Technical and Bibliographic Notes / Notes techniques et bibliographiques

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

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

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

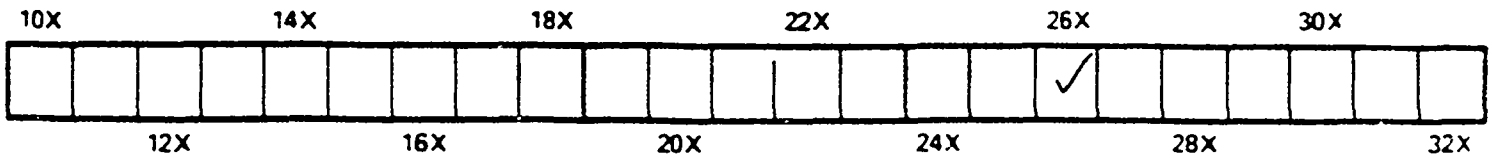
- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☐ Quality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

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

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

☐ Additional comments:/ Commentaires supplémentaires:

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



THE JOURNAL of AGRICULTURE. ILLUSTRATED

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

Vol. VI. No. 9. MONTREAL, SEPTEMBER 1884. $1.00 per annum, in advance.

Table of Contents.

VETERINARY DEPARTMENT:

by Dr McEachran

HINTS ON HORSE-DEALING.

A traffic in horses must have been carried on in very early times, for we read that even Solomon himself dealt largely in horses, having them brought from Egypt and other countries and selling them again at a great profit to the neighbouring sovereigns. It would, indeed be very interesting to us to be informed in what way this traffic was conducted generally in the days of the ancients. Whether the cheating and frauds now in use were resorted to then, and whether the wholesome precaution, "caveat emptor"—let the buyer beware—was as necessary as it is at present. We can trace cheating in horse flesh in English history as far back as the reign of Richard II, for so much was it practised then, that to the English legislators it appeared necessary that rules should be established for the protection of the ignorant against the arts of the designing; and, accordingly, a statute was passed regulating the price of all horses: this related to selling all horses on warranty, and these laws have been in themselves rendered as protective to the purchaser as we believe it possible for words to make them. But the difficulty and uncertainty of appealing to these laws lie in the difficulty and uncertainty of proof, which may thus be accounted for—first, no evidence is so vague and contradictory as that given in horse cases. Secondly, by the almost general ignorance of the economy of the horse either in theory or in practice. Judge and jury often labor under many disadvantages, in their endeavours to get at the truth, again the warranter of the horse, "and it is upon warranty alone that an action of trover can be brought": warrant him sound,—free from vice &c., &c. Now there is no such doubtful word in the English language as the word "Sound" However, we shall endeavour to show what in law is considered an unsound horse. A warranty of free from vice is of a very ticklish nature. It might be very difficult to prove any real act of vice in a horse, whilst in the possession of the seller, and in the next, a horse, from being illtreated or alarmed, may become vicious in a week, never having been so before. In all cases of a horse warranted sound, difficulties often arise in the event of his proving unsound, and that is the proof of his having been unsound or lame from the very identical cause of his present unsoundness or lameness, whilst in the possession of the seller. Without this proof, no action of trover can be maintained, and as we are aware that many diseases will remain a long time inactive, in fact will not be brought into action at all until the horse has done some work, the buyer will thus see that warranties are after all but very slender securities. In our opinion, the purchaser, if he have no knowledge of the horse he wishes to become possessed of, has a better chance of protection from loss by submitting the horse to the inspection of a qualified veterinary surgeon, who, from his anatomical knowledge, will be able to detect not only the incipient disease, but to make a fair estimate of the probability of the animals not becoming unsound from malconformation of limbs, ill organized eyes, &c., &c. As to the good qualities of the horse they are to be judged of by the buyer, and this is difficult without a trial. In fact, as knowledge of horse flesh can only be the result of experience,

we strongly recommend inexperienced purchasers not only not to rely on their own judgment, but in their purchases from regular dealers to procure, if they can, a week's trial of horses for their own work, with a stipulation to pay a certain sum for the trial in case of them not being found suitable. In the event, however, of the warranty being required of the seller, it may be well to let it embrace as many points as may be called in question afterwards, as, *free from vice, sound*, &c., &c.

There does not appear to be any general rule on the subject regarding the *length* of time a warranty should extend; but "no length of time elapsed after the sale will alter the nature of a contract orginally false"; but, if a person should keep an article which has been warranted sound for any length of time after, discovering that it was defective, and when he returned it, it was in a worse state than it would have been if returned immediately after such discovery, I think the party can have no defence to an action for the price of the article on the ground of non-compliance, with the warranty. A difficulty often arises in returning unsound horses, but an offer of the horse, as not answering to the warranty, should always be made, because on that being made the purchaser will have a claim for the expenses of his keep as well as for the value given for him. Verbal warranties are not to be depended upon by reason of their being liable to misinterpretation.

We will now proceed to the most important part of this subject, and state what constitutes a sound and what an unsound horse. At first view it seems easy enough to define a sound horse; but, upon farther consideration, that is if we use the word "Sound" only when every part of the horse is in perfect health, it would appear that such is not the case; for scarcely a five year old in the country could be found free from blemish. The most trifling wart or splint, no matter how small or where placed, is a deviation from health, and would make a horse unfit to be warranted. The reader may imagine how difficult it is to distinguish soundness from unsoundness and, under such circumstances, we consider a middle course the most advisable, and though there must be some outstanding points, yet they are so seldom met with that they may be left to the decision of the lawyer or veterinary surgeon according to circumstances. It is evident, however, that natural defects in the conformation, action, or temper of the animal must not be considered as unsoundness. To introduce this, that a natural defect is an unsoundness, would only increase the difference of opinion and strife which is already too common in horse dealing. I think the following definition, if accepted, would prove most generally useful: "a horse is sound when there is no disease about any part of him that renders, or is likely to render in future, him less useful than he would be without it, and, of course, a horse must be unsound when he has any disease about him that renders or is likely in future to render, him less useful than he would be without it."

DE OMNIBUS REBUS.

LINCOLN COLLEGE, SOREL

August, 1884.

I wish the Laurentian Hills were obliterated from the face of the earth! They draw all the rain clouds off, and leave our poor sandy soil as dry as a cinder. I am tired of hearing that "we had a fine rain at Three-Rivers yesterday;" or, "what a deal of good the storm did at Berthier on Monday;" when we wretched *Sorelois* had none of the cloud-dropped fatness.

August, up to the 30th, was, *quo ad nos*, rainless. The *rape* on the College farm which was knee high on the 8th made no progress during the rest of the month, but rather the reverse. To-day, after Friday night's rain, it looks a little fresher; but there is a nasty blue tinge over it, particularly on the lighter soil, which indicates a total suspension of growth on the heavier land, it is still green, and a fair amount of moisture would make it a full crop. I wish I had a few acres of really heavy land, to show what rape when sown in congenial soil would do.

I was surprised to see one of my neighbours going into the bush to cut *withes* with which to tie his wheat-sheaves! I showed him how to make bands of the wheat itself—as I thought, a universal practice—it was quite unknown to him, and his remark was, that the sheaves would be too small. A queer fault, as the smaller the sheaf the quicker it would dry after rain. In the weeping climate of England our great trouble with the men used to be to get them to tie the sheaves small enough, and in the real wheat lands, where the straw was 5½ feet high, the band (or *bond*, as it was called) was a single length of straw. I can't show the way of making the band without an engraving, but the idea is something like this: take six or seven straws in each hand, cross them three inches below the ears, and give them a twist, so that when laid on the ground the ears of both sets may be in a straight line; lay the bundle of wheat on the ears of the band, tighten the band, kneel on the bundle with one knee, and twisting the ends of the band tightly, insert them under the band. A poor description, I fear, of a very easy process, but I think a few trials would make any one who took pains master of the work.

I cut my early oats on the 16th August; a poor crop, as only half a seeding was planted to allow the lucerne and sainfoin a chance. There seems to be a fair show of both these plants, but the long drought has not been favourable to their development. Not having a reaper, I cut the oats with the mower, and three men with rakes cleared the path of the horses as fast as they travelled. Clumsy work, of course, but better than the scythe after all. I do not tie my oats, but when ready to carry rake them together and put them up in small cocks—they are turned in the swathe when necessary, and the best implement for the purpose is a stiffish rod six or seven feet long. There is no fear of oats shedding if cut, as they should be, when greenish.

The later oats, sown 3rd June, are just ready to mow. The 'White Tartars," strange to say, are at least a week behind the "Black Tartars," and 9 or 10 inches shorter in the straw. The former are of this year's importation; the latter have been grown for some years in Canada, and this may be the cause of the difference.

The land on which the Tartar oats are growing was ploughed last autumn, and ploughed after an evil fashion. The *crumb-furrows* were not *picked up*, and, consequently, there is a space 18 inches wide between the ridges where the oats are only a foot high and almost bare of grain. Had the land been dry enough earlier in the season, I should have passed the cultivator between the ridges and pulled down some mould from the crowns; but as the horses could not set foot on the land till the 27th May, I was obliged to get the sowing done as I could. However, there is not such a bad crop after all, but the eye of the careful farmer is sorely wounded by the defect, and the sad thought comes over him: How many acres are there in the province treated in this way, and, in consequence, how very far short the general yield must fall of what it ought to be.

The frost of the 27th August destroyed all the buckwheat in this district. Well, I should not have had much of a crop, so that moan is soon made, but I am sorry for my neighbours, who depend greatly upon it. It is too risky for me, and, except for ploughing in green, I shall never grow it again.

Odd enough, severe frosts May 27th and August 27th! My tobacco was too ripe to be affected last week, but the tomatoes suffered, and the just formed pickling cucumbers were every one killed, though the plants were not much injured—curious, is it not?

The *Hungarian grass*, sown June 5th, was cut August 6th; just two months. The land had borne potatoes the year before, fairly manured, and the grass-seed was sown on one ploughing, cultivated with the Noxon sowing-machine, well harrowed, and the seed covered with an iron roller. Quantity of seed, ¾ of a bushel per acre. There were about 2¼ tons to the acre, which, cut greenish, took some 3½ days to make. Immediately after the hay was carried, the land was ploughed, cultivated as before, 12 lbs of white mustard sown to the acre, and covered with the harrows. The mustard is now up; looks thin but healthy. It will be fed off by sheep, unless the frost takes it, in which case it will be ploughed in.

In making hay of this grass, care should be taken not to carry it too soon, as it is very deceptive, and puts on an appearance of dryness when in reality it is quite prepared to sweat on being taken into the barn.

