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.

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

THE JOURNAL of AGRICULTURE. ILLUSTRATED

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

Vol. VIII. No. 8. MONTREAL, AUGUST 1886. $1.00 per annum, in advance.

NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.

OFFICIAL PART.

Table of Contents.

THE POULTRY-YARD.

The Rearing of Chickens.

EDS. COUNTRY GENTLEMAN.—The point in which the majority of chicken raisers fail is in respect to the feeding. One of the most difficult matters to instil into the minds of poultry keepers is, that the feeding of their stock must be very carefully and systematically done. Overfeeding is the cause of nearly all the diseases to which poultry, both old and young, are subject. Thus it will be at once apparent that if it is important to feed adult fowls in the right manner, it is especially so in the case of young chickens. The former may, under certain conditions, throw off the evil effects of bad feeding, but this is scarcely possible in the case of young and growing stock at the time when the frame is being formed. The very desire to feed the birds sufficient very often leads to the giving of either too much or too rich food. The delicate stomachs of the little things need food that shall be of a suitable nature, and full of nourishment. This very fact often leads to error. Rich food is not necessarily nourishing, and *vice versâ*.

Chickens do not need any food during the first twenty-four hours after they are hatched. The contents of the yelk-bag, which bag is absorbed into the stomach immediately before hatching takes place, contains sufficient nourishment for the first day, and any attempt to compel the chick to swallow other food is likely to do more harm than good, by the derangement of the digestive system. There will be no difficulty in getting the chicks to eat, if they are simply left alone for the first twenty-four hours after they make their début into the world. All such practises as the giving of a peppercorn to the newly hatched chick are most objectionable indeed, and are founded either on superstition or ignorance. Such pungent things as peppercorns must be very trying indeed to a delicate organ like the stomach of a young chick. That still most objectionable practice of tearing off the horn or scales which nature has placed on the beak of chicks to enable them to break open their prison house, combines cruelty with other things, for this scale will drop off itself within a few days. The less chickens are interferred with, the better, during the early stages of their growth.

The first food should consist of hard-boiled eggs, chopped fine, and mixed with twice their bulk of bread crumbs. Those eggs which have been sat on for a week, and proved to be infertile, answer capitally for feeding the chickens. Failing

these, we should purchase duck eggs in preference to using fresh eggs from the hens, unless the latter are exceptionally plentiful. Only as much of the egg and bread crumbs should be prepared as will serve two or three times, as it soon loses its freshness, and if sour, will cause scouring. It should be slightly moistened with milk, but very slightly, just sufficient to damp it. Much depends on the way in which the bread crumbs are prepared. The way I have always adopted has been to rub the bread—stale bread is to be preferred—through a fine seive, turned upside down. In this way they are not only speedily made, but are fine and even,which is almost impossible to secure, if simply rubbed in the hands. On cold or wet mornings it will do good to add a little seasoning to the mixture, and the same thing is desirable with the soft food afterward. The egg and bread crumbs should be continued for about a week, when the alternate feeds may be given of some such food as Spratt's poultry meal, which, without hesitation, I have found to be the best thing for rearing chicks that has come under my notice - that is, as a soft food, for I should never think of giving that or any other soft food alone.

When the chicks are eight of nine days old, they may have the egg and bread crumbs discontinued, in place of which can be given a little boiled rice, but not much of that, and some oatmeal mixed with barley or wheat meal, or, if it can be obtained, in place of the oatmeal, some ground oats. When they are about a fortnight old, a little crushed buckwheat may be put down to them, as they will not be able to manage the whole corn until they are older. From the time I have already stated they may be gradually accustomed to a plainer diet until four months old in the case of the more rapid growing breeds, and five months in the others, when they will require no different treatment for the older fowls. There should always be mixed with the soft food a little bone meal, which I regard as an invaluable thing for chicken rearing. I like that best which is about as coarse as ordinary oatmeal.

An important matter to be considered is the times of feeding, for the most inexperienced will see that young animals and birds need smaller quantities,but at shorter intervals,than adults. The following may be regarded as a very good table for the periods at which chickens should be fed: For the first week or ten days, every two hours; from ten days to a month old, every three hours; after that time five times a day; and when two months old, four times a day. It is most desirable that the times of feeding be as equally divided as possible, and be strictly observed. Doctors say that there is nothing worse for children than irregular meal times, and this is just as necessary in the case of chickens. The first feed should be early in the morning, say about an hour after daybreak. This may necessitate early rising on the part of some one, but that grace is a most essential one for the chicken-raiser. It can scarcely be expected that chickens will thrive properly which have to run about hungry for hours after they are astir. Some feeders leave a little hemp seed over night so that the birds can help themselves in the morning. This is undoubtedly better than nothing, but they will be more likely to do well if they have a warm feed first of all. Then, until the chicks are a month old, they should have a feed about 9 or 10 o'clock at night. This entails trouble, but it will repay any trouble involved. Food should be fed sparingly and never left for long. The system of feeding I found best of all is to only give as much as is eaten readily. Lately there have been those who have written in favor of always having food so that the birds, both old and young, can help themselves, but I do not believe it is the better method. A hungry chick is a thriving one. Much contention has been raised as to whether chickens should have water or not. As to whether they can be raised without liquid, needs no discussion. That has been proved possible often. But what is possible is not always advisable, and I think it is most desirable that the chickens should have access to water. They will only drink as much of it as their system requires.

One most important thing in the feeding of chickens is a supply of green food. If they are being reared on a nice pice of juicy grass, they can do without anything else, but even then a supply of fresh lettuces will be to their benefit. Should there not be good grass, the lettuces become indispensable.

It is necessary to remind the reader that the directions given here for the feeding of chickens refer to those that are intended to be kept as layers or as stock birds. If to be fattened as speedily as possible and killed off, then another course should be adopted. Under those circumstances the food should be such as will develop flesh and not bone. For this purpose boiled rice,and Indian corn should form the staple food.

Stephen Beale.

FOOD.

BY SIR J. B. LAWES, BART., L. L. D., F. R. S.

In an article on Ensilage by Mr. Easdale published in this journal on the 14th of last month, it is suggested that I should compare silage with mangels in a series of experiments with cows. Mr. Easdale tells us "he would have given a diet solely of mangels, morning, noon and night, for one, two, or three consecutive weeks, nothing else given but water, and ensilage dealt in the same manner." I venture to think that I shall be able to satisfy your correspondent, and I hope most of your readers, thatan experiment of this sort would be altogether worthless as a test of the merits of these two foods. A very interesting paper might be written upon the use, and abuse of food for stock, and I could not desire a better illustration of the abuse of a food than that of feeding a cow which was yielding milk, with mangels.

Milk is a highly nitrogenous substance, while mangels —though they contain a large amount of most valuable food in sugar —have a low percentage of nitrogen, and a considerable proportion of what they do possess is incapable of producing the nitrogenous compounds which we find in milk—How then is milk to be obtained from mangels? The cow would for a time furnish the necessary nitrogenous compounds from her own body, but at the same time would be losing condition. Whether a cow could go on yielding milk from a mangel diet alone, I do not pretend to say, but if she could, the result would only be obtained by a great waste of respiratory matter.

In one of my articles on ensilage I pointed out that an animal for sustenance purposes alone–that is to say an animal which yielded no product, and neither increased or diminished in weight—required a considerable amount of respiratory food, and a very small amount of nitrogenous food. Let us assume 100 lbs. of mangels to be the daily sustenance food of a cow not yielding milk, and that the supply of mangels was increased in order to obtain milk, the result would necessarily be a large destruction of non-nitrogenous matter.

Bran very closely resembles milk as regards the relation of its nitrogenous and non nitrogenous matters, but bran and mangels differ very much in the respective amount they contain of these substances. If you asked a chemist to produce out of a given weight of mangels a substance having the same proportion of nitrogenous and non-nitrogenous matter as he finds in bran, his first operation would be to get rid of a large amount of sugar. A diet of mangels to a cow yielding milk,(1) would be an abuse of the roots. A similar abuse often occurs when too many roots are given to ewes. A lamb which when born is little more than a lump of nitrogen and phosphates,

(1) Of *mangels alone*, Lawes means. A. R J. F.

is expected to be formed from a food which is exceedingly poor in both these substances, and then when wholesale abortion is the result, it is said that the manure which grew the roots is to blame! That the quality of roots is greatly dependent upon the manures employed to grow them, I am quite prepared to admit, but no matter how they are grown, roots when used alone cannot be considered a milk-producing food.

A paper will shortly be published by us upon the composition and value of the manure ingredients obtained by the consumption of various cattle foods. In the construction of this table we have been obliged to estimate—from the best data at our command—the amount of increase which each substance is competent to give, not when used separately, but when used with other foods in such proportion as shall produce the best possible result. In practical agriculture a considerable waste of food is often unavoidable, but at the same time there is a good deal to be learnt before we arrive at such true economy in the use of food as will enable us to produce a pound of beef, or mutton at the least possible cost.

Silage, at the London Dairy-show.

There is a separate department, happily blocked off from the butter by a door which is only occasionally open, in which, under four classes, silage is exhibited from some 15 or 20 silos. Grass, chopped or unchopped, is shown generally sweet, without offensive smell. From Kimbolton Castle, however, palatable or not in the stable or the cow-house, the stuff was black and pungent. Of clover, rye grass, &c., chopped or unchopped, there were several samples: two lots from Kimbolton Castle again not very attractive, put in wet and put in dry, both of them black. A good many samples here simply looked, and felt, and smelt, like wet hay-chaff without smell, unless a slightly sour one. Mr. Wigan of Larkfield's House, near Maidstone, showed trifolium, which should probably have been ensiled earlier than it was, for it was very coarse stuff. Lord Londesborough's chopped grass was rather offensive to the reporter, though whether a cow or horse would have been offended with it is another matter. The chopped rye from the same silo, near Lyndhurst, Hampshire, seemed poor stuff; Lord Egerton's chopped oats, cut and stored green on July 30th and 31 st, smelt rather offensively. There were three exhibits in the class of silos shown in models, with plans and specifications. Messrs. Mackenzie of Cork showed Heard's Patent Capstan process, wherein beams and chopper are connected by chains with the floor below, which chains are kept always tight or short by capstan, and accompanying leverage. Mr. Potter of Alresford showed a structure of slabs, sliding in grooves, within an iron frame, which seemed likely to be both efficient and economical.

REMEDIES FOR THE CABBAGE WORM.

Eds. Country Gentleman—I see in the papers many complaints of the cabbage worm this year, and you ask for the experience of your readers who have succeeded in keeping them off large fields.

I never plant more than half an acre, but have not failed for 42 years in freeing my cabbages of worms. I was at the house of a lady in Kentucky who had the finest cabbages I had seen that year. I asked her how she managed to keep them free of worms. She told me by sprinkling them with flour, shorts or shipstuff. As soon as I got home, I had mine well plowed, and the next morning I put a large tablespoonful of coarse flour or middlings on each head while the dew was on; the dew made it wet, and the worms began to crawl and roll over on the wet flour. The more they struggled, the more paste they gathered; they would soon fall on the fresh plowed earth, which, being wet, would stick to them, and clog their feet and legs, so that they could not get into the ground. Those that could not get off, died on the heads. The paste prevents all eggs from hatching.

