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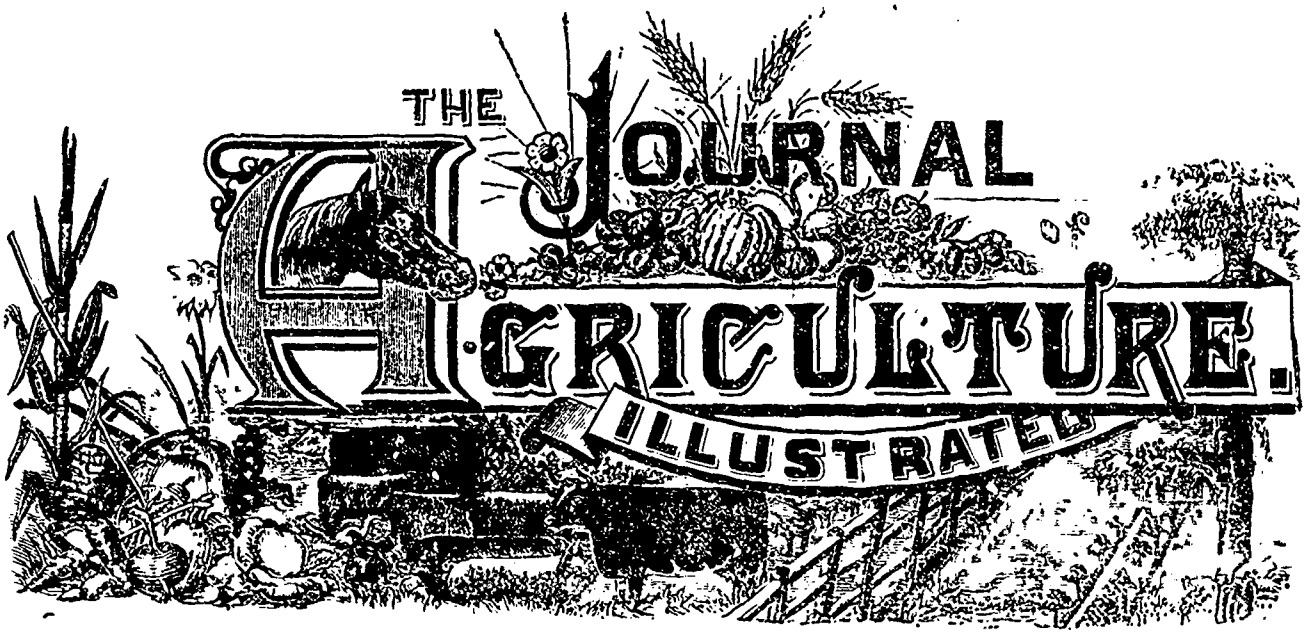

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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—EDITORIAL MATTER. All editorial matter should be addressed to A. R. Jenner Fust, Box 109, Lachine, Que.—or to the Director of Agriculture, Quebec.

OFFICIAL PART.

Table of Contents.

Cold Water for Cattle in Winter.

In January last, at the Meeting of the Dairymen's Association, one of the lecturers expressed himself as being in favour of allowing animals to go out in winter, for the purpose of taking the air, and of being watered at the springs. We then understood M. Marsan, professor of agriculture at L'Assomption, who made the above statement, to recommend the practice of letting cattle out every day in fine weather, and in our report of the meeting, we made him say: *every day except during storms.* At the foot of the report we placed a note to the following purport:

"As the session was drawing to a close, it was impossible to discuss this most important question, against which we should most emphatically have given our decision."

To-day, we propose to return to the matter, and to express our ideas on the subject as we should have done at the meeting, had there sufficient time. To do justice to M. Marsan, we will state, in the first place, that we have attributed too wide a sense to his words, *every day in fine weather*, by adding the words, of our fabrication, *except during storms.* We have received a letter from the lecturer, in which he explains his views clearly, and we will quote an extract from it in order to start the discussion free from any misunderstanding:

"I did, indeed, say that it was advantageous to the health of the stock to turn them out for a little while every day *in fine weather* to make them take some exercise. By fine weather-days, I do not mean days without storms, but only sunny days when the temperature is not low. Moreover, while they are out, the cattle must be kept moving, and not allowed to stand shivering about. For example: this winter, the stock were not allowed to go out during the whole month of January. It is after having observed the effects of *constant* confinement to the house, in winter, that I have adopted the practice of turning cattle out as often as possible, a practice which they (*elles*—feminine. Trans.) are all the better for, and in this I have been guided by the advice of many practical men."

"Mr. Lynch, in his *Dairy-Practice*, p. 4, recommends exercise for cattle when it is fine enough."

"Last week I heard at Montreal that a well known Eastern Townships' farmer kept a beaten road open all the winter, and made his stock take a turn on it every day for the very objects I have indicated."

"As to watering cattle in the open air, I did not give a decisive opinion on the merits or demerits of the practice. I only remarked incidentally, that many good Scotch farmers were in the habit of *turning out their cattle for exercise every day, and of watering them at springs or troughs.*

In fact, I cannot, as a principle, recommend the practice of watering stock in the open air in winter, though in some cases the injury done by it may not be perceptible. At the Portage farm, our beasts are always watered in the house, where water is always before them. But I know that many of the best cattlemen on the Island of Montreal invariably water their beasts in the open air. Even if they do not treat their milch-cows so, they do their other beasts."