I observe that the farm-horses here do nothing after potato-planting until hay harvest, except, indeed, a little ploughing at buckwheat sowing. One or two farmers in the immediate neighbourhood of Sorel grow a few turnips and carrots for sale, but I do not think they make much by the trade, as for example, a man took 20 bags of swedes to Montreal and sold them for 35 cents the bag. Deducting his expenses, the freight, and, a thing that is never considered, the *loss of his own two days work*, there cannot have been much profit attached to the deal: Expenses $1.50; freight $1.00; two days work $2.00, = $4.50, leaving only 8½ cents a bushel for the swedes. The bag holds 1½ bushels. It would have paid the person in question much better to have given the turnips to his poor cows—they, 9 of them, have been in the same six acres of *pacage* for the last two months, and a pretty fright I was in all August, lest, driven by *malesuada fames*, the evil counsellor, hunger, they should break into my root-crops, and do more damage in a night than they are worth. I wish people would learn that six cows well fed would yield more profit than 9 cows starved; but it seems impossible to cram it into their heads. The cows in question do not average two pounds of butter a head per week; they will be out shivering in the cold till the middle of November; what little hay there is will be sold; all the winter the poor things will only get straw to eat; the sons of the family are making bricks in the States; and the farm is actually in the town of Sorel, not four hundred yards from the Church, where no end of dung is to be bought at ten cents a load.

Harvest in England.

The average yield of wheat for the last 30 years has been 29 bushels per acre. This season's crop will, from all accounts, turn out 32½ bushels per acre of very heavy wheat, samples already having been sold weighing 65 lbs the bushel, which is 2 lbs over the average, making, if sold by the usual weight of 504 lbs per quarter of 8 bushels, an additional bushel per acre, i. e. 33½ bushels. This is a great crop, and the condition of the grain is such that it is fit for immediate grinding. The price is low: from 4s 6d to 4s 8d a bushel, but wheat was at the same price in '52, when I bought my seed for 36s a quarter — I sold the crop from it at 84s! Fall wheat of course.

COUCH-GRASS.

We are now burning the couch of seven acres. On this soil, all the earth has to be carefully shaken out of the grassy clods, or else the fires go out after the exterior of the clods is burnt. It is an awful job, and I am only too glad to say that it is the last piece of really foul land on the farm. With a fine autumn, it will be, I think quite clean enough for a root-crop next year, and two drains of 30 to 40 rods each will make the seven acres pretty safe from water.

Arthur R. Jenner Fust.

Montreal, Sept. 9th 1884.

I don't know what is the matter with the usual exhibitors this year. Whether the exhibitions, as Mr McEachran and I prophesied two years ago, come round too frequently, or whether the very peculiar behaviour of the managing committee, as regards the judges of several of the classes, has succeeded in deterring many breeders from exhibiting, it is difficult to say. At all events, this year, there has been very little if any dissatisfaction expressed with the decisions—at least I heard only one complaint, and in this case, the judges were clearly in the right.

Still, the absence of such a number of breeders of the first rank was very striking. No stock was shown by Messrs Cochrane, Drummond, Rodden, Nesbitt, and Irving, and consequently, the stalls were sadly unoccupied. The absence of Mr Cochrane's animals was most unfortunate: his Shropshires alone would have made a vast difference in the appearance of the short woolled sheep class, and the struggle for the Jersey herd prizes would have been much more interesting had the Hillhurst herd been represented. As it was, Mr Reburn of Ste. Anne de Bellevue, carried all before him in the "*Jersey or Alderney*" classes, winning the following prizes:

Old bull	1st and 2nd;
Three-year old do	1st;
Bull calf	1st;
Old cow	1st and 2nd;
Heifer two years old	1st, 2nd and 3rd;
Yearling heifer	3rd;
Heifer calf	2nd and 3rd;

and, finally, both first and second prizes for herds composed of a bull and five females.

The show of Channel Islands cattle suffered greatly, no doubt, in common with the rest of the classes from the fact of the Toronto exhibition occurring at the same, or nearly the same time as our own provincial show. This, however, is not likely to occur again, as M. Georges Leclère gave a sort of pledge on the last day of the meeting that the affairs of the exposition should be better managed for the future; they need be, for the late one was, I regret to say, as regards the cattle, a complete failure. I was sorry to see that Mr Abbott still persists in witholding his fine herd of Guernseys from public inspection. Why he refuses to show I cannot understand. I have no hesitation in saying that if his herd was exhibited as a whole, the following year prizes for this particular breed *must* be offered by the committee of management. A great calamity has occurred to Mr Abbott: the sultan of his herd has been attacked with cancer of the jaw, and this fine animal, the pride of the Isle of Guernsey, and the finest of the breed I ever saw, is doomed to become butcher's meat long before his time. This is really a public calamity, as it will be impossible to replace him at any price. Let us hope, however, that he will leave behind him some offspring fit to carry on his work of regeneration. Talking to one of the largest breeders of Jerseys the other day, he confessed that, as a farmer's cow, the Guernseys were the best suited to the lands of this province; and as a means of crossing, both as regards

quantity or quality of milk and subsequent fitness for the meat market, no breed could surpass them.

I was glad to hear that the ridiculous system of breeding for colour has been abandoned by the best of the Jersey men. This is a grand step in advance, and as I see Mr Andres has begun to mock at breeding for feather in fowls, it seems as if absurdities in all kinds of breeding were on their last legs; and I do not despair of seeing roan and white Shorthorns fetch as high a price, *ceteris paribus*, as red ones. Could any thing have been more ridiculous than that Royal Commander, one of the finest Booth bulls ever seen, should have been sent back to England for sale because his calves were too light in colour to suit the American taste?

It was about as hot as need be on Tuesday and Wednesday the 9th and 10th; another reason for holding the exhibition, for the future, at a later date. I can stand most temperatures, high or low, but I confess that of Tuesday was too much for me, and I have been suffering from its effects ever since.

Mr Browning, Mr Whitfield, and Mr Ewing, of St. Francis Agricultural College, Richmond, divided the rest of the Jersey prizes between them. I do not think the high prices for the breed are likely to last very much longer; in fact, very finely bred animals were sold at Lord Camoys' sale the other day for £30 a piece; and the same at New York, where the average has fallen at least 50 0/0 this year. Still, I take it, certain lines of blood will always have a high relative value, and no one is likely to fling these away, only care should be taken to avoid, what I see looming in the distance: too close breeding. The Jersey is light enough already, and I fancy I see in some herds nearly allied in blood to the St. Lambert's herd a great diminution in size and stoutness.

By the bye, what is meant by the heading of class 2 in the prize-list for horses, "Clydesdales, Pure Breed"? The Clydesdale horse of to-day is no more pure-bred than is an American trotter or a Shropshire sheep. Some of the best English shire-mares have been employed by the Scotch breeders to give size and weight to their stock, and very well has the speculation answered. Captain Campbell, St. Hilaire, will, I hope, give us, as usual, his letter on the horses. I have heard some gentlemen who have acted as judges object to express their opinions in public journals as to the general merits or demerits of the stock inspected by them in their office as umpires; but I do not think the objection holds good in face of the fact that the judges of stock at the shows of the Royal Agricultural Society of England invariably publish the reasons for their decisions in the next ensuing number of the Society's Journal; that is to say the Steward of each department of the yard (live-stock and machinery) describes fully his views on the subject, and the opinions, remarks, and suggestions of the judges are appended to the statement.

A very sensible hint appeared in the *Montreal Herald* of Sept. 13th: that there were too many prizes given at Mile End, and of too small value; a remark I myself made, if I remember rightly, in my report of the exhibition of 1882 in this Journal. for example: "*Pair of slippers in worsted*" two prizes! Absurd enough, according to my idea. If some of these trivialities were retrenched, and the amount saved added to such prizes as those for "Assortment of fine wool Canadian tweeds, 6 pieces, summer and winter," the exhibition would be no loser, and the encouragement to the manufacturer would be all the greater. However, this is rather *ultra* my *crepidam*, so I will return, not, indeed, to my muttons but to my cattle.

Shorthorns.—I must heartily congratulate my friend Mr Ewing, St. Francis Agricultural College, on his success in this class. Richmond is not a bed of roses, and it argues well for Mr Ewing's energy and perseverance that, in spite of the innumerable difficulties with which he has had to contend, he has been able to carry out his views in the production of such stock as the first prize old bull, the 2nd prize bull calf, and the 2nd prize heifer calf! A highly respectable showing for the first attempt. As a class, the Shorthorns (why will people continue to call them Durhams?) were not such as we are accustomed to see at Mile End, and, as usual, there were one or two bulls that had much better have been emasculated in their calfhood than allowed to procreate their species; why the judges persist in giving prizes to animals which are utterly devoid of merit, I cannot say, but I should rejoice beyond measure to see one or more prizes witheld on account of the want of desert of the subjects competing. Herd prizes: Heron, 1st; Kidd, 2nd.

Herefords.—All the prizes go to Cookshire; no competition. Dawes, of Lachine, absent; do Alloway; do Cochrane; do Whitfield!!!

Devons.—No competition; all prizes won by the Rougemont herd.—This is usually the case, and there is nothing to cavil at, as Mr Whitfield's Devons are as good as they make them. A pair of Sussex cattle belonging to the same gentleman, were on the ground, but the Devons killed them—these two breeds should never stand together: the Devon is so thoroughbred in appearance that the Sussex looks almost vulgar by its side. Were all the Rougemont Herefords sent to Toronto?

Ayrshires.—Considering the absence of Messrs Drummond, Irving, and others, whose stock we are accustomed to see at Mile End, the show of Ayrshires was both numerous and good. A name, I do not remember to have seen in the list before—Mr Guy, of some place in Ontario—appears frequently in the register of prize-winners, and particularly as winning the first prize for the best herd. Mr Louis Beaubien, took the 1st for one year-old bulls; the 2nd for two year-old heifers; and 1st for yearling heifers. I was sorely disappointed, as I had hoped to see a renewal of the contest between Mr James Drummond and Mr Thos. Irving, a contest which is always interesting, and the more so because the decision depends upon the bias of the judges in favour of the delicate herd of the one or the stronger strain of the other. Mr Andrew Scott, St. Laurent, took the 2nd herd-prize. (1)

Polled-Angus.—This will really not do! Mr Pope, not contented with carrying off all the Hereford honours, sweeps the board of all the Polled-Angus prizes too! I suppose poor old Judge has been made into beef by this time: I never expect to see his equal again in this life. His length and the extraordinary straightness of his upper and lower lines were points to be remembered during a long life. Where he put his food to, was always a question with me, the belly being hardly distinguishable.

The rest of my report I must defer till the October number of the Journal.

ARTHUR R. JENNER FUST.

OUR ENGRAVINGS.

The engravings of the *Guernsey bull and cow* given in our present number are strikingly representative of this most valuable breed. Those of my readers who have visited Mr Abbott's herd at St. Anne's will recognise the style at a glance.

Howard's plough.— These two-wheeled ploughs are as near perfection as possible. The draught is light, and if the wheels are set correctly, any boy can hold the plough as well as the best ploughman alive. The skim-plough in front of the coulter buries the parings of grass &c. and adds much to

(1) I see that at the Hochelaga show Messrs Drummond and Irving were placed 1st and 2nd for Ayrshire herd prize

A. R. J. F.

the cleanliness of the land without materially adding to the draught. Busby, Ransome, and others make ploughs of the some pattern as Howard—there may be some slight difference, but I would as soon have one as the other.

Hereford Bull.—Not having received any description of the animal represented in the cut, I can only call attention to his superb conformation as a butcher's beast. It seems clear that the popularity of the breed is daily increasing in the Western ranches.

Octagon cattle-barn.—See article on this plan &c.