For 42 years we have had good cabbage. This has been one of the most difficult seasons I recollect to keep the worms from destroying cabbages. Two plowings, and twice going over and applying the flour saved mine, while most of the neighbors lost theirs. It may be necessary to apply it oftener, if hard rains come and wash out the flour. Rye or buckwheat, unbolted, is as good as fine flour; the paste is what does the work. W. G.

Lexington, Ky.

—Two new (to me) remedies for the cabbage worm have lately come to my notice, both of which look reasonable. The first is simply throwing a handful of earth into the head when the dew is on, and although it seems objectionable I am assured that as the cabbage grows, it will throw it all out. Rev. L. L. Langstroth tells me that he has found gritty turnpike dust, applied liberally, the best remedy for the striped bug, and if faithfully followed up it will save the plants. The other remedy for the cabbage worm comes endorsed by Prof. Riley, and is to sprinkle with ice-water in the heat of the day. There is no danger of hurting the cabbage as by the use of hot water, and the sudden ice bath is at once fatal. W. F. B.

Butler County, O.

The supplemental food for lambs should contain, as nearly as is possible, the same ingredients as those furnished in the ewe's milk. The above enquiry shows a good variety of available feeding material. Fine clover is good, and this the lambs will pick from the ewe's racks. Oats are the best grain for young animals, being rich in albuminoids, which form flesh. Corn is richer in fat and in the carbo-hydrates which support the functions of breathing. Old-process linseed meal is rather dangerous for lambs, on account of the excessive quantity of oil acting too freely upon the bowels. If used at all, it must be only in small quantities and with a watchful eye on the part of the caretaker. It contains ten per cent. more oil than the new-process meal. The latter is a safe feed for lambs. It is rich in albuminoids.—J. Wood.

In the old course of feeding there is too much time when the animal is consuming food for subsistence merely, and when there is no growth being made. By giving the animal from its birth all it can profitably consume, advantage is taken of the period of growth when there is little or nothing required to replace waste tissues or for repairs. There must always be a loss of the food of mere subsistence. To save this, and to reduce risks, labor and time, which in this, as in everything else, is money, are the objects to be gained by that careful, plentiful and methodical feeding, which produces the earliest development, greatest addition of flesh, and the quickest preparation for the butcher's block. As the marked gain in beef cattle in early development has been made with certain breeds, so has it been with sheep. It is my purpose merely to allude to this, and to add that nearly all mutton breeds readily respond to the treatment indicated.

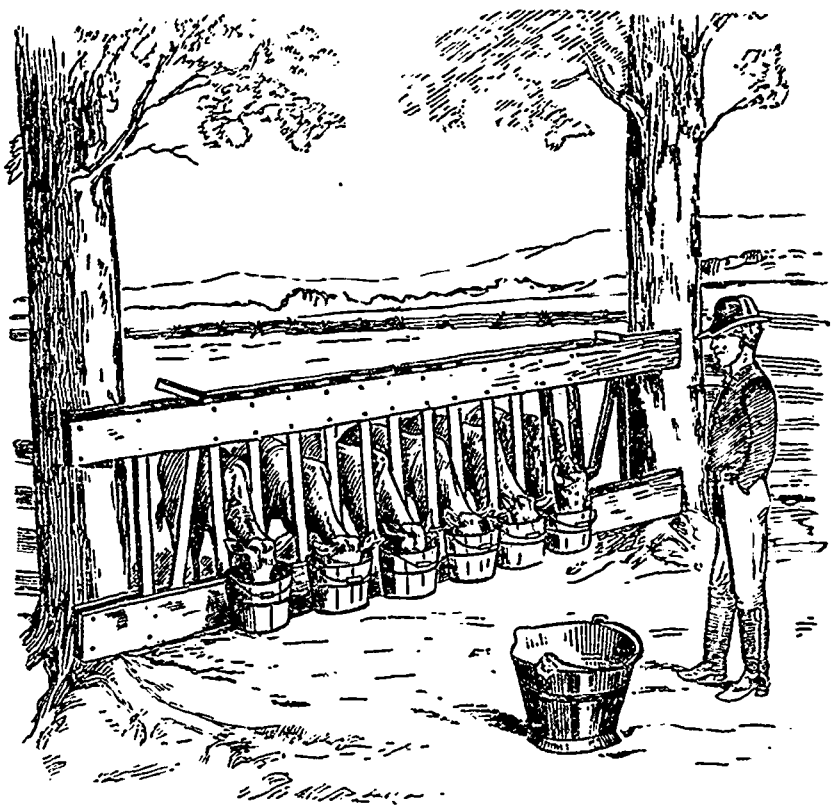
Those who desire to produce the best mutton at the least cost will find the present the time to begin the undertaking. Let the lambs have all they will consume of coarsely ground corn and oats, and new process linseed meal, beside their mother's milk, made from generous foods. (1)

J. Wood.

(1) And, above all things, pease, pease, pease. A. R. J. F.

Misery and comfort in Calf-feeding.

Mr. J. M. Drew, of Winona Co., Minn., sent us, R. N. Yorker, two drawings from which our artist has succeeded in illustrating the dark and the bright sides of calf feeding. Mr. Drew informs us that before the stanchions shown at p. 116 were built, the whole family had to turn out in order to feed the calves. Any man whose boyhood was passed on the farm will appreciate the little drama shown at p. 117. If there is anything that seems to be all stomach and no brain it is a hungry calf. The boy leaning over the fence is probably willing to confirm this statement. He has all he can do to balance himself upon the fence without plunging headlong into the pasture. The two calves bunting and pushing away at the pail keep his hand occupied, while the other tormentor, with genuine calf-wisdom, sucks away at his new hat, regardless of the blows from the stout switch. The other boy is no better off. He has carried the war into Africa to the extent of entering the pasture with his milk. Nothing but his slippery hold upon the calf's ear saves him from total annihilation. Once let his hand slip and his milk is gone for ever. To make this system of calf feeding a success there should be several other boys armed with sticks to keep the extra calves away. Fig. 2 proves two things that have hitherto been considered doubtful: a boy can feed calves with a good deal of comfort and actually smile during the operation; and even a calf can be taught a small amount of common sense and respectability. The picture explains itself. You would hardly recognize the boy. He stands erect and satisfied. He feels that his hat is no longer in danger, and that his boots will not be filled with milk. These stanchions have transformed him from a fighting character into a statesman, showing the great superiority of brain power over brute force. The stanchions used by Mr. Drew are made of 16-foot fence boards. This space gives room for 10 calves. They may be secured to posts or trees, with a stout post in the middle. The upright pieces are three feet long, made of pieces of fencing split in halves. A row of such stanchions long enough to feed a dozen calves can be made in three hours, and nobody but the boy can understand how much patience, perspiration, and milk they will save. At first the calf will have to be pushed into the opening, but after finding that he can get his milk in no other way he will need little urging. The restraint will make a new calf out of him. He will be easier to break to the halter and will be gentler all his life to pay for this early training. After this, let us hear of no more tragedies at the calf pen.



THE BRIGHT SIDE OF CALF FEEDING. Fig. 1.

THE SHEEP GAD-FLY.

MEANS OF WARDING IT OFF.

EDS. COUNTRY GENTLEMAN—The old idea, as entertained by Randall and others, seemed to be that the parasite generated by this fly did not fully develop itself in the head until the spring following the deposit of the eggs. Randall's description and advice are to the effect that if a sheep is seen to dwindle and pine in the spring, with final symptoms of aberration, walking in a circle, staggering, holding the head high, or holding it to one side, that he should "suspect grub in the head." But I have lost lambs from this disease that were not six months old, which shows that the grub had developed rapidly. I think that, in the whole course of my experience, I have lost half a dozen lambs or more within a week from weaning, say from August 1 to 10. This proves that the fly must have begun its pestiferous work early in the spring, or else the grub grows with exceptional rapidity in the head of a lamb. Probably both hypotheses are true, since the abundance of mucus thrown off by the moist tissues of a young animal would naturally foster these parasites into early and vigorous activity.

It is not necessary here to enter upon a careful description of this fly, or the resultant parasites; the reader who is curious can find satisfactory details in the excellent works of Stewart, Randall, and others.

Probably very few farmers have ever actually seen the sheep gad-fly; it is very small, and rapid in its movements. But no one has failed to notice the consternation it produces among its victims—the stamping, the running and snuffing, with noses held close to the ground, the striking with the fore feet. Where there is no shade, the sheep congregate in the field and stand in a group, with their heads thrust under each other's bellies.

These flies prevail worst near or in a forest, or on lowlands, about moist pastures, swamps, &c. Notwithstanding they are thickest in the woods, the sheep congregate there for the sake of the shade. And they find, also, in the woods a means of self protection against their enemy—that is, the dust. Every sheep is observed to have its stamping ground—a little basin stamped out at the foot of a tree, or beside a log, or deep within the recesses of a fallen tree-top—where it lies down and gets up, turns around, and lies down again a

score of times in a day. Sometimes it will lie here a long time, with its nose outstretched close to the ground, inhaling the dust. I consider this natural dust-bath a great protection against the gad-fly, and almost as necessary to the sheep's best welfare as it is to the hen's. It not only wards off the fly, but the foot-rot as well.

The next best thing is an open shed, to which the sheep can resort during the heat of the day. This should be dark and cool, to make it attractive. The sheep soon learn that a room of this sort is almost exempt from the visitations of their enemy, and they will travel a considerable distance for the privilege of passing the day under its shelter.

But after all has been done and provided, there is a margin of danger toward the close of the afternoon. The sheep get hungry during the long, hot day, and they venture forth before sunset, at the very time when the fly is probably the most active of the whole day. Now it is that the mischief is done; the egg is laid in the nostril.

After the grub has effected a lodgment in the nasal sinuses, I have always found it unsatisfactory to attempt to dislodge it. The mucous membrane lining these cavities is so sensitive—a fact attested by the suffering and death of the animal from a cause apparently so trivial, often beclouding the judgment of the farmer as to the real nature of the ailment) — as to make it dangerous to bring in contact with it anything strong enough to kill or loosen the grub. An injection of turpentine is the best thing, both as a remedy and as a preventive, though, as I said above, no remedy can be depended on as certain. I have found it well worth while to go over the entire flock of lambs twice during the season, as a preventive measure, and at weaning, and again about October 15. For this purpose a common bulb syringe, to be had at the drug store, is best. Let the operator take the lamb between his legs, standing up naturally, charge the syringe with a mixture of equal parts of turpentine and linseed oil, introduce the nozzle carefully the whole length of the nasal passage (in a grown sheep this is nearly or quite six inches long), and then with a quick spurt inject about a teaspoonful. Let the lamb have its head until it recovers from the shock; then treat the other nostril the same way.

