)

But in times of difficulty like these, when we were confronted with the goods of all the world poured freely into the lap of England without any charge whatever, those difficulties they had to deal with were so largely increased that if on the one hand they had to look upon protection as a thing beyond the range of practical politics, they had a right to turn to the Government and say, "At any rate, do for agriculture in this country what every other nation is doing for agriculture in their countries." That was the line he had taken, those were the arguments he had used, and he was happy to think in some small way he had met with some share of success. Even in the present year the Government had set aside for the first time in the history of England, a sum of £5,000 as a grant to certain schools for the teaching of some of the principles of the science of agriculture. (2)

The following estimate of the harvest of 1888 in England

(1) Cover the plants with large (15 inch) pots, and bed thickly with leaves round the pots. A. R. J. F.

(2) From a speech by Sir Richard Paget, M. P., on agricultural education, July, 1888.

may be taken as a near approach to accuracy, with the exception of the estimation of the wheat crop, which will certainly turn out better than it is here reputed to be. The farmers in general will find themselves pretty well off, but the arable-land tenant on cold, heavy clays will be a severe sufferer.

AN ESTIMATE OF THE HARVEST.

The agricultural writer in the *Times* has given a carefully-prepared forecast of the results of the harvest. He says :—

The year 1888 will be a curious one in the history of agriculture, and in marked contrast with 1887. The year cannot possibly be called, on the whole, a disastrous one, so far as the quantity of produce is concerned, if we except the wheat crop, which will be not only worse than in any year since 1879 in yield, but generally of a very inferior quality. At the end of June it was stated that the prospects of the wheat crop were admirable, and that for all other crops they were very doubtful. Grass had made scarcely any growth, and a poor yield was expected. Then came July, which changed the entire character of the season; rains continued throughout the month, damaging the quality of the hay, but increasing its yield. Heavy storms beat down the corn crops, damaged the wheat in its flowering stage, and the result is that at the present time the whole character of the harvest is reversed as compared with what it was at the beginning of July. Wheat is now, so far as yield is concerned, the worst crop of the year, and hay the best. As has been the case since 1881, inquiries have been sent out to some 400 farmers in every part of the United Kingdom asking their opinions on the harvest of the year. The result is to show that the wheat crop is 27.6 per cent. worse than last year; barley is 2 per cent. better; oats are 25.5 per cent. better; potatoes, 27.7 per cent. better; beans, 33.9 per cent. better; peas, 41.3 per cent. better; and roots, 46 per cent. better; while the most extraordinary feature of all is that the hay crop is 35.9 per cent. better than last year. All these figures, it must be borne in mind, refer simply to yield, because it is very certain that, owing to the bad harvest weather, the quality throughout is inferior. From every part of England, although the returns speak of good yields, notes are given declaring the quality to be much damaged and very inferior. Hay, for instance, which is a full average crop, will not be of what may be termed a good saleable quality. Potatoes, again, are much diseased and watery. There will be no fine coloured barley, and no plump and heavy wheat, as was the case last year. Oats, too, will probably be a ragged sample. In a word, the harvest for all crops excepting wheat will be one of fair yield, but of inferior quality. At the same time, it must not be forgotten that even now plenty of sunshine may improve its prospects, while a return of wet weather may make things a very great deal worse.

The greatest interest attaches to the wheat crop of the year, and the quantities of imported grain likely to be required. Last year, on August 24, we gave an estimate in the *Times* that the wheat crop would be one of 32 bushels per acre, and in February last the official returns showed the crop to have been one of 31.97 bushels per acre. Such accuracy as this is not to be expected in estimates made while the crop is still standing, but may well be alluded to as showing that such estimates, if carefully done, are quite near enough for ordinary purposes. We have worked out the figures in the same way this year as last, and the result is that the crop promises to be one of about 23.50 bushels to the acre, this being 5 50 bushels per acre less than an average crop, and 8.50 bushels less than last year. We may put down the wheat crop of 1888 as one of about 6,768,000 qrs., which, after deductions for tail corn and seed, would mean one of only 5,000,000 for sale - probably the smallest wheat crop grown in these islands in the present century. This will leave us dependent on foreign sources for at least 20,000,000 qrs. That we shall obtain this is certain, but it is very doubtful if we shall get it at the low prices which have prevailed during the past few years. The rise may not be very great, but probably the year may see wheat up to 40s. per quarter. Short crops prevail generally this year in countries, and France must be also a large buyer. At the same time it must not be forgotten that, owing to the lateness of the harvest, the 1887 crops have supplied us with 13 months' wheat, leaving only 11 months to be still supplied. This may have an effect towards keeping down prices, but it may be fairly argued that higher prices must prevail.

Severe frosts on the 6th and 7th September. Buckwheat and tobacco round Montreal destroyed. The latter crop should be severed by the first of the month, as there is frequently an early frost in the first week. There will be no grapes worth speaking of. The wonderful 20,000,000 bushels of Manitoba wheat seem to have somehow-dwindled down to, 15,000,000! In 1886, much the same sort of thing happened. Two bad years out of three must try the tempers of new settlers in the North-west. As far as my knowledge goes, this will be one of the worst years ever known in the province of Quebec. The two frosts of the 6th and 7th were naturally followed by rain—and pretty heavily it is falling now, the 8th—and this must finish up the wretched, damaged grain-crop below Quebec. A lamentable state of things indeed, as, there, no farmer has a stock of last year's grain or hay to fall back upon. I am not a pessimist, but I really do not see where the seed for next spring is to be found in such districts as Rimouski, Métis, &c.

Best white wheat in England was fetching 44s. a quarter = $1.25 a bushel on the 21st August, just 10s a quarter = $2.40 more than it fetched a twelve-month ago. Fortunate are those farmers in England who have a few stacks of old wheat by them!

A. R. J. F.

NON-OFFICIAL PART.