A. R. J. F.

Breeds of British Sheep—VII

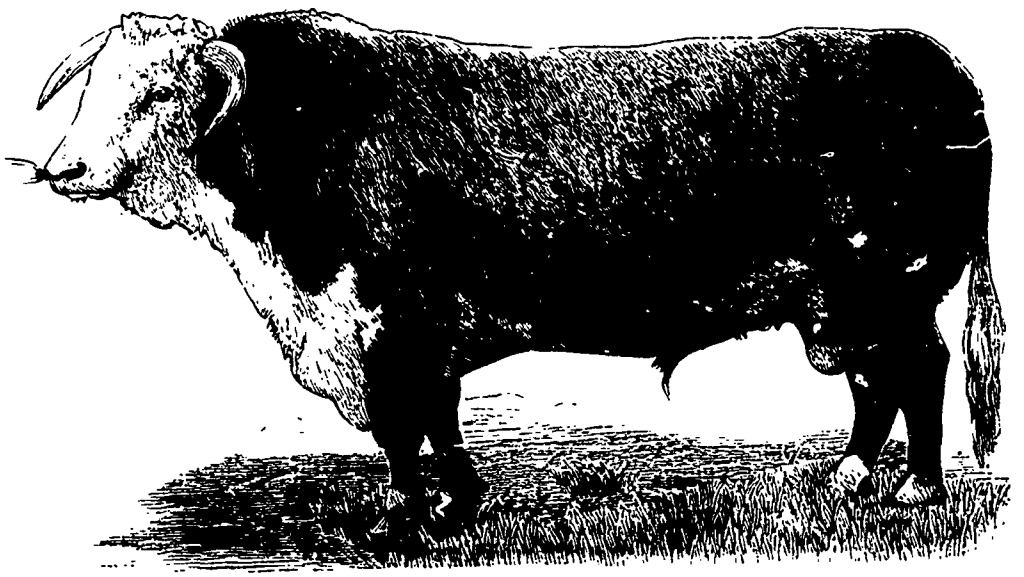
SOUTH-DOWNS.

Between the river Thames and the English Channel there are two nearly parallel ranges of low hills, called respectively the North and the South Downs. The term "down" appears to be of similar origin and meaning as *dune* — primarily applied to low hills of movable sand along the sea coast. This meaning is now restricted to the word *dune*, while *down* is applied to these hills more remote from and yet near the sea. The northern hills in Kent and Surrey are sometimes called wolds(1). The southern ridge is mostly contained in the county of Sussex, but it also extends into Hampshire and a division trends northward into Berkshire.

The striking feature of these hills is the chalk rock which composes them. It is soft and porous and quickly absorbs the rainfall, so that it is said there are never freshets in the streams of a chalk district. This peculiarity of the rock often causes great difficulty in obtaining water for stock and for domestic uses. Frequently the wells have to reach a great depth. I have seen all the water for 800 sheep drawn from a well over 300 feet deep, being lifted by a donkey working a tread-wheel. (2) The rock is everywhere near the surface, being rarely at a great depth in the valleys, while upon the hills the covering is usually a poor soil of but a few inches in thickness. On every country road the wheels roll upon the easily powdered rock, and every railway cut displays it in solid mass. Imbedded in it are nodules of flint, sometimes in layers, sometimes scattered irregularly, furnishing an inexhaustible supply of this long-used fire-producing mineral. This white chalk, forming cliffs of considerable heights facing the sea has given to the country the name of Albion.

These chalk hills of Sussex are the home of one of the purest breeds of sheep in England, with its long line of unmixed descent known from the time of William the Conqueror. As it is one of the oldest pure breeds of sheep known, it is unquestionably also one of the most valuable. It combines many very desirable qualities, and the excellence of its flesh is fully acknowledged wherever known. Very naturally, one might suppose that such excellence was the result of pampering care, but on the contrary the qualities of the South-Downs were developed and established under difficult circumstances, and, like many very excellent human families, they have known no way of obtaining a livelihood but by hard work. The thin covering of poor soil upon the chalk produces a scanty growth of grass, very light but sweet and nutritious. The soil not being good enough for cultivation, the farms were usually so divided that each included portions of the arable lands of the lower grounds, as well as the more extended uplands. The hills were exclusively used as sheep pastures. The flocks grazed upon them during the day, and at night were folded upon the arable lands, often travelling long distances for this purpose. By this means, the arable lands were manured for the crops grown upon them. Thus for centuries the sheep were used as manure carriers. In this work they developed two very important and rarely found qualities—the ability to stand this hard and regular travelling, and the ability to stand very close folding. As a matter of course, a breed produced under such circumstances could not be of great size. By careful selection, its frame, formerly of very imperfect shape, became, as it is now so well known, compact, strong and vigorous; and, as effect surely follows cause, so its fine quality of abundant muscle came of the short, sweet pasturage and the healthful exercise in the high pure air necessary in obtaining its food.

South-Downs are so well known that it seems unnecessary to describe their appearance. Almost every farmer has admired their attractive make-up, with the small and hornless head



HEREFORD BULL.

(1) Doubtful!

(2) At Mr Tanner's, where 2,000 breeding ewes were kept, I presume.

A. R. J. F.

and face varying from brown to grey, with the space between the nose and eyes narrow and "fine," with the shoulders broad, breast wide and deep, the back flat, broad and straight from head to tail, and the tail set on high and nearly level with the spine. The ribs come very close to the hip. The legs are wide apart before and behind. The color of the faces and legs is very in different sections,some very fine flocks in Sussex being still bred with these quite black. Their fleece is the closest and finest of the middle-wools. But wool is now produced in such quantities in Australia, South America and our Western States and territories that the markets of the world are oversupplied, and it is no longer entitled to much consideration in judging of mutton sheep, except as it is supposed to be some indication of the quality of the flesh beneath it.

The introduction of root crops has enabled the Sussex farmers to carry so much heavier stocks of sheep, that artificial food is now used to a greater or less extent throughout the year. The sheep are now mainly wintered upon turnips, hay and straw, the latter usually cut—"chaffed." In the spring, mangolds and portions of pastures, reserved from the autumn with a good fog-grass upon them,are relied upon until rye, rye-grass and sainfoin are ready, and these, with clover, help the natural pasturage through the summer. Tares or vetches, of both the winter and summer variety are also employed for furnishing green food in summer. The winter variety is sown from harvest time till the end of October, and gives good feeding during June and July, when the spring tares sown in April and May are ready Some low-land farmers, without down pasturage, raise large root crops and feed them to the sheep of upland farmers at from 3d. to 6d. per week, according to the abundance of feed. They rely upon this for manuring their land. Upon the mixed land farms the wethers and draft ewes are usually fattened by their breeders, but many of the down farmers keep only breeding flocks and sell their wether lambs and draft ewes to be fattened elsewhere. The chief wether fairs are held in the autumn at Lewes.

It would have been impossible to produce the South-Down sheep under the modern system of "high farming," and it is doubtful whether under it their qualities can be maintained. Changed circumstances will necessarily change the animals. Fortunately, he downs are so extensive that the original conditions are to a considerable degree maintained, and will tend to preserve the qualities which they originally produced For several years, the Sussex breeders have strongly objected to the type developed by noted breeders on other lands; and this objection has more than once found expression in formal protests at the Royal shows against these sheep as not being South Downs at all.

The improvement of the breed upon its native hills had been very slow until Thomas Ellman, of Glynde, gave it his intelligent attention, and by judicious selection he made such marked advancement as to call general attention to his sheep. Subsequently Jonas Webb, of Babraham, in Cambridgeshire, became the most noted of all South Down breeders, and brought his flock to the highest excellence, taking the leading prizes everywhere, and realizing great prices at his ram sales. The Sussex breeders, in objecting to his sheep, charged that he had used Leicester blood in developing his flock, but this Webb emphatically denied. There was no reliable evidence to substantiate the charge, although it was claimed that the grey faces proved it. (1)

Jonas Webb was followed by Lord Walsingham. Under the skillful management of Henry Woods, the Merton flock has fully maintained its high standard, and of late years has furnished the great prize winners. The Dukes of Richmond have often been successful exhibitors of fat wethers at the Smithfield shows.

Mr. Rigden, (2) near Brighton, is considered the leading breeder of the original type of Sussex Downs. His ram sales are very successful.

Matchless in beauty, faultless in form, irresistible in the show ring, as are the Webb and Walsingham South-Downs, it is yet very questionable whether their great "improvement" has not been at the expense of some degree of vigor and hardihood, and whether the original Sussex type would not be more valuable to the average American sheep raiser in those useful qualities which make their advocates in England call them "rent payers." This is strongly indicated by the fact that it is very difficult to here keep the Webb stock up to anything like its standard of excellence when first imported.

South-Downs resemble the Leicesters in showing their greatest value when crossed with other breeds. Like the thoroughbred horse, their prepotency strongly stamps their qualities upon their offspring.

Mt. Kisco, N. Y. JAMES WOOD.

(1) Webb's sheep were at least 50 per cent heavier than Ellman's! This may have been due to the feed, but the general character was suspicious, particularly the rumps. A. R. J. F.

(2) My dear old farm-tutor. A. R J. F.

THE POULTRY-YARD.

KEEPING FOWLS.

EDS. COUNTRY GENTLEMAN—In my last letter I discussed the choice of stock for starting a yard, by selection from the old stock or by purchase, on the supposition that for most beginners it would be best to begin with a stock of good pullets as a foundation, and to build up upon this a flock for future and long continued usefulness. I advised obtaining the best possible "general purpose" females, but said little about the cock—the most important factor in determining the character of next year's flock. We cannot well discuss this without knowing which will pay best—eggs, broilers or chickens; or if it will not be best after all to hold on for the present to the general purpose fowl until the particular character of the yard should be determined after a year's trial of the needs of the family, and the market for the surplus.

CROSS-BRED FOWLS.

It is quite probable—nay, positively certain, that for many purposes, and particularly for what I call "chickens" (that is, market fowls *less than a year old*) it is best to take a direct first cross; for instance, to use a Game cock with a flock of Gray or Colored Dorking hens, or a Plymouth Rock cock with Cochin hens. But there are not many of those for whose benefit I fancy I am writing who would procure such flocks of really good hens, and resist the temptation to breed pure. It is a poor plan to have inferior fowls of their kind among the foundation stock of a yard, or even to winter known inferior fowls, even though of pure blood. Avoid such, because one should take pride in his flock, even though it be merely of barn door fowls without name or lineage. Let them be selected for their perfection of form, vigorous health, and, if possible, uniformity of size and style. You will like them a great deal better, and will do better for them.

A pure-bred cock crossed with good common hens will give chicks marked strongly after his breed, and by the time the third generation comes upon the stage the fowls will have three crosses of the chosen breed, or only one-eighth of the original common blood. So they will be for all purposes of crossing, just as good as the average pure-bred hens of the same breed.

It is then important at the very outset to make a good selection, not only of a cock, but of the breed to which he belongs. If you follow my advice, and first establish a general

purpose yard, I would recommend three breeds from one of which to obtain one or more cocks. To name these in order of my own preference is not to disparage others, or even to assert their superiority to one another, for each is perhaps best under certain circumstances.