THE DARK SIDE OF CALF FEEDING. Fig. 2.

The well-known veterinary surgeon, Dr. Geo. Stuart, in a letter to me, gives a drawing and description of a face-cover which he has found very efficacious in protecting his sheep, Shropshire-Downs, from the gad-fly. It is made of lamb-skin, in the form shown in the cut, fig. 1, page 118, and applied as shown in fig 2, page 118. The strings or tails are smeared with crude carbolic acid ointment, made viscid like varnish, with an addition of resin; and the short wool retains the body and odor of the ointment a week or more, when it will have to be renewed. (1)

The doctor gives a number of distances showing the efficacy of this protection; he states that he has seen his sheep quietly feeding on an August evening, now and then shaking their heads to drive off the flies, while the flock in a neighboring field, being unprotected, were standing huddled together and motionless. The length of the tails is sufficient to cover the nostrils, yet not interfering with the act of grazing.

During a number of years, experience, sheep protected in this way have never had the disgusting mucous noses, and have never been pestered with grubs.

Stephen Powers.

DE OMNIBUS REBUS.

Box 23, Sorel—
July 1st, 1886.

Superphosphates. —It seems, upon the whole, that in spite of the hard times prevalent in Europe among the farmers, owing to the decrease of beet-root cultivation arising from the increase of the sugar duties, the demand for our Canadian *apatite* is greater than ever. A curious fact in the industry is that high class phosphates, after being worked up with sulphuric acid in England, are reimported into the United States. A shipment of 100 tons has already been made by M. Franchot, the manager of an extensive apatite mine near Hull; but I regret to state that that gentleman, in spite of the opinion to the contrary of the chief agricultural chemists of the day, holds "that the pure pulverised phosphate is superior to that *manipulated*, which means diluted with sulphuric and other acids."

(1) All right, provided a hood is never put over a sore head.
A. R. J. F.

Now, by this time, all my readers know my opinion on the matter: Apatite, however finely ground, is utterly useless unless dissolved in acid. The great advocate for the use of ground phosphates in preference to superphosphates is Mr. Jamieson, chemist to the Aberdeenshire and Sussex societies; but even he acknowledges the utter uselessness of undissolved apatite: "The well-known *massive* forms of phosphate of lime, such as *coprolite* and *Carolina rock*, if finely ground, seem nearly as effective as nitrogenous manures. Hence the most economical phosphatic manure for turnips is, probably, insoluble phosphate of lime, from any source, ground down to an impalpable powder." But, Mr. Jamieson wishes it to be

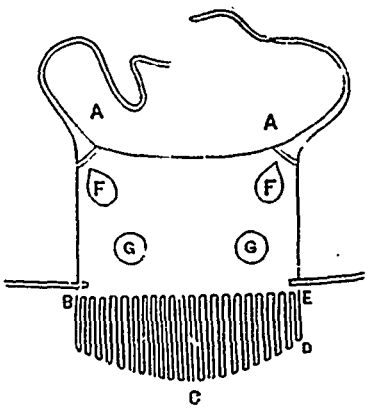


Fig. 1—A, *tie behind the ears*; B, *clipped tails*; C, *showing length of tails*, D, *where the tails taper*; E, *tie at the jaw*; F, *ear-hole*; G, *eye-hole*.

distinctly understood that when speaking of insoluble mineral phosphate he refers to the above mentioned massive forms, as "Our Aberdeenshire experiments will *not* apply to apatite, our experience of which is that is action, when undissolved, is *nil*, or so slight and slow as not to be regarded as having manurial value." So far Mr. Jamieson.

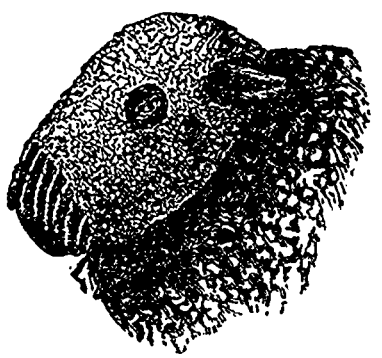


Fig. 2.

Mr. Aitken, chemist to the Highland Society, when in charge of the experiments at Lord Tweeddale's, found the following effects to result from the use of divers phosphatic manures:

	Weight per acre. tons.	cwts.		tons.	cwts.
Ground coprolites	17	5			
Bone meal	15	14	Average	14	6
Ground apatite	10	14			
Dissolved coprolites	22.	4			
Dissolved bones	20.	1	Average	21.6	
Dissolved apatite	21.	13			

"Showing," he says, "an increase with soluble phosphates of nearly 50 per cent. The plot with ground Canadian apatite *was a failure from the beginning to the end of the season*, showing that this hard crystalline phosphate is unsuited for use in the undissolved state, even when very finely ground."

Again, in 1880, a repetition of Lord Tweeddale's experiments, under the charge of the same chemist, Mr. Aitken, gave the following results:

	Undissolved per acre tons	cwts.	Dissolved per acre tons	cwts.
Bone-meal	1	10	10	12
Ground coprolites	1	18	12	8
Ground Cacoa ph		14	12	2

The crop, even with the dissolved phosphates, was very poor, for the season was very unfavourable.

The late Mr. Voelcker, chemist to the R. A. S. of England, in a private letter to me, said: "In my judgment it is a gross perversion of the truth to represent finely ground apatite superior in fertilising properties to the same material dissolved in sulphuric acid: I go so far as to maintain that a hard crystalline material, *such as apatite*, ought never to be applied to the land merely in a finely ground state. Such a recommendation, if followed, must inevitably do harm to the best interests of the farmer."

Mr. Aitken, again, writing to me in 1882, states that: "All my experiments with ground Canadian apatite have been such as to prove that phosphate to be unsuited for a manure until dissolved. When I have applied it to roots, the result has been usually equal to *no phosphate*, and I have never seen any effect produced by it on the succeeding corn (*grain*) crop.

Sir John Lawes writes me word that: "As there can be no doubt that soluble phosphates act *far more rapidly* than insoluble phosphates *however finely ground*, they will continue to be used. If I used phosphates for cereal crops—not for turnips—I should be quite content to use a *certain portion of phosphates in the ground state*, provided: 1st, that the phosphate was derived from some *non-crystalline* source, such as Cambridge coprolite or Carolina rock." Now, as we saw just now, *Apatite* is a crystalline form of phosphate of lime, and, therefore, if the opinion of these four practical agricultural chemists is of any value, is utterly useless as a manure unless dissolved in acid; and I trust that in future no attention will be paid to those interested persons who attempt to delude the public for the sake of a paltry extra profit which they hope to derive from the article in which they deal.

I do hope and trust that one of the first things carried out on the Experimental Farms shortly to established may be the final settlement of this question. To my mind it is settled already, but there are too many persons in this country who cannot be convinced that what is true in England must necessarily be true here, and, in consequence, many experiments which have already been thoroughly tried abroad will have to be repeated here, to the utter waste of time, trouble, and expense.

Great improvement in farming throughout this district since 1884. The potato crop is harrowed, horse-hoed, and earthed-up moderately with the double-mouldboard plough. Some extensive fields of potatoes are really beautifully worked. Dr. Sylvestre tells me that he has sold six times as much turnip-seed this year as he ever sold in any one previous season. But they *will* sow too little seed per acre.

Clover-hay was fit to cut here on June 14th. Unfortunately it was allowed to stand till the 26th, and, in consequence, some of it "kneed-down" and the mower passed over it. A great deal of grass was ruined by the frost after the rain at the latter end of December, and Mr. Arch. Campbell, of St. Hilaire, writes me word that in their district the same loss has been experienced. By the bye, Mr. Campbell speaks of M. Couture as describing a Canadian cow which gives 50 *quarts* of milk! For *quarts* read *pounds*.

Earthing up.—There seems to be a general desire to have done with the summer-working of the potato as soon as possible. A great error, I believe. Potatoes should be horse-hoed at least twice, and only earthed-up on the eve of their shaking hands across the rows. However, all things are decidedly improving in this line, and I do not doubt but what in a few years' time we shall see potatoes not earthed up at all.

Cauliflowers.—Only one failure as yet—my cauliflowers—but then I ought to have shown better than to have planted them in a bed of dust with no one to water them. There was no use setting them in my own garden, as that is so surrounded by trees that no sun can get to it. So I planted them in "Le Bout," i. e., the town-end.

Mangels.—A curious fate has overtaken the mangels sown on the Fosbrooke farm. They came up well, and all of a sudden they vanished! I looked for wireworm, &c., but in vain. Probable cause: the land was too light for this root, as swedes grown alongside are a splendid plant.

Wheat-crop eaten.—At Saint-David, I am told, the wheat in some fields is entirely gone, except at the end of the ridges and on the headlands. The horses turn, I believe, on these spots, and jam the land down tight. Hence, I conclude, the damage is due to wireworm, as pressure is the only way to stop the ravages of this abomination. Some day or other, I do not absolutely despair of seeing heavy rollers employed in this country!

Permanent grass. — What on earth can Mr. Henry Stewart mean by saying that, in laying down land to permanent grass, English farmers, thirty years ago, used to employ a ton of bones, and (or?) ten cwts. of guano? In those days, guano used to analyse 17 % of ammonia, and ten cwts. would therefore = 190 lbs. of ammonia per acre, which would infallibly destroy every blade of grass. The real amount of manure used in England may be seen in the article transferred from Agricultural Gazette, at p. of this number of the Journal. Very large dressings of half-inch bones were, indeed, used by Cheshire farmers about 40 years ago; but now-a-day, they are too shrewd to waste their reduced means in such a fashion.

Summer frost.—On the night of the 11th of June, I raised my melon-frames, and on the morning of the 12th, the leaves outside the frames were touched by the frost! Just like my luck! No damage, however, was done to the crops.

Experimental Farms.—The first thing to be done on an experimental farm, before any trustworthy work can be carried on, is to thoroughly exhaust the soil! If wheat is to be experimented on, four successive crops, should be grown before the trials begin. At Rothamsted, Lawes' last crop of turnips without manure weighed only 7 cwt! It was the neglect of this exhaustion that rendered the experiments of Mr. Brown, of Guelph, on artificial manures so utterly useless. By the bye, I see it stated in one of the U. S. agricultural papers, that Mr. Brown, after 4 years' experience, has entirely given up the use of ensilage. This is one of the points to which the earliest attention of the managers of the experimental farms will, no doubt, be directed. In England, it is clear, the practice of ensiling green-crops of every kind is gaining ground every year; but the risk of hay-making in the moist climate of that country may in some measure account for it. I wish I had a silo here of any kind, for I should clearly like to try how my new mixture of maize, oats, tares, pease, and rape, would suit milch-cows in November. It is a marvellous crop as it stands, and, if no heavy storms lay it low, I calculate that, when fit to cut, there will be 15 tons to the acre! All the people here say that they never saw anything like it.

Ash-leaf kidneys were, as I mentioned in my last, dug for market on June 21st, exactly two calendar months from the day of planting. The sets were started in the light. Bliss' American Wonder pease, sown on the 22nd April, were picked for market on June 25th. Rather a curious fact in connection with the Stratagem pea: the sun-pods were full at the same time as those of the American Wonder, but were no bigger than they, though the general crop pods of the Stratagem are nearly twice as big. I shall mark them, as perhaps they may turn out something superior.

Pace in ploughing.—The Rural New Yorker, in a recent number, says that a horse that can plough one acre a day is worth twice as much as a horse that can only plough half an acre a day! A strange calculation, indeed, for, by a parity of reasoning, a horse that can plough two acres a day is worth twice as much as a horse that can only plough one acre a day, and so on, *ad infinitum*. Now, one reason why ploughing is in general so very badly executed here is that the horses, not being really farm-horses, but what we call in England *nags*, step so quickly that no ordinary man can keep up with them and, at the same time, hold the plough as it ought to be held.

A calculation can be easily made as to the pace necessary for a plough-horse. The ordinary rate of a man is rather more than three miles an hour; if this pace were kept up all day, that is, for 8½ hours, exclusive of turns and stoppages, with a furrow of 10 inches wide, the distance traversed would be 24¾ miles, and the quantity of land ploughed would be 2 acres and a-half nearly. Practically speaking, 1½ miles an hour is about the pace at which plough-horses ought to travel, if the man between the stilts is to be at ease, and at liberty to devote his whole attention to the plough; and at this pace with 8½ hours work a day, exclusive of turns and stoppages, one acre will be turned over, and 12½ miles will be the distance walked.

But here I must advert to another feature of too many our farms. The time lost in turns while ploughing some of the little patches too often seen is almost incredible, for instance:

Length of ridge.	Breadth of furrow.	Time lost in turning.		Time given to ploughing.		Hours of work.
Yards.	Inches.	H.	M.	H.	M.	H.
78	10	5	11	4	49	10
149	10	2	44	7	16	10
200	10	2	1	7	59	10
212	10	1	50½	8	3½	10
274	10	1	22	8	32	10

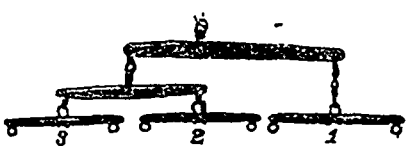
Thus it appears that a ridge of 78 yards in length requires 5 hours 11 minutes out of every 10 hours for turnings at the headlands; whereas a ridge of 274 yards only requires 1 hour 22 minutes for turnings. And in cross-ploughing and cross-harrowing on our narrow farms the loss of time is frightful to contemplate. According to my experience, a ridge of 250 yards in length is the most profitable: too short ridges, as we have seen, lose time; too long ridges tire the horses.

Lastly, as regards the faults in ploughing which are generally observable here, I mention one in particular: the ridges are never, actually never, finished at all. The last furrow should be uniform with those of the rest of the ridge, but the ploughman is very apt to miscalculate the width of the furrows near the sides of the ridge. If the specific number of furrows into which the whole ridge should be ploughed be too narrow, the last slices of the open furrow will be too broad, and will therefore be too flat. If this too broad space be cut up into two furrows, the slices will be too narrow, and stand too upright. When the last furrows are badly made, the open furrow cannot be properly ploughed out; because, if the space between the last furrows be too wide, the open furrow must be made too deep in order to fill up all the space; and if too narrow, there will not be sufficient *crumb* to make the open furrow of the proper size. If the last furrows are laid too flat, the open furrow will throw too much mould upon the edges next the open furrow, and thus make them too high. An English farmer has one phrase always on his lips when teaching a lad to plough: "Take care of your *crumb-furrow*.

This is rather prosy work, I admit, but I have succeeded in making two decent ploughmen out of two very bad ones since I have been at Sorel, and it was by constantly dinning this lesson into their ears. If any one seeks for further information on the subject, I beg to refer him to that wonderful repertory of useful agricultural knowledge: Stephens' Book of the Farm. ARTHUR R. JENNER FUST

WHIFFLETREES.

The common and simplest form for a three-horse whiffletree is represented in the annexed figure. The long end of the evener gives the horse attached to that end an equal amount of draft with each of the two others, the single horse being on



the left. The centre of the middle one should exactly front the centre of draft, to make the draft even. The chain attaching the small whiffletree marked 1, to the main evener, should be long enough to make 2 and 3 in a line with it.

HORSE RATIONS.

To feed a horse properly, according to the individual wants of the animal and the work it has to accomplish, is no easy matter. And with farm horses it is especially difficult to regulate.

Horses doing full work should be fed three times daily; if they can be fed four times so much the better. Little, given frequently, is preferable to large feeds given at long intervals. Farm horses, as a rule, are watered immediately before they are fed; otherwise immediately afterwards. Some experiments tried on worthless horses at Alfort, in France, seem to show that the latter of these systems is not the right one. The horses in question were killed for dissection after being fed. They were first fed and then given water, and afterwards killed and examined. Some of the grain which they had eaten was found undigested in the intestines, twenty feet beyond the stomach. And the waste of food in such cases is not all; for a portion of the material that is carried along undigested is likely to have an inflammatory effect upon the mucous membrane. Nor is the plan of giving a horse its fill of cold water just before eating, altogether free from objection. The time of watering farm teams does not, however, admit of much choice.

It is amongst large city studs that we find the greatest economy combined with the greatest efficiency in horse-feeding. In this respect the various tramway companies compare very favourably. Thus the Glasgow Tramways Company fed their horses at a cost of 8s 4d. each per week during the past year. And the Dublin United Tramways Company, with a stud of over 1,000 horses, professes to hold its own with the Glasgow Company. In Dublin the daily ration allowed each horse is: —

	s.	d.
10 lb. maize, costing.....	0	6½
7 lb. oats "	0	5½
12 lb. hay "	0	2
	1	2

with ½ lb. of bran daily, bringing the cost per horse to something like 8s. 3d. per week. On the other hand, it cost the Edinburgh Tramways Company 12s. 11½d. per week to feed each of their horses during last year.

At the same time we must not forget that there is a power for work in the well-fed horse which is usually wanting in the under-fed one. This was well illustrated by Col. Kingscote in a paper on "Horse Labour in Farming," read by him some short time since at the Kingscote Farmers' Club, when he showed that where the horses were liberally fed the ploughing cost 6s. 8d. per acre, whereas with the teams in poor heart the ploughing cost 10s. 6d. per acre!

Nor must we forget that horses vary a good deal in their capacity for food. And appetite, which depends on health and temperament, has as much influence as weight in determining how much a horse will eat. We have heard it said that a horse will eat 2 per cent. of its weight in dry food daily, and at this rate a horse weighing 1,200 lbs. would require 24 lbs. daily of dry provender.

The late Professor Dick found that a horse not working could be kept in fair condition on 12 lb hay and 5 lb. oats, but where a good amount of work had to be done it required 14 lb. of hay and 15 lb. of grain. Horses used for very fast work are fed considerably more grain, as much as 18 lb., or even 20 lb where they are continuously employed and have to be kept in prime condition.

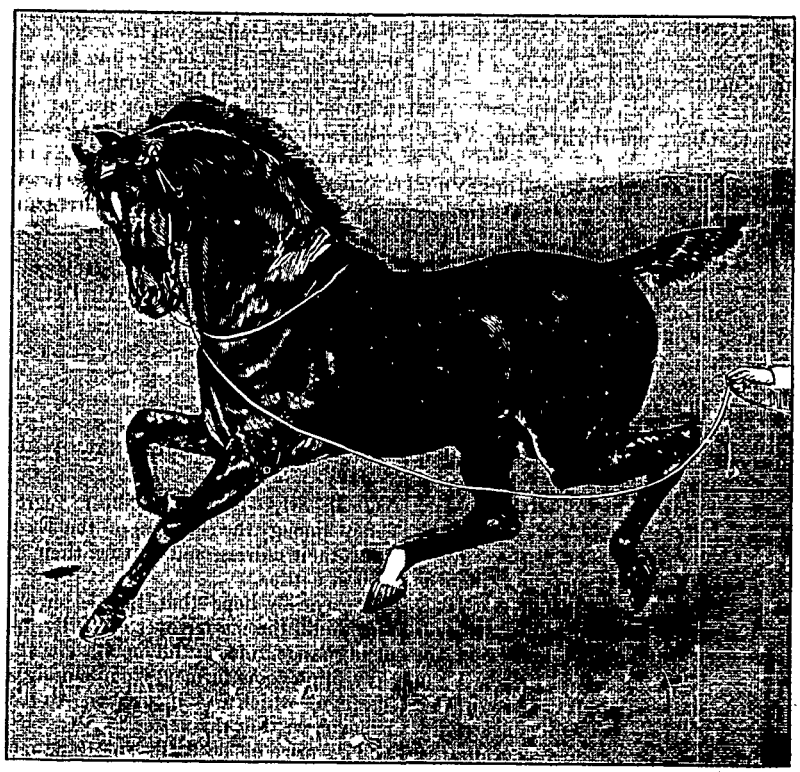
Crushed or bruised corn is more nutritious, and therefore more economical in horse feeding than grain fed whole. The most conclusive experiment on this subject is that conducted some years ago by the London Omnibus Company, who are the owners of some 6,000 horses. One half the horses were confined to bruised oats and cut hay and straw, while the other half were fed on whole oats and long hay. The ration allowed per day to each horse, on the first system, was bruised oats, 16 lb.; cut hay, 7½ lb.; cut straw, 2½ lb. The allowance on the old system was: unbruised oats, 19 lb.; uncut hay, 13 lb. The money advantage in favour of bruised oats and cut hay was fully 2½d. per day for each horse — equal to £62 10s. per day on the 6 000 horses. And this saving was accomplished without any sacrifice of efficiency, for all the drivers and those having charge of the horses agreed that the difference in the condition of the horses was decidedly in favour of those fed on bruised oats and cut hay and straw. ENG. AG. GAZETTE.

OUR ENGRAVINGS.

Hoods for sheep.
Whipple-tree for three horses abreast.
Hack Stallion, Candidate.
The Bright and the Dark side of Calf-feeding.

HACKNEY-STALLION.

The capital stallion Candidate 920, whose portrait appears herewith, carried off the champion prize at the London Show of the Hackney Stud-Book Society last March He " is a beautifully-colored rich chestnut, standing exactly 15 2 hands high, with superlatively good fore action, and great propelling power behind. His head is a model, and his neck and shoulders first-rate, whilst his back and loins are as strong as can be desired. Placed on short very powerful flat legs he walks fairly well, but his trot is grand, being distinguished by that freedom and elasticity that is so peculiarly characteristic of a good Hackney; and, when it is added that Candidate's manners in public and temper in his box are absolutely beyond reproach, it is intended to imply that, in the writer's opinion, nothing of his age has ever yet been produced to rival " him we quote from the official report of the exhibition, for a copy of which we are indebted to the secretary, Mr. Henry F. Euren, Mercury office, Norwich. The picture is re-engraved for the Country Gentleman from the frontispiece of the report. Candidate was bred and exhibited by Mr. Henry Moore, Cranswick, Hull, and comes of highly esteemed lineage.