PLYMOUTH ROCKS —I have enjoyed this fine modern and thoroughly American breed very much. It has been fashionable, and is still so, but that does not hurt it. In fact, the only disadvantage is that it makes very fine birds rather high priced. The plumage is that of the old Dominique. The skin is yellow, the legs are clean, the body well shaped, and the fowl heavy. The hens are early layers of large brownish eggs, and the chicks are hardy, bearing the cold well, growing rapidly, showing more fat as broilers than most, and being solid and weighty for their size and age. The pullets lay early enough, and make good winter layers.(1) It is a disadvantage that when crossed upon barn-door fowls of no particular breed, and often also when crossed with established breeds, we get a good many *black* chickens, on account of a reversion to the Java—one of the original breeds used in the formation of the one we are considering.

COLORED DORKINGS—Have the characteristics of other Dorkings; but as little or no attention has been paid to plumage, and much to breeding for size, form, the fifth toe, and especially to its useful points, the useful preponderates decidedly over the ornamental in the composition of the breed. They are fine large birds with pale skins, white legs of ideal form for the table, good layers of large white eggs, and, in warm houses, winter layers. The pullets mature and begin to lay early, and both sexes, if kept apart, fatten quickly. The fat, like the skin, is pale. The chicks are not especially hardy, but with good care grow very fast, and as soon as they have lost the first feathers and gained their mature plumage, they are as hardy as any fowls, so far as my experience goes. The Dorking has been bred in England for centuries; hence its characteristics are prepotent, and the cock marks his chickens after his breed, giving them almost uniformly white skins, the fifth toe, and wellshaped bodies.

I prefer colored Dorkings to gray, silver-grays, cockoos or whites, because they are usually larger and hardier. The disadvantages of the breed are that there is a certain delicacy of constitution which has to be guarded against in our climate, and that the hens usually lay small clutches of eggs before becoming broody. Both these disadvantageous traits nearly or quite disappear when the blood is mingled with that of hardy common fowls.

GAMES.—This class of fowls are of many breeds,which vary greatly in size. It is important to select for our purpose large cocks, and it makes little difference what the plumage is. White games with yellow legs make a good cross with anything. Though the whites are perhaps the least gamey of the games, yet for cross breeding there are no better. In size, the games are much less than Dorkings or Plymouth Rock fowls, yet they have many advantages. They impart to their get their own compact, full-breasted, close knit bodies, their hardiness and great excellence as table fowls. They and their grade's blood are good winter layers and admirable as sitters and mothers if needed for these purposes. The best use of the game is to cross upon the Dorking, but in case games can be obtained and Dorkings cannot,do not hesitate to use game cocks with any large well-formed common or crossbred hens, and the results will be highly satisfactory.

FRENCH FOWLS.—Next to those I would place the Houdans, or in fact any of the French breeds. They are all nonsitters, but this peculiarity rarely shows strongly in the first cross; it is really of little or no disadvantage if it does. In fact, it is often an advantage, but it is hardly consistent with our idea of breeding strictly general-purpose fowls. Their form is excellent, they are as hardy as Dorkings, their eggs are large and white. The broilers are ready just about as early as any, and the chickens fatten in autumn very easily and well.

After the stock is secured, they should be kept confined to their roosts and surroundings until wanted, then given free range, and a chance to pick up grasshoppers and other autumn insects, and well fed besides once or twice a day to keep them growing and get them in good feathers and in condition to begin laying as early as the first of November. The cocks that they are to be mated with should not run with them until about that time. Meanwhile, we have time to get the chicken-houses in order, and everything prepared for winter.

M. C. WELD.

(1) Mr Cartwright's pullets, he tells me, hatched on the 12th April began to lay July 25th!!!

The Latest Knowledge about Gapes.

The gape worm may be termed the *bête noire* of the poultry-keeper—his greatest enemy—whether he be farmer or fancier. It is true there are some who declare that it is unknown in their poultry-yards—that they have never been troubled with it at all. These are apt to lay it down, as I saw a correspondent did in a recent number of the COUNTRY GENTLEMAN, that the cause is want of cleanliness, or neglect in some way. But I can vouch that that is not so. I have been in yards where everything was first-rate—where the cleanliness was almost painfully complete— where no fault in the way of neglect could be found—and yet the gapes were there; and on the other hand, I have known places where every condition seemed favorable to the development of such a disease, and there it was absent—this not in isolated cases, but in many. No, we must look elsewhere for the cause.

Observations lead me to the belief that gapes are more than usually troublesome during a wet spring or summer following a mild winter. This would tend to show that the eggs from which the worm (that is in itself the disease) emerges, is communicated from the ground, from the food eaten, or the water drunk , in the first instance, but it is more than possible that the insects themselves may pass from one fowl to another. All this we can accept as a settled fact, and also any description of the way in which the parasitic worms attach themselves to the throats of the birds, and cause the peculiar gaping of the mouth which gives the name to the disease.

Many remedies have been suggested, and my object now is to communicate some of the later ones—thus to give a variety of methods, so that in case of the failure of one, another will be at hand ready to be tried. It is a mistake always to pin the faith to one remedy, for the varying conditions found in fowls compel a different treatment. The old plan of dislodging the worms with a feather is well known, and need not be described again. But I may mention that in this country some have found the use of an ointment, first suggested by Mr. Lewis Wright, I believe, most valuable. This is made of mercurial ointment, two parts; pure lard, two parts; flour of sulphur, one part; crude petroleum, one part—and when mixed together is applied to the heads of the chicks as soon as they are dry after hatching. Many have testified that they have never found this to fail as a preventive, and if the success is to be attributed to the ointment, it would seem as if the insects are driven off by its presence, for the application to the heads merely, would not kill the eggs.

Some time ago Lord Walsingham offered, through the Entomological Society of London, a prize for the best life-history of the gapes disease, and this has been won by the eminent French scientist, M. Pierre Megnin, whose essay has been published by the noble donor. His offer was in the in-

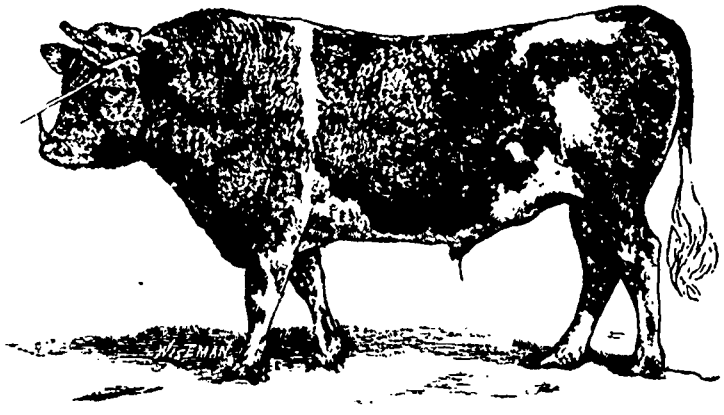
terest of pheasant breeders, but the benefit is not confined to that variety of game alone, for it is equally applicable to all gallinaceous birds troubled with this disease. The pamphlet in question is a very valuable work, and gives very clearly the methods by which the parasite develops. But for our purpose it will be sufficient to narrate what M. Megnin recommends for the cure of it. These are various, as will be seen, and comprise the experience of other inquirers as well as himself.

He states that Montague obtained great success by a combination of the following methods: Removal from infested runs; a thorough change of food, hemp seed and green vegetables figuring largely in the diet; and for drinking, instead of plain water, an infusion of rue and garlic. And Megnin himself mentions an instance of the value of garlic. In the years 1877 and 1878, the pheasant preserves of Fontainebleau were ravaged by gapes. The disease was there arrested and totally cured, when a mixture, consisting of yolks of eggs boiled bullock's heart, stale bread crumbs, and leaves of nettle, well mixed and pounded together with garlic, was given, in the proportion of one clove to ten young pheasants. The birds were found to be very fond of this mixture, but great care was taken to see that the drinking vessels were properly cleaned out and refilled with clean, pure water twice a day. This treatment has met with the same success in other places, and, if any of your readers are troubled with gapes and will try it. I shall be pleased to see the results narrated in the columns of the COUNTRY GENTLEMAN. Garlic in this case is undoubtedly the active ingredient, and as it is volatile, when taken into the stomach the breath is charged with it, and in this way (for garlic is a powerful vermifuge) the worms are destroyed.

Another remedy recommended by M. Megnin was the strong smelling vermifuge asafœtida, known sometimes by the suggestive name of "devil's-dung." It has one of the most disgusting odors possible, and is not very pleasant to be near. The asafœtida was mixed with an equal part of powdered yellow gentian, and this was given to the extent of about 8 grains a day in the food. As an assistance to the treatment, with the object of killing any embryos in the drinking water, fifteen grains of salicylicate of soda was mixed with a pint and three quarters of water. So successful was this, that on M. de Rothschild's preserves at Rambouillet, where a few days before gapes were so virulent that 1,200 pheasants were found dead every morning, it succeeded in stopping the epidemic in a few days.(1) But to complete the matter, M. Megnin adds that it is always advisible to disinfect the soil of preserves. For this purpose, the best means of destroying any eggs or embryos it may contain, is to water the ground with a solution of sulphuric acid, in the proportion of a pennyweight to three pints of water, and also birds that die of the disease should be deeply buried in lime.

Fumigation with carbolic acid is an undoubted cure, but then it is a dangerous one, and unless very great care is taken in killing the worms, the bird is killed also. Thus many find this a risky method, and prefer some other. Lime is found to be a valuable remedy. In some districts of England, where lime-kilns abound, it is a common thing to take children troubled with whooping cough there. Standing in the smoke arising from the kilns, they are compelled to breathe it. This dislodges the phlegm in the throat, and they are enabled to get rid of it. Except near lime-kilns, this cannot be done to chickens, but fine slaked lime can be used, either alone or mixed with powdered sulphur, two parts of the former to one of the latter. The air is charged with this fine powder, and the birds breathing it, cough, and thus get rid of the worms, which are stupefied by the lime, and do not retain so firm a hold on the throat. An apparatus has recently been introduced to spread this lime powder. It is in the form of an air-fan, with a pointed nozzle, which is put just within the coop at night, when the birds are all within. The powder is already in a compartment made for it, and by the turning of a handle, it is driven through the nozzle, and the air within the coop charged with it There is no waste of powder, nor any fear that it will not be properly distributed. Experienced pheasant and poultry breeders state that by the use of this once a week, gapes are affectually prevented. In this case, also, I shall be glad to learn the result if tried. STEPHEN BEALE. H—, *Eng.*, *Aug.* 1

(1) Some error, surely, in the figures.



GUERNSEY BULL.

Dr GILBERT ON SOME POINTS IN THE COMPOSITION OF SOILS

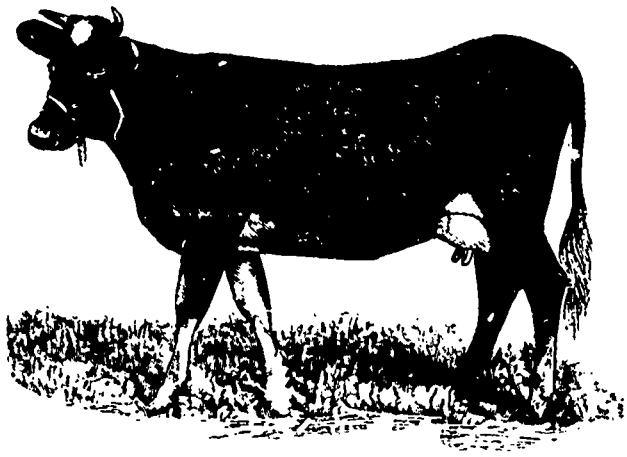
With results illustrating the sources of fertility of Manitoba prairie soils.