CHAMPION HACKNEY STALLION CANDIDATE.

CORRESPONDENCE.

Sherbrooke, June 27th 1886.

Arthur R. Jenner Fust, Esq., Sorel.

My dear Jenner Fust,—I have been reading Mr. Brown's report of the Guelph Ag. College for 1879 in which he gives his experience in fattening cattle, showing that in feeding 16 steers he has sustained a money loss of $390 50. He then shows what he *ought* to have paid for them, and what he *ought* to have sold them for, and adding the value of the manure made, $269.00, he shows a profit on the experiment of $177 50.

Now my excuse for troubling you is that Mr. Brown is giving us his experience in one of the most important branches of agriculture, and one which has seen more vicissitudes in this vicinity lately than any other. I have seen all around me costly basement stabled barns, built and stocked by good judges of cattle; men who had the means and disposition to feed liberally, but after one or two years they have all given it up, and have been beating about to see what to try next. Now in Mr. Brown's balance sheet I cannot help feeling that he has made a most grievous mistake and deceived himself, and, probably, others as well.

In the first place, as he is on a Govt. farm, he does not include in his estimates of expenditure, rent, taxes, interest on the cost of stables and loose boxes, nor annual depreciation of the same, all of which the *farmer* has to allow for. But let that pass. Also, allow that he *might* have bought at a lower rate, and sold for a higher: still he has to fall back upon the value of the manure for his profit. Now, what is this manure good for? simply to be returned to the land whence it came, minus some very valuable constituents which have been taken from it by the cattle during the time of their laying on flesh and fat, plus, let us say, some nitrogen which the leaves of the growing plants may have extracted from the air. Now if this is the case, why not plough in a crop of green clover and be done with it, and *save* a $30.00 a head *loss* on the 16 steers, which is not an unfair estimate if we take his first figures and add the items of interest, taxes, rent, wear and tear of buildings and machinery, now think this over and let me know how you view the situation. Of course, in ploughing in the clover, we may lose a years rent and taxes (though not if it is the aftermath), but we increase the productiveness of the land without all this winter's work, worry, and *loss*. We could either sell off hay and grain for our profit for several years, and buy manure to replace the waste, or turn our attention to dairying or some other branch of farming—or else " sell out." But it does seem to me that if we are to look for our bread and butter to the value in the manure, which is only valuable when in the ground—we should not have to sell it even if we got Mr. Brown's price of $2.69 a ton for it at the farm—that our children must needs go hungry.

You say in one of the late numbers of the Journal, that land plaster is the cheapest form of lime we can apply. Would it answer as well as ordinary lime in making clay land more friable? I am using, by your advice, large quan-

tities of "swamp muck" as an absorbent in *all* stables, and in manure heaps, and in making composts. I use fresh ashes and muck on sandy soil, slaked lime and muck on clay soil: would plaster be better?

Your Journal I have, bound in volumes, since its commencement, and would not part with it for a good deal, and am going in for *Hampshire Downs*. Don't fail to be with us at our Dominion Show, Sep. 23rd to Oct. 1st. I am on the executive, and expect to be on arts and manufactures. I had machinery as well last year.

Believe me sincerely yours,

W. A. HALE.

Office of J. M Jocelyn, Instructor in butter and cheese making.

AGENT FOR DAIRY SUPPLIES AND APPARATUS.

Stanstead, Que., and Derby Line, Vt.

DEAR SIR:—In calling your attention to "JOCELYN'S FARM CHEESE APPARATUS," it gives me great satisfaction to be able to speak to my fellow farmers upon a subject that has occupied my whole time and attention for fifteen years, and the practice and experience gained in all those years, enables me to judge of the needs of the dairy farmer from a practical standpoint. Hence, leaving out all fine spun theories and flights of fancy, permit me to present you with some facts and figures which will open a door through which, I trust, you may see "light ahead." I ask you to take note of the following statement of facts, whether you are a patron of a cheese or butter factory or not, because there is much of the year that the cheese and butter factories are not in operation, and then it would be an inducement to better care and feeding of stock to have means of profitably working up the milk at home. All the finest cheese made in the United States is required to supply the home demand, and there is not enough made for that purpose; hence, there is a large quantity of fancy cheese imported from Europe, and our second quality of cheese is nearly all exported or used in the southern trade.

The first question that you will ask, is: Will it pay better than making butter? I answer, "yes," and will tell you why. The amount of milk required to make one pound of butter, will make two and one half pounds of first class cheese, and it is as easy to obtain 12c per pound for choice dairy cheese, as it is to get 20c per pound for butter; and the sweet whey, with four pounds of middlings added to the hundred pounds of whey, makes it of as much value for feeding calves or pigs, as skim milk, and three pounds of oil meal in addition to the above, makes it equal in feeding value to new milk, always bearing in mind to feed at blood heat.

The reasons why every farmer should own Jocelyn's Farm Cheese Apparatus, are:—

1. By its use the proceeds of the dairy may be increased at least 50 per cent.

2. The price is so low that it will pay for itself several times over in one season.

3. It is so durable that it will last with proper care, for twenty years or more.

4. It is so easily operated that a child of 12 years of ordinary strength and intelligence, can perform the whole operation by carefully studying the printed instructions that are given with each set.

5. There is a home demand for fine dairy cheese at good prices at all seasons of the year.

6. The best of cheese can be made in the winter season, thus encouraging better care and feeding of cows in that season of the year when they are generally most neglected.

7. Cows will nearly or quite pay their way through the winter, if the milk is made into cheese.

8. No farmer who keeps six or more cows, can afford to do without it.

The set is all made from the best of material, and comprises a 50 gallon cheese vat, with reservoir for hot or cold water, a curd sink, with tinned iron bottom, also tinned iron bottom encased in wood to water compartment under the cheese vat; 2 cheese moulds of a capacity of 25 pounds each; 1 six blade curd knife; 1 curd scoop; 1 thermometer; 2 followers for cheese moulds; 1 press board; 1 curd strainer; and 1 graduated glass for measuring rennet or coloring; weight of the whole about 200 pounds.

In order to induce you to order one of these sets at once, and in consideration of the dull times and low prices, I will, for this season of 1886, furnish the above named set, with full printed instructions for use, at the extremely low price of $27.50, net cash, free on board cars.

To avoid delay, please order at your earliest convenience, as orders will be filled as they are received.

Satisfaction guaranteed. Address all communications to

J. M. JOCELYN,
Stanstead, P. Q., for Canada.
Or Derby Line, Vt., for U. S.

EDITOR OF JOURNAL OF AGRICULTURE

Dear Sir,—It is with sincere regret, that I notice a tendency among the farmers of the Eastern Townships, to neglect their dairies, and to turn their attention to the raising of beef cattle.

I earnestly hope that this letter will cause some to stop and think the matter over carefully, before making this ruinous change, and if the facts below stated are the means of preventing some farmers from making a false move, from the effects of which it will take long to recover, I shall feel well paid for writing this letter.

The price of beef will surely be much lower than it is at present, within the next four years, and permit me to give you my reason for this opinion. At present prices, beef can be produced in the west at an enormous profit, and the dark outlook occasioned by the conflict between capital and labor will cause many capitalists to seek for a safe and profitable investment for their money, and it is not to be expected that the stock raisers who are reaping such golden harvests, will lack for neighbors, very long, and the result will be,—more beef, and still more, until the price is so low that there will be no great inducement for others to enter the field.

Does the present price of beef pay the actual cost of production in these Eastern townships? I think I hear you say, no. Well how will it be when the price goes down twenty five or thirty per cent? No, Sir, there is nothing but certain failure in store for those who take this step.

While the advantage in producing beef is all with the stockman of the great west, the production of cheese and butter must necessarily remain to the average farmer, for this reason: the average farmer can attend to the milking of a limited number of cows, without employing extra help, and,

when he exceeds this number, he incurs a heavy expense for milkers.

Many of our farmers would keep more cows if they could milk them, this is the chief reason why dairies of over fifty cows are rare. Leaving aside all other questions of advantage to the average farmer, this one fact is a complete defence, for all time to come, against competition in the production of cheese or butter from the more extensive stockmen of the west. Many instances have come under my observation, where, farmers have sold part of their cows for this reason: they were obliged to keep too much extra help to get the milking done. With this fact before us, it is easy to see how oleomargarine, butterine, and all the other imitations of butter come to be put upon the market. The producers of these fraudulent articles, tempted by the high price of genuine butter, and being unable to produce that, without regard for God, Man, or Devil, their sole aim to make money, the honest dairyman has been robbed of his birthright by the most outrageous swindle known since the day when Jacob cheated his brother Esau out of the blessing by imitating the roughness of Esau's hands by clothing his own in kid skins. Just at present, the discussion going on in the press concerning the imitation of butter, has a very depressing effect on the butter trade; because a person can hardly take up a newspaper now without seeing something about butter frauds; and, consequently, they are afraid to buy except where they are certain of getting the genuine article. Hence, in the cities and large towns, the consumption of butter is decreasing, and stock is accumulating to an alarming extent. We cannot expect better prices for some time to come, but rather the prospects are that butter will sell lower than it has within our memory before there is an advance.

When all imitations of butter have the marks of concealment torn away by the strong hand of the Law,—then, and not until then, may we expect fair prices for of genuine butter. I am glad to see that the people are waking up, and are beginning to assert their right to know what they are eating. Let us not rest until *all* the frauds in food are exposed, and laws made, that will put the counterfeiter of foods at least on a level with the counterfeiter of money, but in the name of *Justice* I for one propose that the crime be made a capital one. (Does Mr. Jocelyn know what a *capital* crime is? A. R. J. F.)

The production of beef, being out of the question, and the prospect for paying prices for butter very doubtful for some time, let us consider the cheese question.

Oh! I hear you say, cheese is down to nothing; but wait a little; and let us look at the question more closely.

There is a marked difference in the condition of facts that controls the demand for these two products; butter and cheese: from the blue-blooded aristocrat, down to the rat-eating Chinaman, there is not a nation or tribe, but prefers that one grade of butter, namely, the finest that can be got, and this can only be divided into two classes; salted and unsalted, while as to cheese there are so many different tastes, that a great variety of flavours, sizes, shapes, and colors, are in demand. It is easy to understand, that if we make more of one particular kind of cheese, than the lovers of that kind of cheese can or will dispose of, there is an over production, not in *cheese*, but in that particular kind of cheese; and on the other hand, if we fail to meet the wants of the public in another kind of cheese, then there is a scarcity, and high prices will prevail—not for *cheese* but for *that* particular *kind* of *cheese*.

Now this is the exact situation of the whole cheese business to-day. If people cannot obtain what they like, they will use very little of what they do not like.