The first part of this paper consisted of a *résumé* of the work done by Dr. Gilbert, for some years past, in respect to nitrogen in the soils, the amount assimilated by plants, and the necessity of nitrogenous manures. As these are points of exceeding value to scientific agriculturists, and as they also bear on some of the chief points referred to in previous pa-

pers, read before the section this afternoon, we shall give his recapitulation before proceeding with his remarks on Manitoba:

"To summarize the points already reached, it has been shown in detail in our former paper and in abstract in the present one, that when crops are grown year after year on the same land without nitrogenous manure, the produce and the yield of nitrogen decline in a very marked degree. This is the case even when a full mineral manure is applied, and it is the case not only with cereals and with root crops, but also with leguminosæ."

Further, with this great decline in the annual yield of nitrogen of these very various descriptions of plants, when grown without artificial nitrogenous supply, there is also a great decline in the stock of nitrogen in the soil. Thus, a soil source, at any rate, of some of the nitrogen of the crops is indicated. Other evidence was also adduced clearly pointing to the same results. Next, determinations of the demands of nitrogen as nitric acid in the soils of known history, as to manuring and cropping, and to a considerable depth, showed that the amount of nitrogen in that form in the soil was much less after the growth of a crop than under corresponding conditions with a crop.



GUERNSEY COW.

It was hence concluded that the nitrogen had been taken up as nitric acid. In the case of gramineous crops, and some others, the evidence pointed to the conclusion that most, if not the whole of the nitrogen was so taken up from the soil.

It was also clear that some, at any rate, of the nitrogen of leguminosæ had the same source, and some of the results were in favor of the supposition that the whole of it might be accounted for. Still it is admitted that this is not proved.

It has also been shown that, although in the case of the growth of a leguminous crop year after year on the same land, the crop, the yield of nitrogen, and the total nitrogen in the soil, greatly decline; and the nitric acid in the soil may likewise be very small. Yet there may be under parallel conditions very much more nitrogen in the soil after the growth of a leguminous than of a gramineous crop. A consideration of the circumstances of this result led to the conclusion that in some way which could not be explained, leguminous growth and residence were favorable to the development of the nitrifying organism, in the case of deep rooting plants especially, causing the nitrification of the nitrogen of the subsoil which thus becomes a source of the nitrogen of such crops.

In 1882 several samples of soil from the North-West Territory, taken at intervals between Winnipeg and the Rocky Mountains were examined for nitrogen, and proved to be about twice as rich in nitrogen as the arable soils in Great Britain. Four Manitoba soils were examined in considerable detail, viz: one from Niverville 44 miles west of Winnipeg, and the others from Brandon, Selkirk and Winnipeg itself. They all showed a very high percentage of nitrogen. That from Niverville about twice as high a percentage as in the first six or nine inches of ordinary arable land, and about as high as the surface soil pasture land of Great Britain. That from Brandon was not so rich as that from Niverville; but the first twelve inches of depth is as rich as the first nine inches of good arable land. The soil from Selkirk was taken from a farm that had been 25 years in cultivation and showed an extremely high percentage of nitrogen in the first twelve inches and in the second twelve inches as high a percentage as in any ordinary pasture soil. Both the first and second nine inches of the Winnipeg soil were exceedingly rich, richer than the average of old pasture surface soils.

The question arises how far the nitrogen in these soils is susceptible to nitrification, and so to become valuable to vegetation. The soils and sub-soils were submitted in shallow dishes under proper conditions of temperature and moisture for periods of 28 days, and then extracted from time to time. The rate of nitrification decreased after the third and fourth periods, and in the sub-soils there was a marked increase in the rate of nitrification for the eighth as compared with the seventh. This result affords direct evidence that the nitrogen of subsoils is subject to nitrification under suitable conditions, and the result tends to confirm the view that deep-rooted plants favor nutrification in the lower layers. That the soils of Manitoba do not yield large crops is shown by the reports of yield which are annually published (1); but that under present conditions, they do not yield amounts of produce at all commensurate with their richness compared with the soils of Great Britain which have been under arable cultivation for centuries, is illustrated by the fact that the estimated average yield of wheat per acre over the seven years, 1876 to 1882 inclusive, is almost identically that of the United Kingdom.

That the rich Prairie soils of the North-West do not yield higher amounts of produce than they do, is due in part to vicissitudes of climate, and to short seasons of growth, but largely to scarcity of labor, and consequent imperfect cultivation, leading with other disadvantages to a luxuriant growth of weeds. Then, again, in the early years of a settlement, and until mixed agriculture and stock feeding can be had recourse to, and local demand arises, the burning of the straw and deficient production or disregard and waste, are more or less unavoidable, but nevertheless very exhausting practices. So long as land is cheap and labor dear, so long sacrifice of fertility is inevitable in the process of bringing these virgin soils under profitable cultivation; and the only remedy for this serious waste is to be found in increase of population. Still the fact should not be lost sight of that such practices of early settlement do involve a serious waste of fertility. There can be no doubt that the characteristic of a rich virgin soil, or of a permanent pasture soil, is a relatively high percentage of nitrogen and of carbon, and of a high relation of carbon to nitrogen. On the other hand a soil that has been long in arable culture is much poorer in these respects, whilst an arable soil under conditions of known agricultural exhaustion shows a very low percentage of nitrogen and carbon, and a low relation of carbon to nitrogen. In conclusion it has been maintained by some that a soil is a laboratory and not a mine; but, not only the facts adduced in this and former papers, but the history of agriculture throughout the

(1) I thing the reporter has put in a *not*, here. The passage should read, I fancy, "that the soils of Manitoba *do* yield &c." A. R. J. F.

world so far as we know it, clearly show that a fertile soil is one which has accumulated within itself the residue of ages of previous vegetation, and that it becomes infertile as this residue is exhausted.

IMPROVEMENT IN BUTTER

By W H. Lynch.

It is generally admitted that the largest proportion of poor butter is made in our private dairies. The creamery has certain advantages over the dairy, as it is. The creamery produces uniformity in quality, and by the production of quantity, helps to the solution of the marketing problem. It has been claimed, therefore, that the creamery will eventually bring about the desired improvement. Could this be reasonably expected it would be a matter for congratulation; but the conviction is gaining ground that the conditions of butter-making are not favourable enough to make the creamery become in this industry what we desire to see it, and what the success of the factory in cheese-making has led some to expect. Says Prof. Arnold:

"I foresee the time when the best as well as the greatest quantity of butter will be made in the private dairies."

T D. Curtis just writing up a trip through Missouri, writes:

"I am told that some fifty creameries have been started in the State - all small and many doomed to failure."

The writer may quote himself, from his evidence before the House of Commons Committee, from the Report of which Prof. Arnold's opinion was taken:

"The expectation that the private dairy will give way to the factory is based upon the supposed fact that it has done so in cheese-making. It is a striking commentary on such a claim, that after twenty years of co-operative dairying in the United States, there is yet more than twice as much cheese made in the home dairies as there is butter made in the factories proper, and within 2,000,000 pounds of as much cheese made in the home dairies as there is butter made in the factories altogether — in creameries and skim cheese factories. Again, 74 per cent of all the dairy products of the United States consists of butter made in the private dairy; while the butter, so far made in factories, altogether is less than 3 per cent. of the whole dairy product. The cheese made in factories is, as yet, only 20 per cent of the whole dairy product. The state of things in Canada cannot be materially different."

This would at least go to show that any improvement, at all events any radical and early improvement, must be brought about in our private dairies. This is where the bulk of butter is made, and for all the proof that has yet been given to the contrary, will be made.

There have been three agencies at work effecting improvement in dairying. They are co-operation, education and improved utensils. Which has done the most it is hardly necessary to claim. Co operation could not have done so much as it has done in cheese making, had it not been for improved machinery; and co-operation might do more for butter-making if it could have a larger aid from improved implements. Education has done a great deal for butter making, and it will do more if it has further aid from improved mechanical appliances. The general use of the thermometer alone would make a marked difference in the average quality of the whole product. The necessity for the skill and judgment that comes only from long practice, would be largely eliminated by the use of this simple and cheap instrument.

Co-operation will do a great deal towards meeting the want where the conditions are favorable as they usually are in cheese-making, and sometimes are in butter making.

Education will do much both towards helping to the introduction of improved appliances, and making the use of them effective.

To the natural question what will set these agencies to work, there can be but one answer. Government and private enterprise. The work of the former will be mainly educational, the work of the latter will be mainly the establishment of co-operative dairying and the introduction of needed appliances.

CUT HAY EARLIER.

The best writers for the agricultural press have for many years urged farmers to cut their hay a little earlier than has been the prevailing practice, and, so far as we can judge, the farmers generally are ready to admit that the hay crop is not cut quite as early as it should be to give the best quality of fodder for cattle. The difficulty seems to be that farmers do not get ready to begin haying as soon as they ought. There is a little more planting to do, or a little more hoeing, or the machines are not in order, or the extra hired help do not arrive.

Some do not like to begin till all other work is finished, so that there shall be no interruption when the mowers are started. It is possible that the farm may be mowed over and the hay secured at less cost where other work is not allowed to interfere after haying is begun, but the quality of the crop is likely to be far inferior to what it would be if each lot were cut at the time it was in its best condition.

The introduction of haying machinery has enabled the farmer to cut his hay in much less time than it formerly took, and consequently our hay crop is secured in much better condition than formerly, but we think that farmers, as a rule, are quite too backward about beginning the hay harvest. We would never consider the hoeing all done for the season so long as there were any weeds that ought to be killed, or ground that needs stirring, nor should the planting season be deemed ended so long as there are vacant spots in field or garden that ought to be devoted to some paying product. With our greater diversity of crops we find it often necessary to be planting or sowing seeds nearly all the growing season. —*Peterboro Times.*

CHEESE FOR FARM USE.

This process, says an exchange, is a simple one, and the needs for it are few. Every pound of cheese requires ten pounds of milk, and a ten pounds cheese is about as small a one as can be conveniently made. A clean tub which will hold the milk and a boiler large enough to hold ten gallons will be needed. A small press, which any smart boy can make, with a lever to hang a stone upon, will also be required, and then the "know how" is all the rest. Making cheese is a chemical operation, and depends greatly, like all other such work, upon temperature. One cannot be safe without a thermometer, — a rule of thumb will not be precise enough.

The first thing to do is to bring the milk to a temperature of 90 degrees. This makes a soft cheese; a higher temperature will make a hard one. The milk may be of two milkings—the evening milk, set in a deep pail in the cellar and stirred late at night and early in the morning, to keep the cream from separating, and the morning milk mixed with it as it is strained after milking. If any cream has risen on the evening's milk it may be skinned off. The evening's milk may be warmed to 100 degrees and then added to the fresh morning's milk, which will be about 80 degrees; the whole will then be about the right temperature, which is 90 degrees. The rennet is then added. This is the liquid

made by steeping a piece of the dried stomach of a sucking calf in warm water.