There is, to-day, an over production of American factory cheese—hence, prices are very low; not for all kinds, but for factory cheese. To-day the quotations are as low as six cents for the above named cheese, while English dairy cheese is worth, from 12c to 18c, and it costs no more to produce than the other. (1) The United States does not produce above three pounds of cheese for each person, per annum, and this *tremendous* amount, about one hundred and seventy million pounds, is fully nine-tenths factory cheese of about 40 to 70 lbs. each, and as uniform in quality and flavor as it can be made. My own observation in nearly all the states east of the Mississippi river, has taught me that a small, rich, soft, full flavored, dairy-cheese is in great demand, and, such cheese meets a ready sale in all parts of the country, at good prices, even when factory cheese is entirely neglected.

There is also a large demand for Limburger and Sweitzer cheese, and several other varieties, but the English dairy cheese, is perhaps more generally relished than any other sort, and I am confident that if the American and Canadian people who are producers of cheese, would take the trouble to ascertain the wants of our own people and, then cater for *their* tastes, with half the perseverance that has been shown in courting the English market, we could double our production, and still not have a pound to spare for export, except at good paying prices.

Believing that the above is true, and expecting to see the attention of dairymen turned in this direction for a solution of the present problem; I have perfected an apparatus, that enables every farmer to make just such cheese as may be required, but it is especially adapted for English dairy cheese, and the price is very low; in fact, a farmer with six cows would save the price of the whole apparatus in one season.

I shall be happy to send descriptive circulars and other information to any of our readers who will send me their address.

J. M. Jocelyn.

Stanstead, June 1886.

In fact: "*There is nothing like leather.*" A. R. J. F.

A rare treat for me! Actually *two* letters this month; a thing that has not happened for a long time. Mr. Hale's inquiries I will answer first, as well as I can; and as to Mr. Jocelyn's observations, well, I fancy I had better leave them to the judgment of the readers of the Journal.

Mr. Hale speaks of Mr. Brown's calculations as to the loss or gain derived from the fatting of certain bullocks. I remember quite well the report for 1879, and the impression it made upon me when I read it. I had long before come to the conclusion that in fatting beasts in this country, one must expect to lose money. My calculation of the loss incurred was somewhere about fourteen dollars a head, and here, as in England, I expected to be recouped by the manure. With us, no farmer in his senses dreams of making a profit from his fat cattle, except from those fed on superior grazing land, like the Vale of Aylesbury. In Lincolnshire, in my time, where straw grows profusely, large herds of cattle were kept and fed on purchased cake and grain for no other purpose than, as it was expressed, to "tread the straw into dung." And the farmer was quite satisfied if the beasts, at the time of sale, left the manure clear of charge; looking to the future wheat-crop as his own profit.

Of course, Mr. Brown's playful way of converting real loss into an apparent profit, by charging $2.69 a ton for

(1) Where? At the last Berkeley fair—Gloucestershire—44s per 112 lbs. was the price of the very best double-Gloucester dairy cheese. My brother, Herbert Jenner Fust, a landed proprietor in that county, is my authority. A. R. J. F.

the dung, is founded on Lawes' valuation, which is something to this effect :

Estimated value of the manure obtained on the consumption of one ton of different articles of food usually consumed in this country :

Decorticated cotton-seed cake	$27.67
Linseed cake	21.52
Linseed	15.65
Pease	13.35
Maize	7.08
Potatoes	1.51
Swedes	.91
Mangolds	1.08
Turnips and carrots	.86

It is very remarkable how very small a proportion of the food consumed is retained by the animal. Taking the two elements of nitrogen and ash, for example, we find their ultimate destination to be as follows :

NITROGEN STORED UP AND VOIDED FOR 100 CONSUMED.

	Stored up as increase.	Voided as solid excrement.	Voided as liquid excrement.	In total excrement.
Oxen	3.9	22.6	73.5	96.1
Sheep	4.3	16.7	79.0	95 7
Pigs	14 7	21.0	64.3	85.3

ASH CONSTITUENTS STORED UP AND VOIDED FOR 100 CONSUMED.

	Stored up as increase	Voided in total excrements
Oxen	2.3	97.7
Sheep	3.8	96.2
Pigs	4.5	95.5

The starch, &c., are of course used up in the production of heat and mechanical work.

As to ploughing in clover, I cannot recommend it. Why not feed it off with sheep? It is, as yet, the opinion of the best authorities on agricultural chemistry that plants do not assimilate free nitrogen from the air. The real value of clover, as a manure, depends upon its root-production, and, in the four-course rotation, it is commonly said that if we (in England) can get a good plant of clover, we are sure of a good crop of wheat. The roots of clover weigh from four to seven tons per acre, and are rich in nitrogen, which they, it is reasonable to suppose, extract from the subsoil. A practical proof of this is, that the wheat crop is always better when clover has been mown twice, than when it has been grazed from the commencement : in proportion to the growth above ground is the production of roots below ground.

Land-plaster is the cheapest form of lime we can use, as 75 cents worth is a good dressing for an acre; whereas, 100 bushels of lime, the least imaginable application, would cost, besides carriage, manipulation, &c., at least $35.00! The small quantity of plaster used can have no effect in rendering clay soils friable.

I certainly recommend the use of swamp-muck as an absorbent in stables, dung-pits, &c.; but as for compost-heaps, Mr. Hale must have misunderstood me, or mistaken the opinion of some one else for my opinion. I do not think that the labour expended in making composts is profitable, except in countries where wages are very low, and I have frequently made this statement in the Journal.

The compliment Mr. Hale pays the Journal under my care is especially grateful to me, as not long ago a leading newspaper was good enough to hint that it was rather an inferior production. I don't suppose the writer of the article in question had ever read a page of the Journal, but that did not hinder him from expressing his opinion in very strong terms.

ARTHUR R. JENNER FUST.

ENSILAGE ON AN ENGLISH FARM.

The following article appears editorially in a recent issue of the Agricultural Gazette:

The testimony of a tenant-farmer, who fills and empties sixteen silos yearly, many of them of unusual size—one, indeed, with an area of 2,000 square feet, and more than ten feet deep when settled solid—must be held to be conclusive on that subject. A herd of over 300 cows in constant health; a home market for most of the milk produced—only the surplus going to London—some of it, however, yielding cream and butter, even cheese—must, we say, be held conclusive, whatever be the subject to which they bear witness. The whole field of the manufacture—between the land which yields the grass and swedes and wheat and straw, all of which, along with much purchased food, are eaten by the cows, and the satisfaction of the consumer close by with the milk, cream, butter, when produced—is covered here on so large a scale that its testimony cannot be disputed. The only weak point in the story is that it does not represent a very long experience. The farms have, we understand, all been taken within the last five years. To two of them which had been bought there have been others hired, which have been gladly given up by previous tenants. These, and one of which the tenancy was purchased, make an area of some 3,000 acres in extent, one-quarter of it arable. The soil is sand and clay, and wet and dry, and of various natural quality. There are several homesteads—and silos everywhere. Since the tenancy commenced, some five years ago, a great deal has been done in improvement of both land and buildings. A powerful bone mill has already done its work, and all the land which needed it has had a sufficient boning. Artificial manures, chiefly nitrates, have been largely purchased, too. But this operation is now believed to be completed, and the bone mill already is discarded. The purchases now are of food, not of artificial manure, and they are confined to wheat and millers' meals and Indian corn, generally at a cost not more than 4s. 6d. a cwt.—£5 a ton is the maximum. Wheat at 2s. 9d. to 3s. 3d. a bushel has been largely bought this winter. Straw, also, has been purchased, for the silage went faster than was expected, and the cows are now getting straw chaff with 10 lbs. of meal daily, and such grazing in the day-time as the pastures yield.

On the farm which we saw the other day ninety acres had been ensiled. One silo, an old barn, 35 ft. long and 16 ft. wide, with an area, therefore, of 560 ft. held perhaps nine or ten feet depth of silage when finally filled—over 5,000 cubic feet in all. The second silo had been specially erected, dug some 5 ft. or 6 ft. deep where the land was lowest, and perhaps 10 ft. deep on the higher side of the bank, and standing 6 ft. to 10 ft. above the ground. It was of irregular rectangular form, with an area of, at least, 2,000 square feet. The two together hold more than 25,000 cubic feet. They had been filled during four weeks in July and August last year—filled up thrice and well trampled down by men and

horses during the process, and finally covered with half a foot of sand wheeled on to the top, with no intervening screen, whether of paper or of wood. This sand was taken off bit by bit, as the mass was cut down in sections, like a rick, from top to bottom; and 150 to 180 cows were fed on it between the end of October and March. During 150 days they received between three and four tons daily, corresponding to nearly six tons of grass per acre off the ninety acres that were ensiled; corresponding also to about 40 lbs. a day apiece upon an average; and corresponding to some 40 lbs. per cubic foot of the silo space, so far as that was filled. And all of these figures are consistent with each other and with ordinary experience.

But the silage was not evenly administered. The cattle, allowed during the day access to the pastures whenever they were green—*i. e.*, except when the snow had covered them—had there had swedes scattered for them over the land, which they dealt with as they chose; and sometimes, when this was not available, they had almost as much silage, along with a little meal, as they chose to take. The store then dwindled rapidly, and that, with the unusually late season, has involved large purchases of straw and unusual purchases of meal this spring.

The silage treated in this wholesale manner, both in the making and in the use of it, has been perfectly satisfactory both to the cows and to those who drink their milk. That there has been, nevertheless, the usual abominable stench was plain from such remnants of it as regaled us when we were over the place a few days ago.

Of the place itself something must be said, for it is to a large extent the creation of the tenant, who holds a lease of twenty-one years. The materials employed are for the most part railway sleepers and corrugated iron. One large cow-house, with standing room for 144, covers about 70 ft. by 120 ft,, thus accommodating four rows of thirty-six cows each, with 3ft. 2 in. to 3 ft. 4 in. apiece of standing room, and with ample gangways both before and behind. The feeding space between the two rows of heads facing each other has a gangway of 7 ft. wide, with railway for the carriage of food; and the troughs, 2 ft. wide on the ground, are also in the open space—making 11 ft. in all between the rows of posts and hanging chains—thus placing the heads in the open. They are held midway between the posts, with, however, ample liberty of lateral movement, by a chain round the neck attached to the central link of a looped-up chain fixed between each post and its neighbor. The troughing in several horizontal sections—for the surface falls somewhat from one end to the other, so that the urine in the gutter runs away—has an inch or more of water let into it before feeding time; the straw chaff in quantity enough is thrown into it from the railway truck, the meal is shoveled on to this and simply trod in, or with the back of a rake thrust into the chaff and water; the whole is thus, as it were, sodden together. The cows come trooping in from the field. They stand on a floor partly the original sand and partly wooden sleepers—a level four or five inches higher than the gutter behind them. This area has had some sand brought in on the line of railway at the rear of each row, and scattered over the lair; no other litter is required or used. Each cow goes to its usual post; the two half-chains, joined in a central link, which have been hanging on to the midway post on either side, are hocked round the neck of each; and they buckle to at the keep, whether of silage and a little meal, or straw chaff and much, before them, with eagerness and gusto. When the food is getting finished, the foreman goes round and wipes the udder of each cow; and some twelve milkers, men and boys, having washed their hands, set to the work of milking. The milk is passed through a sieve over a cooler into the scoured-clean "churns;"(1) and these are sent to the neighboring towns or to the station for London—the morning's milk ready for breakfast here, or for tea-time there.