For one hundred pounds of milk, or forty-five quarts, a piece of the rennet about as large as one's thumb, or two inches long by one inch wide, is put in a quart of warm water in the evening, with half a tablespoonful of salt. In the morning this liquid is strained into the warmed milk in the tub and well stirred through it. The tub is then covered to keep the milk warm until the curd is formed, which will be in about half an hour.

As soon as the curd is formed enough to cut, a long-bladed knife is drawn through it both ways, so as to cut the mass into inch cubes. This causes the whey to separate, and when this separation has been effected the whey is dipped out or drawn off, and the curd gathered into a mass at one side of the tub, the tub being raised at one side to cause the whey to drain off. The tub is kept covered to retain the heat, or if the curd has cooled considerably the whey that has been drawn off is heated up to 100 degrees and turned on to the curd until it is warmed through again, and the whey is then drawn off. The curd remains thus for about an hour, until it attains a very slight degree of acidity, when it is broken up fine with the hands, salted with about half an ounce of salt to the pound of curd, and put into the hoop.

The hoop for a ten-pound cheese should be about eight inches in diameter and ten inches deep. It has neither top nor bottom. It is placed upon a smooth board or bench, and the curd is pressed down into it with the hands. When the curd is all in, a cover is placed upon it, and the hoop is put under the lever, which presses down upon a block resting in the cover. Very little pressure is required, and this only until the curd has become solid enough to keep its shape. Twenty-four hours in the press is quite enough, the cheese being turned twice in that time. The cheese is then taken out and the outside is rubbed with butter and wrapped in a cotton bandage, the edges of which are turned down on the two faces for an inch or so. The cheese is then placed in a cool room or cellar, and is turned every day for a month, after which it should be turned once a week for another month, when it is fit for use.

—*Selected.*

THE BUTTER YIELD.

The results of butter tests among the farmers' butter cows demonstrate plainly that the limit of butter production has not yet been reached. Twenty-five years ago the cow which could make fourteen pounds a week, was as remarkable as the Jersey or Holstein which now comes before the public with a record of twenty eight pounds a week (1) Is it possible to do much better? Taking the present as a basis, is it possible that the ratio of the last quarter of a century can go on through another, and the future cow of the year 1900, produce fifty-six pounds of butter in one week? While it is quite impossible that such a result will ever be attained it is fully as certain that the extreme limit of butter production has never yet been recorded. One pound a day has been considered a high average through the good grass months of June and July; under varying conditions in exceptional cases this has gone up to four pounds and over. Can five pounds per day be reached? Possibly; but is it wise to do it? Many a good cow has been spoiled by forcing her to her utmost capacity. When a man is forced to labor beyond his natural strength, just so far his vitality is impaired. It is so with the ox, it is so with the horse. A cow, forced to give an unnatural production of milk, will become unprofitable for dairyng purposes in two or three years,so milkmen tell us. A really good cow, with all the good points, is too valuable an animal to be spoiled in a few years. Her usefulness should [illegible] through ten or twelve years at least; and the cow wi[illegible] has a strong constitution and the quality of long endurance, will bring a calf every year, and yield a flow of milk during ten of its twelve months. The forcing method of the last few years would undermine her vitality almost before she entered on the career of her usefulness, and thus cripple the means by which her good qualities might be transmitted and perpetuated.

(1) Stuff! Plenty of cows used to give 14 lbs. and 16 lbs. a week in those days. I had, 35 years ago, ten half-bred cows at one time averaging 9 lbs and 10 lbs a week for four months after calving, on hay alone the first 60 days, and very moderate grass the rest of the time. A. R J. F.

The object in keeping cows, of course, is profit. To secure this, we want the best milkers and butter yielders, and the question is when we get a good cow, whether it is better to force her to exhaustion in three years, for the sake of a little more profit, or let that profit run through ten years, with all the probable benefits that would result to a community through the transmission of the dairy qualities to her offspring. Good cows are too scarce, but if the latter rule was observed there would be more of them, and with stronger and more lasting qualities of endurance.

On the little island of Jersey, from whence our famous butter cows come, the average yield per cow is considerably less than one pound per day. Here she must do twice that or she has no chance of getting upon the record. A cow which will turn out butter at the rate of twenty-eight pounds in seven days, and nine hundred pounds in a year, and bring a calf in time, is the ideal cow of to-day. But if you have a cow of whatever blood, which is making three hundred pounds of butter a year without the forcing process, she is a good cow, and you need not be wasting time in looking for the nine-hundred pounds a year cow, for she is not the one the average farmer will succeed in producing in the present generation. Should such an instance occur anywhere, it would be simply accidental, and not only the cow but the whole family relation would be controlled by monied men, and the prices held so high as to be absolutely beyond our reach. Our interests will be best subserved first, by holding our best cows and add to them by receiving the best without overstepping our means; second, by breeding to the best bulls, always remembering, if dairying be the object, that the sire should come from a good milk and butter strain; and third, to take the best possible care of our cows. If they have warm quarters in winter with plenty of good hay, and a fair allowance of concentrated feed, it is all that will necessarily be required; and they will respond satisfactorily in milk and butter. Under favorable conditions, cold, open stables, poor hay and straw with no other food, even the best cows will make but an indifferent showing. Remember this fact, and act wisely.

THE DAIRY INTERESTS OF CANADA.

Cattle and the products of cattle are fast coming to the front as the most important exports of Canada.

It is only a few year since far more butter was exported than cheese, now five times of the quantity and four times the value of cheese is exported over butter. Why is this? simply because the factory system and the most modern and scientific methods have been adopted in cheese-making, while butter is mostly left to the old plan of twenty-years ago.

We can now take some pride in the name Canadian cheese has abroad, but we must for shame hold down our heads when Canadian butter is spoken of, especially the so called dairy butter of western Ontario. In such a season as this, when

Irish butter is unprecedentedly low and substitutes are extensively used, Ontario butter is hardly looked at, and if English buyers are pressed for orders their only reply is, "We prefer butterine, unless Western Ontario can be had at 10c to 12c."

Now, Mr. Editor, what is the remedy? Simply this, establish butter factories. But, says some sturdy farmer, we have a butter factory in our neighbourhood, but the cheese factory just over the way pays so much better. True, but your butter factory is not a modern one, you are simply working away with the deep set cans or the old-fashioned large pans, taking twenty-five to twenty-seven pounds of milk to make a pound of butter. Cork butter used to be the standard, and if we could attain to that in Canada we were quite content; but we cannot stop there now. Denmark is at the front, and we must aim to equal her product. If we do this then we must adopt her plan and put in centrifugal machines, whereby it is claimed that in the average of a season a pound of butter is made from a near approximate of twenty pounds of milk. If five pounds of butter can be made from one hundred pounds of milk, and the butter sells at 20c. a pound (which we think is not an unfair estimate, even in a season like this) you have a dollar per hundred pounds (less cost of making) and with the probable average price of cheese for this season Mr. Sturdy Farmer will probably f his milk sent to the butter factory giving him better r . or at least as good, as can be obtained from cheese. robably 50,000 tubs of butter are made west and north of Toronto each season. The difference between 12c and 20c per pound would be $200,000 —a nice little sum to go into the farmer's pocket, as the result of an improved system.—*A. A. Ayer, in Toronto Globe.*

Should all Students be compelled to labor at an Agricultural College?

PROFESSOR W. J BEAL.

In the number of the RURAL, Nov., 4, 1882, you quote part of a student's editorial in our college SPECULUM and ask me to write something in relation to the same subject. The

HOWARD'S PLOUGH.

article refered to contains much that is true, and will doubtless be hailed with delight by some who have always maintained that student's labor at college must necessarily be a failure The article suggested some remedies which were not quoted.

I cannot satisfactorily explain all the objections referred to in the article without being personal. A conversation of a few minutes would explain most of the objections in a manner satisfactory to any intelligent person. It is believed that a plan will soon be inaugurated by which all these objections will be satisfactorily answered. The plan does not propose to abandon compulsory labor. There is no denying the fact that there are great difficulties in successfully maintaining student's labor, but it can be done It has been well done where classes in agriculture or horticulture were very small, not exceeding five or eight. For large classes in Michigan, we have never had one half enough of trained foremen. Our teaching force is inadequate This has been shown more forcibly by our plan of requiring all students to work at the same time during the same days.

The students are often more anxious to receive pay for their work than they are to work for instruction without pay or at reduced rates. A student is almost sure to greatly overestimate his own skill. He thinks he can do a certain job well and knows all about it, when in truth he is much mistaken. Our superintendents want work done and have money to pay for it. They show as well as they can a great number how to perform a variety of work in many different places. Much of the rough, pioneer work of clearing, ditching and otherwise improving the farm has now been done. In the horticultural department especially, and to some extent in the farm department, more of other kinds of work has often been planned, but some of it for several reasons has not been carried into effect. The right way lies between a course where students work five hours or more daily and where no work is performed.

Our educational labor has not been made as prominent as any of us thought it should be. It has not been marked and put on record. To encourage our students to get good lessons, we urge regular attendance on classes, lectures and laboratory work. We call on them to recite at odd intervals and mark them for their effort. We frequently examine them by requiring written answers to close questions in great variety. These marks for recitations, lectures, laboratory work and examinations go on record, are seen and discussed by all at the college. With the exception of a short period, no attempt has here been made to place manual labor on an equal footing with recitations or lectures. Students are not stimulated to learn how to perform various kinds of work by being marked on a scale, as they are for class-room work Remove all class marks and all final examinations, and see how soon it would detract from application to study. The same rule holds good regarding labor To be sure, students are now paid wages for work performed. This does not go on the same record with the studies. Work for wages does not necessarily induce a young man to seek all kinds of work to secure a high rank.

I would insist on a good manual training of every student of agriculture or horticulture. He should be examined with tools in hand as well as in the class-room, and marked for his proficiency. This has been tried enough to guarantee its success. Such manual work alone would make mere manipulators and not necessarily good thinkers. Class-room work alone in agriculture or horticulture is like a course in elementary chemistry without experiments, a course in surveying without field work, a course in medicine without dissection of subjects, a course in botany with the examination of flowers left out. It is mere booklearning; it is cramming; it is a study of words without knowing their meaning.

In a college course two or three hours of work daily are often objected to because they occupy so much valuable time. Students not unfrequently ask to be excused from work to put more time on their studies. But a long experience in this and other colleges in watching the progress of students who work regularly three hours a day and those who do not, enables me to affirm with much confidence that the manual labor is not a hindrance to intellectual progress. On the contrary, manual labor is a great benefit, in several respects. No person can study all the time while he is awake. There must be some change, some physical exercise.

In the minds of some, an agricultural college should teach why to plow and not how to plow, why to trim apple trees and grape-vines and not how to trim them. There is time enough for the studies and the work too. The one aids the other, the practice will enforce the theory or the indoor instruction and help to fix it in the minds of pupils. I have taught horticulture for the past ten years; I have tried several methods and have watched the results, and am prepared to say of mere lectures and book instruction what Huxley says of

mere book knowledge in natural history: "It is a sham and a delusion," or in the words of Agassiz, "It is a poor basis of culture." Without practice in connection with most or all of their studies in horticulture, students cannot fully understand it.

MILK SETTING.