That is a rough general report of the experience which we heard and saw last week. It is chiefly in its relations to the silage question that we describe it here. The silage, we were assured, roughly as it is put together and protected, is all of it welcome to the cows. A little is mouldy around the walls, but it is all eaten up. The 90 acre area of which we heard was not all old grass. Much was clover—for the tenant is encroaching on the plow land, laying it down with properly-selected seeds—fescues, timothy and cocksfoot, rye grass, meadow grasses and clovers. White clover and alsike are sown afterwards if there are any patches getting bare. That and manure will make a pasture ultimately.

Eng. Ag. Gazette.

SHEEP WASHING.

A correspondent suggests that, "among the numerous subjects on farming that deserve discussion, there is the question—Why should sheep be washed? Would we, for the benefit of the sheep, throw them into cold water; and if it were not for washing, should we not shear our sheep earlier, and at more convenient times"? He adds that the percentage of washed wool from the Colonies is continually decreasing.

The question here raised is of all the importance indicated. We shall be very glad, therefore, if practical men will favour us with their opinions for or against the ancient practice of sheep washing. The answer must be of equal interest to wool-sellers and wool-buyers. Let us, then, hear the arguments of both parties. If there is room for antagonism between them in this matter, let us have it made perfectly clear. It is true that the percentage of washed wool from the colonies is decreasing, but there may be reasons for that which will not bear examination from the standpoint of a British sheep-farmer. Many of the American wool-growers are also giving up the practice of sheep-washing, and the principal reasons they allege against it are (1) that buyers will not pay enough extra for washed fleeces to meet the cost of washing, together with the shrinkage in the weight of the wool, and that, therefore, the slovenly man is the gainer; and (2) that the washing can be done cheaper after the wool is off the sheep than before. In this country, however, it is seldom that any extra expense is incurred when sheep washing; the shepherds, as a rule, do the work themselves, and their wages have to be paid whether the washing is done or not. Besides which, all the labour incurred in washing is saved in shearing, a washed sheep being far easier clipped than an unwashed one. Nor does the American experience of wool buyers hold good in this country, for washed wool is here worth quite a 1d. a pound more than unwashed, and so long as wool-buyers act up to this distinction, as they now do, it is the interest of the flockmaster to wash his sheep. If the unwashed wool is exceptionally dirty, the difference in price is so much the greater. The necessity for washing is not, of course, equally great in all cases. Long-woolled sheep and sheep that have been folded on turnip land need it more than short-woolled sheep and sheep that are all their time on clean pasture. We must keep these facts in view when looking at the question as a whole, and allow that "circumstances may alter cases." But, after all, it is wool and not dirt that is the marketable commodity in question, and wool-buyers soon find out the painstaking ones amongst wool-sellers, and appreciate them

(1) *Churn*, in the English dairyman's language, means, here, a large pail holding twenty gallons or so. A. R. J. F.

accordingly. A good many clips of wool in this country are still sold by *character*, going year after year to the same buyers, who, having had them once or twice, will afterwards bid for those clips without seeing them—a very unlikely thing if selling wool with the dirt in it ever becomes the fashion.

The Bradford Chamber of Commerce, the most influential company of wool-buyers in the world, have recorded their opinion on the very point at issue. "What is wanted" they said, "is more care and attention to this part of his "business on the part of the British agriculturist; and as "the out-spoken opinion of this Chamber may be of service, "the committee appointed to report on the subject venture "to say that in this matter an amount of culpable slovenliness "prevails on the part of the farmer which in any other "branch of our national industry would not be tolerated." If the Bradford Chamber of Commerce have seen reason to alter their opinion since they reported to Earl CATHCART in the above terms, some few years ago, we shall be glad to have intimation of it.

Let us make sure that those who complain of not getting as much more price for washed wool as will pay for the work, and make up for loss of weight, really washed their sheep in the way they ought to have done. Was the wool really clean, or was it smudged by driving the wet sheep along some dusty road as they came from the washing pool, &c.? And was the necessary time allowed to elapse between washing and shearing for the yolk to rise again in the wool? The yolk comes from the skin, and not from the wool; and, therefore, if the yolk is up again before shearing the loss of weight of wool by washing, as asserted by some, is a pure fiction. That there is a loss in the weight of the fleece we do not deny; but it is only the dirt—the unmarketable commodity—that is gone. It is equally absurd to say that the washing can be done cheaper after the wool is off the sheep's back. Wool is never so well washed, and never with so little injury to the fibre as when it is washed on the sheep. The increased severity required to get dirty wool clean in the process of manufacture is injurious, and consequently reduces its value. Our flockmasters, we fancy, are cute enough to see that this reduction in value, if suffered at all, must fall upon them, and not upon the manufacturer, who can protect himself by paying a smaller price for the dirty wool. Nor do we believe that washing is injurious to the sheep, but the contrary, when done at the proper time. In the hope, however, that a discussion will follow the appearance of this article in our pages, we need not say more on the subject at present.

Eng. Agricultural Gazette.

COMPLETE FOODS.

Naturally, grass is a complete food for all herbivorous animals. Farm stock of all kinds will subsist upon grass when it is young and succulent. The common June grass of the Northern States, the Kentucky blue grass of the South, and the *Poa pratensis* of the botanists, is well known as the best pasture grass and as giving the enviable character which the best dairy regions possess for choice butter and cheese, and the best pasture localities claim for fine cattle, sheep and horses. This grass has the following composition.

COMPOSITION OF KENTUCKY BLUE GRASS HAY.

Water	14.30	Carbo-hydrates	44 96
Mineral matter	4.46	Proteine	11.54
Fat	4.24		
Nutritive ratio	1 to 4.8		

This is seen to be very nearly a perfect food, containing the nutritive elements in almost precisely the requisite proportion, which is one of proteine to 5 of carbohydrates. Some other excellent pasture grasses have the same comparative composition, as redtop, 1 to 5.4, and orchard grass, 1 to 6. When these grasses are fresh and in a growing condition their nutritive elements are more easily digestible than when they are dried and in the form of hay, because of the large quantity of water contained in fresh herbage and the soluble condition of the fibre at this period. For this season hay alone is found not to be a satisfactory food for cattle and horses, although this is probably due to the necessity for a larger ratio of carbonaceous elements is the cold weather, when the vital heat is heavily drawn upon.

But farmers cannot pasture all their stock in the summer or feed only hay in the winter. A large proportion of the feed must be made up of other fodder, as cornstalks, straw, etc., and these are far from being well-balanced foods. For instance, the following kinds of green and dry fodder commonly used are seen to vary considerably as to their nutritive ratio:

NUTRITIVE RATIO OF VARIOUS FODDERS.

Green fodder corn	1 to 9	Wheat straw	1 to 45
Green oats	1 to 7	Rye straw	1 to 46
Young clover	1 to 2.5	Oat straw	1 to 29
Green pea vines	1 to 3.5	Pea straw	1 to 12
		Dry corn stalks	1 to 34

These figures show the great difference which exists between green and dry fodders of the same kind, and also how incomplete the dried fodders are as food.

As it is necessary, however, for farmers to use these dry fodders, it is indispensable for them to preserve their stock in healthful condition by using some mixtures of other substances with the coarse feed. Without this addition cattle can merely subsist through the winter, as is the common case with cows which are fed upon straw and cornstalks alone, and come out in the spring barely able or even unable to stand, from weakness induced by the waste of muscle for want of sufficient nutriment to renew the constant exhaustion of it. A cow fed upon wheat straw gets but one pound of muscle-forming nutriment to 45 pounds of carbonaceous elements, and these go mostly to sustain the animal heat, and to procure this is obliged to consume nearly 150 pounds of the straw. This explains clearly why straw-fed animals fail so miserably in the spring after several months of partial starvation. Dry cornstalks are but little better than straw, and require rich supplementary food to make up for their defects.

What supplementary foods, then, are the best for making for making up an equivalent food which contains the right proportion of nutriment? Of these there is a large choice. Some of the most easily attainable are mentioned, with their nutritive ratio, as follows:

Rye, nutritive ratio	1 to 7
Oats, nutritive ratio	1 to 6
Corn, nutritive ratio	1 to 8 6
Peas, nutritive ratio	1 to 2 9
Wheat bran, nutritive ratio	1 to 5.6
Middlings, nutritive ratio	1 to 7
Starch waste, nutritive ratio	1 to 5.3
Brewers' grains, nutritive ratio	1 to 3 (1)
Linseed-oil meal, nutritive ratio	1 to 2
Linseed-oil, new process, nutritive ratio	1 to 1.4
Cotton-seed meal, nutritive ratio	1 to 1.8

(1) When dried at 212° F., I presume. A. R. J. F.

All these foods vary in a contrary direction from the coarse fodders, and although they are highly nutritious, yet the nutriment is decidedly unbalanced, and therefore unhealthful and productive of disease. Wheat bran approaches most nearly to a complete food; oats are the next to bran in the list, and thus oats, with occasional feeds of bran, scalded to help its digestion and given with a portion of hay is a complete but costly food for horses. Economy, however, has to be considered, and it is one object in discussing this subject to show how cheaper foods can be substituted for the more costly ones, with equivalent results.

Corn, it is seen, contains 50 per cent, excess of carbonaceous matter, which easily explains how corn-fed animals, (swine for instance), become diseased by overloading of the blood with these elements, and depriving it of its due proportion of nitrogen, the excrementary organs being unable to dispose of the overplus. Cottonseed meal is another ill balanced and dangerous food which is to be used with the greatest caution to avoid excess.—*Times.*

GRASS LANDS

At any season we may very usefully take up the subject of Grass Lands in its various aspects — seeding, whether in spring or autumn, top dressing, laying up for the hay crop, summer grazing and soiling, or cutting for hay or ensilage. With the latter aspects however, we cannot on this occasion deal, and would very briefly refer to those of more immediate interest, viz., seeding, top dressing, and laying up for mowing.

To ensure success in seeding to grass, the land must be (1) perfectly clean, (2) in good tilth, and (3) in at least fair manurial condition; and (4) good seeds of the right kinds and in the right quantities must be used. Where the seeds are sown after a root crop, as is generally the case, there should not be the slightest difficulty in fulfilling the first requirement. As regards tilth, when the "seeds" are sown along with a corn crop, this is best attained by allowing the corn to braird before sowing the grasses and clovers, when the latter need only be rolled in. Feeding a crop of turnips on the land by sheep is one of the best preparations for the young grasses from a manurial point of view, provided due care is taken to plough in the manure as fast as the turnip fold is shifted. Where turnips have shown any appearance of finger-and-toe, the land should be limed if it is to be laid down to permanent pasture.