Prof. Arnold says, in the London Agricultural Gazette, that, 1. To make the finest-flavored and longest keeping butter, the cream must undergo a ripening process by exposure to the oxygen of the air while it is sweet. This is best done while it is rising. The ripening is very tardy when the temperature is low. 2. After cream becomes sour, the more ripening the more it depreciates. The sooner it is then skimmed and churned the better, but it should not be churned while too new. The best time for skimming and churning is just before acidity becomes apparent. 3. Cream makes better butter to rise in cold air than to rise in cold water, and the milk will keep sweet longer 4 The deeper milk is set the less airing the cream gets while rising. 5. The depth of setting should vary with the temperature; the lower it is the deeper milk may be set; the higher, the shallower it should be. Milk should never be set shallow in a low temperature nor deep in a high one. Setting deep in cold water economizes time, labor and space. 6. While milk is standing for cream to rise, the purity of the cream, and consequently the fine flavor and keeping of the butter, will be injured if the surface of the cream is exposed freely to air much warmer than the cream. 7. When cream is colder than the surrounding air, it takes up moisture and whatever escapes from the cream. In the former case the cream purifies the surrounding air; in the latter, the air helps to purify the cream. The selection of a creamer should hinge on what is more desired—highest quality or greatest convenience and economy in time, space and labor.

Undissolved Phosphates as manure.

WE have now to speak of the comparative value of dissolved and undissolved phosphates as manure. The question is a purely practical one, and can be answered only by actual experience in the field. A few words on the chemical aspects of the question may, however, serve to clear our ideas on the subject before proceeding to look at the evidence yielded by field experiments.

In a good ordinary superphosphate we should probably find 32 per cent, of phosphate of lime (reckoned as tricalcic phosphate), of which 25 per cent. would be in a form freely soluble in water, and 7 per cent, existing partly as undissolved and partly as reduced phosphate. It has been assumed by some writers that the acid soluble phosphate in a superphosphate is not directly taken up by plants, but that it must first be precipitated within the soil before the roots can make use of it. This opinion, as far as I am aware, is not supported by any actual experiment: while the acid nature of plant sap and the fact that plants grown in solutions flourish best when these solutions are kept slightly acid, seem to support the view that acid phosphates can be directly assimilated.

When superphosphate is applied to soil the soluble phosphate is dissolved by the first shower, and is distributed by the rain through a greater or less bulk of soil. As this distribution proceeds, the soluble phosphate is precipitated on the particles of the soil, and assumes a less soluble condition; there is, consequently, no fear of its being washed out of the soil by heavy rains. In a soil containing carbonate of lime, the phosphate may be first precipitated in the form of bicalcic phosphate (a phosphate intermediate in solubility between the perfectly soluble monocalcic and the little soluble tricalcic phosphate), which by the further action of water is converted into tricalcic phosphate. In a soil containing no carbonate of lime the phosphoric acid will be more slowly precipitated as phosphate of iron, or phosphate of aluminium. The same action will gradually take place in almost every soil; all dissolved phosphates, whether derived from superphosphates, or from the solution of powdered mineral phosphates, in the soil, being finally converted into phosphate of iron or aluminium. It is chiefly owing to this fact that the residues left in the soil from previous applications of phosphates are so much less effective than a fresh dose of manure.

We should expect, from the facts just stated, that a small quantity of superphosphate would prove as effective as a much larger quantity of undissolved phosphate. With the superphosphate we have a great gain in time, the phosphoric acid being immediately available, we have a better distribution in the soil, owing to the solubility of the manure, the precipitated phosphate formed in the soil will also generally be more readily attacked by the roots of a plant than the phosphate supplied in a powdered mineral, lastly, the superphosphate has the advantage of supplying the crop with gypsum as well as phosphates. On some soils, naturally destitute of lime, which have been long treated with superphosphate, ammonia salts, or other manures supplying acid matter, the soil may possibly have aquired a condition of excessive acidity, in which nitrification and other functions of the soil become difficult, in such cases a powdered mineral phosphate may perhaps produce a better effect than another dose of superphosphate, the mineral phosphate supplying to some extent the base of which the soil stands in need. Excepting such cases, we should expect that phosphoric acid in the form of soluble phosphate would prove a far more effective manure than any undissolved phosphate

Comparative field experiments with dissolved and undissolved phosphates are already very numerous, and more will doubtless be made; indeed, the best advice that can be given to a farmer interested in the question, is that he should make a careful experiment on his own land. The value of such experiments depends, however, entirely on the manner in which they are conducted, and upon a full statement of all the facts being made when the result is reported.

We require to know the character of the soil, whether light or heavy, and, if possible, the percentages of nitrogen, organic carbon, and carbonate of lime present. We should know also the history of the soil, especially as to previous applications of farmyard manure. Care must be taken that the phosphates used are exactly what they pretend to be; that for instance, South Carolina phosphate is not employed under the name of coprolite. The degree of fineness of the powdered phosphate (that is, the fineness of the sieve through which it will pass) should also be stated. A chemical analysis of all the phosphates used is clearly requisite. The proportions of dissolved and undissolved phosphate employed should either be arranged so that the two manures supply the same amount of phosphoric acid, or that they may have the same money value; the latter plan appears the best for a farmer's experiment, as the result then shows at once, without any calculation, which is for him the most economical manure. In making the report, information must be given as to the mode in which the manure was applied. The experimental plots should if possible not be less than one-tenth of an acre; errors due to irregularity of soil and thinness of plant are greatly increased when small plots are adopted. It is absolutely essential that there should be a plot on which no phosphate is applied, without this the results will have little meaning. The dates of sowing and of harvest should be mentioned, with a general account of the weather experienced during the period of

growth. The number of roots on each plot should be counted before weighing the crop. The whole produce of each plot should be weighed roots and leaves separately. If the acre for which the results are calculated is a Scotch or Irish acre, the fact must be mentioned.

Having looked through nearly all the published records of field experiments with dissolved and undissolved phosphates, the writer is sorry to state that in very few instances has even a majority of the particulars above mentioned been included in the report of the experiments; it becomes, impossible, therefore, in many cases to decide whether the results are of value or not.

In looking at the results of a field experiment, we should in the first place see what amount of agreement exists between duplicate plots. It is clear that differences cannot safely be ascribed as due to manure, when they are no greater than the differences between plots in the same field similarly treated Where the increase obtained from the most effective phosphate is but small, no argument can safely be drawn as to the comparative value of different phosphates; in such a case the soil clearly stood in little need of phosphates,and was unsuited to test their efficacy.

Supposing that the results appear on examination to be free from error, we have next to look at the amount of increase which the several manures have yielded. To regard the mere weight of the crop is most delusive. Thus in Mr Wilson's experiments in Berwickshire, the ground coprolite yielded 21 ton 8 cwt. of turnips, and the coprolite superphosphate 22 ton 19½ cwt.; from these figures we should be inclined to say that there was little difference in the action of the two manures. The plot without manure gave, however, 19 ton 1½ cwts. of roots; so that the produce of the undissolved coprolite was really 46½ cwt,. and of the dissolved coprolite 78 cwt., showing thus a decidedly great effect from the latter manure.

Many of the comparisons of dissolved and undissolved phosphates are fallacious, simply because the quantities of phosphate applied have been too large. The size of the crop which can be grown on any field is always limited by the character of the soil and season, and no application of phosphates can force the produce beyond this point. To compare different phosphates with accuracy the quantity of the most active phosphate employed should be rather less than will suffice to produce a maximum crop; it is only when this is done that each of the phosphates is able to display its ful effect.

Suppose, for instance, that in a certain field and season 3 cwt. is thelargest quantity of superphosphate that can be economically employed for the tunip crop, any excess over this quantity giving no return. If on such a field experiments are started with 5 cwt. of boneash superphosphate, to compare with an equivalent quantity (about 3 cwt.) of undissolved boneash, it is evident at one that the result will be most unfair to the superphosphate. The 3 cwt. of slowly soluble boneash is probably able to display its full effect, while the superphosphate can only show three-fifths of its power. The boneash may thus appear as equal to the superphosphate in manuring effect, without in any way deserving such a character. It should clearly be possible, by employing sufficiently large quantities of the phosphates to be tried, to make them all yield an equal result. The same equality of result might also be brought about by a season of little growth, in which the poorest manure was sufficient for the wants of the crop. A fair comparison can only be obtained when none of the phosphates applied exceeds the wants of the crop.

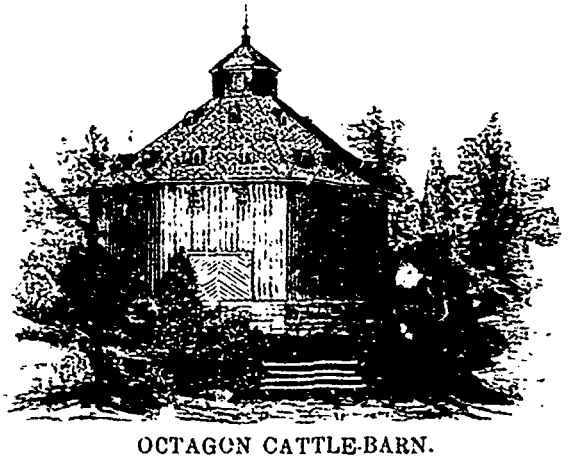
The quantity of superphosphate applied to turnips is often very excessive; farmers seldom take the pains to ascertain by actual trial what quantity will give the most economical result, but go on blindly employing the same dressing they have been accustomed to. In Mr Vallentine's experiments, just published, 3 cwt. of superphosphate yielded an increase of 2 ton of swedes, while 6 cwt. of superphosphate gave 2 ton 7 cwt. In the experiments conducted by the Cirencester Chamber of Agriculture some years ago, it appeared that 3 cwt of superphosphate drilled with the seed was as much as could be economically given; this amount produced on an average an increase of about 5¼ ton of swedes. When we recollect that 3 cwt. of ordinary superphosphate will contain about 49 lb of phosphoric acid, of which 38 lb. will exist as soluble phosphate, while 5 ton of swedes will contain in root and leaf about 8 lb of phosphoric acid, we shall readily believe that the quantity of superphosphate just named is amply sufficient to produce a still larger increase in the swede crop when soil and season ar favourable.

The use of extravagantly large amounts of phosphate is probably the chief cause of the near agreement between the results yielded by dissolved and undissolved phosphates in some of the published experiments. Some of the results are truly ridiculous. The Rochester Farmer's Club actually applied 9 cwt. of coprolite superphosphate per acre, and obtained an increase by this treatment of only 2 ton of turnips, including tops! Let us hope that the farmers of this district do not usually employ manure in this wasteful fashion.

In all future experiments we would strongly advice the use of smaller quantities of phosphate. Let 3 cwt of superphosphate, rather than 5 cwt., become the unit on which experiments are planned. If this is done, the economy of using dissolved phosphates will, we believe, be placed beyond doubt in a great majority of cases.—R. WARINGTON.

OCTAGONAL BARNS.

We published some years ago, in the eighth volume of RURAL AFFAIRS, the plan and description of an octagonal barn, furnished by E. W. Stewart of Erie county, N. Y., from buildings of his own construction. Much interest has been felt in relation to their success, and further information is desired. Mr. Stewart now informs us that this form of barn has been very satisfactory to him, and that some 30 or 40

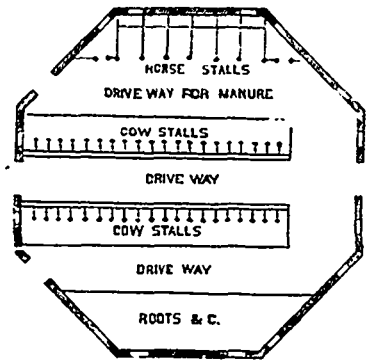


OCTAGON CATTLE-BARN.

have been built in various parts of the country—among them five in Pennsylvania, three in Indiana, four or five in Illinois, two in Minnesota, and several in Kentucky. We give briefly the substance of the description, in connection with the plans. The perspective view furnishes a good idea of the general form.

The leading advantages of this form are, economy in exterior walls and siding, and the absence of purlins to support the roof, while the roof cannot spread. It has great strength, without cross-ties or beams. The space above the "big beams" is quite clear of obstructions, and a horse-fork may be run to any part. The large space in this barn is reached from one floor, saving the labor of changing. The barn is 80 feet in diameter, and 50 feet of outside wall are saved as compared with an oblong barn 50 by 108 feet, enclosing the same area as the octagonal one.

The roof is an octagonal cone, each side bearing equally on every other side, giving it great strength. The plates are halved together at the corners, and the lips bolted together with four half inch iron bolts, fig. 2; a brace 8 by 8 inches is fitted across the inside angle of the plate corner, with a three-fourths inch iron bolt through each toe of the brace, and through the plate, with an iron plate along the face of the brace taking each bolt, the nut turning down upon this iron plate, fig. 3. The hip-rafter, 6 by 12 inches, is cut into the corner of the plate, with a shoulder striking this cross-brace, the hip-rafter being bolted with a three-quarter-inch iron bolt



through the plate into the corner post. A purlin rim, like the plate rim, of 8 by 10-inch timber, supports the intermediate rafters. The roof-boards act as a strong tie to hold all together. The posts are 28 feet high, the roof rising 22 feet. The cupola floor is 50 feet above the driveway. It will be seen that the structure, strengthened as here described, must stand with great firmness, and Mr. Stewart informs us that his barn has withstood some very strong gales.

A plan of the barn is shown in fig. 4, requiring but little explanation. The driveway through the centre is 15 feet wide, on either side of which is a line of "big beams," 13 feet high across which a scaffold may be thrown. The space above is clear of any obstruction. The bay for hay, on the left side, will hold 160 tons, and may be filled as well as emptied by separate portions. A scaffold 8 feet high, on the right, is for carriages, machines and tools. Above this scaffold is a large space for grain, enough to thresh 2,000 bushels or more. In the basement, the passage through it is at right angles to the driveway. There is no excavation for the basement, but embankments are made for access.

The Use of Fertilizer Materials.

We trust that most of our readers have cut out and preserved the price-list printed in our issue of February 20. It will probably not vary much during the season. A friend writes us, urging that we do not press too strongly upon our readers the use of the more insoluble forms of phosphoric acid. He says: "You use these fertilizers in large quantities to the acre, intending them to wholly take the place of stable manure. So used, there is enough to be available for plant food all the time. But perhaps you are not so well aware as I am that nine out of every ten who will make up fertilizers after your formulas will use only one or two barrels to the acre, where you use half a ton or a ton. Every one of these men is going to be disappointed, and will be sure to blame you. Dr. Cutting understands the farmers better than you do when he makes them dissolve their bone in acid before using it. He knows they will be stingy of it."

We accept our friend's counsel, and will now give some formulas on his principle, in which all the constituents are in a soluble form, immediately available for being taken up by the plants. But we believe in our heart that this is the wrong way to do. Nature never presents to the roots of plants their food in this extremely soluble form. In our naturally rich soils, that produce the largest crops without manure, all the phosphoric acid, potash and nitrogen are in more or less insoluble forms in the soil, and yet the plants get them. The roots themselves have the power of dissolving them as they require them. If the plant food in the soils of our farms were in this soluble form, the rain and melting snow would wash it all out, and leave them barren in a single year. But here are some soluble fertilizers:

FOR CORN.

2,000 lbs plain superphosphate of lime (15 to 16 per cent soluble)	$20 00
200 lbs sulphate of ammonia	6 00
200 lbs sulphate of potash	3 00
	$29 00
Add for freight at $5 per ton	6 00
Total	$35 00

This is a complete fertilizer, with all the ingredients in an immediately soluble condition. It can be made very nearly, if not quite, as soluble in another way, as follows:

FOR CORN—NO. 2.

2,000 lbs plain superphosphate 15 to 16 per cent soluble.	$20 00
600 lbs cotton-seed meal	9 00
10 bushels unleached hard wood ashes, at 20 cents per bushel	2 00
	$31 00
Freight on the superphosphate	5 00
	$36 00

For a potato fertilizer more ammonia and more potash are required, and for them we should mix eight hundred pounds of cotton-seed meal and twenty bushels of ashes with the two thousand pounds of the plain superphosphate. We wish to repeat, with all possible emphasis, that in order to have these fertilizers effective, they must be very thoroughly mixed. Many will fail in this, we fear.

For wheat, hops and onions, more nitrogen (ammonia) is wanted, and one thousand pounds of cotton-seed meal should be used with ten bushels of ashes and a ton of the plain superphosphate. The first formula can be used, bulk for bulk, the same as the purchased fertilizers, but as cotton-seed meal

and ashes will at least double the bulk, and are not near so strong, weight for weight, as sulphate of ammonia and the potash salts, the quantity used should be proportionally increased. We trust that some, at least will be persuaded to apply all fertilizers broadcast, instead of in the hill, even though they use but a small quantity to the acre.

DR HOSKINS in Vermont Watchman.

Home-Bred Cows.

We have no doubt that dairymen find it extremely difficult to buy profitable cows in market, and the more the dairyman knows about cows, the nearer impossible he will find it to buy such cows as he wants. Now, is this not really the turning point in the case? The dairyman must have profitable cows, or he cannot afford to carry on the business. It is generally conceded that he cannot depend upon finding them in market, and as the low average yield of dairies proves the business unprofitable, what reasonable solution can there be but to intelligently breed his own cows? Given good cows, a good dairyman can keep them at a fair profit. If it is proposed that the dairyman shall raise no better cows than he can buy, then he certainly cannot afford to raise them, for they are not worth raising. But we must suppose that he goes into this business of breeding his own cows, just as any prudent man should go into any business—studies all its points, and tries to understand it. He will breed heifers only from his best cows. And to know which are his best cows, he must test each cow separately. This cannot be guessed at. If his herd is kept, uniformly, for quantity of milk, then this test must be sufficient; but if for general dairy purposes, he must test for quantity of butter as well. The cream test has little value, for quantity of cream does not determine quantity of butter. When the dairyman knows the individual merit of his cows, then he is prepared to breed intelligently from them. He will, of course, be as guarded and critical of the merit of the sire as of the dam. If he studies the matter as he should, he will select a pure-bred male of the breed which he thinks best adapted to his style of dairying. The dam and grandam of the sire, at least, should have strong merit in the particular excellence he wishes to breed in his heifers.—*National Live Stock Journal.*

Influence of Food on Milk.

Sir John B. Lawes, in reply to a letter from Mr. Morgan Evans, writes as follows:—

"I do not think that the quantity of water supplied to cows reduces the quality of the milk provided the cows are well fed. My cows, both in-doors and out-of-doors, have as much water as they like to drink, and for the class of cows (Short-Horns) the quality of the milk is high, but they are highly fed preparatory to the regular experiments which I propose to carry out next winter. The food and milk of my dairy cows have been carefully weighed by one of the persons out of my laboratory. The following are the figures per cow daily:—Decorticated cotton-cake, 4 lbs.; bran, 3½ lbs.; hay, straw and chaff, 14 lbs; mangels, 80 lbs. Average of two or three months, 100 lbs. of food, or, calculated as dry, 27 lbs. Average produce of milk per day, 30 lbs.; number of cows, 25 to 31. There can be no doubt that if the cotton-cake was stopped the milk would reduce both in quantity and quality, and that when brewers' grains are largely used, a milk containing a large amount of water and a low amount of fat is produced. You are quite right in saying that solids and albuminoids are more constant than the fats. Fat is increased by rich food, but breed is more potent than food, and no amount of food will produce in a Short-Horn as rich a milk as is produced in a Jersey, or in an Ayrshire as is produced in a Highland cow. The same law prevails both in plants and animals. We get several more per cent. of dry matter and sugar in our experimental sugar beet and mangel crops, when the plants resemble in size their native form, but we only get perhaps half a ton of sugar per acre; whereas, by feeding them highly, we obtain two tons of sugar per acre in roots having a higher percentage of water and a lower percentage of sugar. Unless I had made certain of the fact, I could not have believed that mangels so worthless in all feeding properties could have been grown, and, for the same reason, I think you might produce a genuine very poor milk. Genuine or not, I think a standard of quality should be fixed, below which no milk should be sold."

Dr. Augustus Voelcker has also replied to the same leading questions Mr Evans addressed to Sir John Lawes. He says:

"The direct supply of water to milk cows, according to my experience, does not affect the quality of the milk, at least not to a very appreciable extent. You cannot, in other words, water the milk by giving cows much water to drink. The case is different if washy or very succulent food, which is always very watery, often immature, and at the best poor or innutritious, is given to cows. In my judgment it is the poverty of the food, rather than the excess of the water, which causes cows fed upon such food to become watery. Again, if food such as brewers' grains or silage, which is naturally sour, or barley or oatmeal, is mixed with water and kept until the wash gets sour, such acid foods or wash greatly promote the flow of milk, and unless supplemented with concentrated food, have the effect of producing much but watery milk. All the constituents—fat, casein, milk, sugar and ash—vary in cows' milk according to the breed of the cows, age, time elapsed since calving, and especially the quality of the food on which they are fed. The greatest variation occurs in the percentage of butter fat. I have had milk sent to me for analysis which yielded twice, and even three times, as much butter fat as other samples of an unquestionably unskimmed, unadulterated milk. The proportions of solids not fat vary much less. Milk, and to the same extent also, the relative proportions of casein and milk sugar, vary in different samples of milk, but not in any great degree. As a rule, a milk which yields a high percentage of solids not fat, also yields much fat. I have never found as little as 2.2 or 2.4 only of fat in a milk containing 9.2 per cent, of solids not fat. If milk gives 8.7 of solids not fat, and only 2.4 per cent. of fat, in my opinion it is skimmed, but may be otherwise pure and not watered.

"As a matter of fact, the bulk of London milk has more or less of the cream taken off, especially in the strawberry season; and in my opinion the minimum standard of public analysis, namely, 2½ per cent. of fat and 8½ solids not fat, might with propriety and with benefit be altered to 3 per cent. of fat and 8 per cent. of solids not fat. According to my large experience, genuine milk of fair quality, and by no means extra rich quality, such as is produced from well-fed Alderneys, seldom contains less than 3 per cent., and much more generally 3½ to 3¾ per cent. of fat throughout the greater part of the year. My opinion is that a large proportion of milk sold in London and elsewhere, and passing the public analysts ordeal, is more or less skimmed."