The seeds sown must vary in kind and quantity according to the nature of the soil and the object of the pasture. "If a "pasture is generally to be mown for hay, then varieties of "grasses should be chosen which come to their greatest per-"fection at the making season. If, on the other hand, the field "is to be generally grazed, a selection should be made which "will ensure a continuation of feed throughout the whole year. "Pastures for sheep should be formed of finer, closer-grow-"ing varieties than those to be fed by cattle, and bullock "pastures may contain many varieties which it would be "useless to sow on a trainer's paddock." The use of short-lived grasses and of biennial clovers, coupled with an insufficiency of proper seed, is, in Mr. Faunce de Laune's opinion, the main cause of the deterioration of new pastures after the first two or three years. As a rule not less than 40 lb. to 45 lb. of seeds should be sown in a permanent mixture. Want of space prevents us giving the details of various mixtures, but it may be well to give Mr F. de Laune's mixture of seeds for good or medium soils, which is as follows:—Foxtail, 10 lb.; cocksfoot, (1) 7 lb.; catstail, 3 lb.; meadow fescue, 6 lb.; tall fescue, 3 lb.; crested dogstail, 2 lb.; rough meadow grass, 1½ lb.; hard fescue, 1 lb.; sheeps' fescue, 1 lb.; florin, 1½ lb.: yarrow, 1 lb.; perennial red clover, 1 lb..; cow grass, 1 lb; alsike, 1 lb.; Dutch clover, 1 lb.—total, 41 lb. per acre. This, it will be seen, excludes rye-grass, which few Northern farmers would care to do.

For rotation grasses from 22 lb. to 30 lb. of seed per acre is usually given, according to the number of years' lay. Thus, on medium soils, Mr. Hunter recommends, (1) for one year's lay, 22 lb. of the following mixture:—Italian rye-grass, 5 lb.; perennial rye-grass, 3 lb., cocksfoot, 3 lb.; catstail or timothy, 2 lb; alsike clover, 1 lb.; broad red clover, 6 lb.; and trefoil or yellow clover 2 lb. (the foregoing for mowing; if for grazing, replace 2 lb. red clover by that quantity of white clover); (2) for two years' lay, 25 lb., in the following proportions: Italian rye-grass, 4 lb.; perennial rye grass, 5 lb.; cocksfoot, 4 lb.; meadow fescue, 2 lb.; catstail, 2 lb.; alsike, 1½ lb.; broad red clover, 4 lb.; white or Dutch clover 1½ lb.; and trefoil 1 lb.; and (3) for three or four years' lay, 30 lb., as follows: Italian rye-grass, 3 lb.; perennial rye-grass, 7 lb.; cocksfoot, 6 lb.; meadow fescue, 3 lb.; hard fescue, 1 lb.; crested dogstail, 1 lb.; catstail, 3 lb.; alsike, 1½ lb.; broad red clover, 1½ lb.; perennial red clover, 1½ lb.; and white clover, 1½ lb.—Mr Sutton's superb volume on the grasses may also be consulted on this, as on every other practical point in grass land management.

As a top-dressing for "seeds" to be cut for hay, we know of nothing more effectual, in the shape of artificial manures, than equal mixtures of superphosphate and nitrate of soda. On light soils kainit may be added to the mixture with advantage. The quantity of the mixture that can be profitably applied may vary from 3 to 5 cwt. per acre, according to the condition of the land and the demands to be made upon it. As a top-dressing for permanent pasture, where the land is poor, and farmyard manure is not available, 1½ cwt. to 3 cwt. each of bone dust, Peruvian guano, and kainit will be found to produce a good and durable effect.

It is bad policy to pasture mowing lands late into spring, but when there is not a full bite of grass on the other fields, and hay, straw, and roots are already exhausted, there is sometimes, in exceptional seasons, no alternative. If possible, however, the fields to be mown should be laid up early in April at latest. Grass meadows should first be looked over for mole hills, and if any are seen these should be levelled without baring the spots; then the whole meadow should be well chain or bush harrowed; next, all stones, rubbish, &c., picked off; and the ground finally rolled with a plain iron roller. (2) Clover "seeds," rye-grass, and rotation grasses intended for mowing should, at the time of laying up, be picked clean of all surface stones, &c., and well rolled. Where there is a well-established plant, a turn of the bush or chain harrow first will also do these good. If any top-dressing is to be given, it may be applied after the rolling, if the weather is showery at the time; but in a very dry time, we prefer to brush it in and follow with the roller. *Eng. Ag. Gazette.*

PLASTER.

Land plaster, when perfectly pure, contains (per cent) sulphuric acid, 46.50; lime, 32.56; water, 20.90. When subjected

(1) Cocksfoot is orchard-grass. Yarrow, Italian ryegrass, and trefoil or hop-clover, are no good here. A. R. J. F.

(2) Ah! If our farmers here could only see an English meadow in the middle of May after the treatment mentioned in the text. A. R. J. F.

to heat in iron vessels it parts with its water, and then contains, of course, a larger percentage of sulphuric acid. In this condition, however, it is not sold as a fertilizer, but is used for "hard finish" on walls, etc. Commercial plaster of the best quality is so nearly pure that the Nova Scotia plaster has usually as much as forty four per cent of sulphuric acid, but the New York plasters are much poorer, having often twenty-five per cent, or more, extra of common lime in them.

We have not the least doubt that the value of plaster in promoting the growth of crops depends entirely upon the sulphuric acid in it. But how that acid acts no one in any given case can positively say. One way it doubtless acts is in making the natural potash and phosphoric acid of the soil available. When it does this its action tends to the ultimate exhaustion of those elements in the soil. But it probably also acts as an aid to "nitrification"—that is, the formation of nitrogen compounds in the soil. Where the proper conditions exist in the presence of lime, sulphuric acid, potash minerals and vegetable and animal matter, joined with a proper moisture and temperature, nitrification proceeds very rapidly, and the land is greatly enriched. The result of nitrification is the production of nitric acid, which unites with potash to form nitrate of potash (saltpetre). This is a powerful fertiliser. The sulphuric acid will also act directly to form sulphate of potash, and also to take lime from the insoluble forms of phosphate of lime, making them available as plant food. In this way a small dressing of plaster may cause the development of as much plant food as is contained in a good dressing of dung.

DR. HOSKINS.

Ensilage experiments at Bristol

Owing to the exertions of Alderman Smith, who for 20 years has been farming largely at Westbury-on-Trym, the Bath and West of England Society decided upon having a series of experiments in ensilage in connexion with the Bristol meeting. A local sub-committee was appointed, and its report has been drawn up. It states that it was appointed to conduct certain experiments, with a view to ascertain comparative results, as shown by chemical analysis, from grass from the same field made into (1) hay, (2) sour ensilage, and (3) sweet ensilage. After consultation with Sir J. B. Lawes, Dr Gilbert, Mr H. M. Jenkins, and Mr Georges Fry, of Chobham, it was decided that about five tons of hay, 7½ tons of sour ensilage, and 7½ tons of sweet ensilage should be made, the sour and sweet ensillage to be made in lots of about 2½ tons each, each made in a separate silo. Sufficient old pasture was rented at Bower Ashton, with the use of a barn in which the six silos could be erected. It was an instruction to the sub committee that the grasses and herbage growing on this pasture should be examined and classified, and that the proportion of each of the various plants found thereon should be carefully estimated and recorded. When mowing commenced samples of the grass were taken from each load as carried to the barn, and sent to Dr Voelcker for analysis; and the area of the pasture was so subdivided that the hay and the contents of each silo should be fairly representative of the herbage growing over the entire area of the pasture mown. The hay was to be made in the usual manner. Six substantial, water-tight wooden silos were erected, each having a capacity of 250 cubic feet, the details of the filling of which were:—

No. 1. Sour Ensilage.—Rammed and compressed as rapidly as possible. Temperature kept down to 50 deg. Fahr. Silo filled and covered in one day. It was anticipated that the only acid present in this ensilage would be lactic, and perhaps a little butyric.

No. 2. Sour Ensilage.—Temperature kept below 120 deg. Fahr. Trodden and compressed as much as practicable in a general way. The filling extended over a week. The acid was expected to be both lactic and acetic.

No. 3. Sweet Ensilage.—Made by carting the grass as cut direct to silo, treading it well in at the sides, but not in the centre. Temperature from 140 deg. Fahr. to 150 deg. Fahr. This should produce a fruity type of sweet ensilage.

No. 4. Sweet Ensilage.—Grass allowed to lie after cutting one day in the field, and then made as No. 3. It was intended here to produce an aromatic type of sweet ensilage.

No. 5. Sour Ensilage.—Grass to be chaffed and the silo filled at once and covered as in No. 1.

No. 6. Sweet Ensilage.—Same as No. 3, with the exception that the grass was chaffed.

To guard against error or mismanagement the services were secured of Mr W. J. Malden, who for some years has been manager of the experimental farm at Woburn, and who was trained by the late Dr Voelcker. An offer of Mr George Fry to send his bailiff to assist during the filling of the silos was thankfully accepted, as he has had much practical experience in ensiling at Chobham. The sub-committee conclude by stating that "it does not consider it to be within its province to offer any opinion of its own upon the results which have been obtained, or as to what place ensiling will ultimately take in our agricultural economy. These points will, no doubt, be comprehensively studied by the authorities on agricultural chemistry, and form the subject of a special essay in the ensuing number of the society's *Journal*."

The experiments being completed it may be said that they give, for the first time, what may be well called a base line for the study and practice of ensiling. In the case of each silo the results show exactly the results expected, while they also demonstrate that in ensilage we have a food nearer to that of the natural herbage in its fresh and green state than can be obtained by any other means. They also show that chaffing the green crop before putting it in the silo—which means additional cost for labour does not offer commensurate advantages. It is also clear that the preservation of ensilage is a matter quite within control, and that either a sour product or a sweet fruity or a sweet aromatic food can be produced at will. These are valuable results, and the details of this the first attempt at accurate and detailed experiment will form a valuable guide to the practical farmer in making his essay in preserving green crops for winter and spring feeding.

On the main lessons of the whole experiments, Professor Ramsay says.—"The general result of these experiments appears to be that there is a loss of nutritive material in converting grass into ensilage; and that the albuminoids, or flesh-forming constituents, are more reduced by the conversion into sour than into sweet ensilage. The loss is not compensated by the acids produced by the fermentation, nor have they any claim to be regarded as foods, however they may act as stimulant to digestion in causing woody fibre to be more readily assimilated by the animal organism. On the other hand, the conversion of grass into hay is accompanied by no loss of nutritive material, although the loss of water may tend to render the food less easily digested. The practical points for the farmer to consider are, what is the value of the albuminoids lost during the process of ensilage, and what is the extra cost of dealing with so much waste of water; as against the advantage of being able to secure crops which in so capricious a climate as ours would otherwise be frequently lost."