"I can understand that in your climate below Quebec, the turning out of cattle in winter cannot be done so often as in the district of Montreal, but, given a favourable temperature, the reasons for the practice are as good for the farmers below Quebec, as for those above that place."

M. Marsan's letter modifies considerably the purport of his speech at St. Hyacinthe as far as concerns the Eastern part of the province, where, except on very few days, in peculiar winters, it is always too cold to turn cattle out. Last winter, we had not one sufficiently mild day. But we go farther than he, and we assert that in no part of our province is it right to turn cattle out to exercise, and it is especially wrong to water them at a spring. It is true that M. Marsan did not intend, as we gather from his explanatory letter, to recommend the latter practice, but another farmer did, advising the watering of cattle at the months of drains. For this reason, we think it well to discuss the value of this proposition too.

Mr. Jenner Fust, of the *Journal of Agriculture*, appreciated our ideas on the matter, as he showed when, speaking of the question discussed at the meeting, he said: "M. J. C. Chapais declared himself to be entirely opposed to this practice. As for me, *distinguo*; milch-cows ought to be kept in from the 1st November to the 10th April, and their water should be of the same temperature as the cowhouse. From the above date, they ought to gradually *hardened off*, like hotbed plants, unless they are intended to be kept in the house all the summer on green-meat. Young stock will be none the worse for out-door exercise in a sheltered yard." Mr. Jenner Fust lives at Lachine, near Montreal.

The exposure to the external air in winter of milch-cows is, in reality, the most injurious form of this mode of treatment; as is that of watering them at springs, which are generally icy cold. But, for farmers in general, we contend that no animal, without exception, can be allowed to remain out of doors in winter without injury, unless it be for working purposes, and that the injury is two fold, affecting both the farmer's purse and the animals' health. To prove this statement, we will remind our readers of some of the principles that govern the feeding of cattle, and the effects that follow. In order to be well understood, we will give some extracts from a relatively recent publication on cattle-feeding, by M. Jules Crevat, which was honoured with the applause (*couronné*) of the French Agricultural Society in 1885, and the well-reasoned *data* of which it would, in my opinion, be hard to confute.

In order to understand the argument of M. Crevat, we must understand a term he frequently uses: *calorie*—(a modern scientific term, signifying, I presume, in English, *heat-unit*. A. R. J. F.) This term he explains as follws:

"For the unit of matter the weight of 1 *kilogramme* (=2.20 lbs.), and for the unit of work 1 *kilogrammètre*, have been assumed. The latter represents the force required to raise 1 kilogramme, vertically, 1 *mètre* (=39 37 inches) high, time being beside the question.

"The heat-unit is taken as one *calorie*, or the amount of required to raise 1 *kilogramme* of distilled water (=4¼5 of an imperial quart) by one degree of the centigrade thermometer.(1)

"By a number of most ingenious experiments, modern physicists have proved that it requires about 425 *kilogrammètres* of work to produce 1 heat unit—the greatest discovery of modern science.

"An animal being a living piece of mechanism, must be always in motion, for *motion is life*.

"By its anatomical construction, the animal machine can only do its work at a temperature more or less elevated, varying according to its kind and its environment, which demand a certain amount of heat.

Motion and heat being essentially diffusible, that is, having a tendency to act in every direction and through every space, it is clear that in the animal machine there will be a constant loss of heat and of motion. The animal, then, will exact a certain quantity of heat to maintain its temperature, and a certain quantity of work, in the mechanical sense of the term, to maintain its motion.

On the average, it may be calculated that a full grown bullock, weighing 1100 lbs., kept idle in a temperature of 12° C. (=53° F) will lose daily an amount of heat equal to 16,000 units (*calories*), of which about ⅔ represent the heat radiated from the surface of its body, ¼ the heat expended by the evaporation of sweat, whether through the skin or by the lungs, the remainder being employed in warming the drink and food, as well as the air it breathes."

Thus, one-twelfth of the heat obtained from its food is expended by the animal in warming its food and drink, and the air it inspires.

We say, the heat obtained from its food, for the author tells us afterward, "that one part of the elements of the food, in contact with the tissues, fixes itself, assimilates with the body, properly so called, for its support and increase, while another part undergoes, in contact with oxygen, a genuine (*eremacausis*) slow combustion, destined to produce the heat necessary for the proper working of the animal machine.

As we saw just now, the loss of heat by radiation from the body is very considerable—⅔ of the entire loss. If it be two-thirds in the case of a bullock kept idle in a cattle-house at a temperature of 53° F., what will it be with the same animal strolling about in the open air in winter? And, again, if the beast expend ½ of its heat in warming its food at an ordinary temperature, it must needs expend much more in warming ice-cold water! and, thus, the remedy this great waste of heat, the quantity of combustibles, that is, of food, must be increased. So much for the question as regards its economy.

Now as to the health part of the business: M. Crevat shall tell us what he thinks of cold water for stock: "The temperature of their drink should be about the same as the temperature of the bodies of our cattle, that no sudden change should be caused in the heat of their bodies, which would always injure the regular process of their functions. A temperature of from 50° F. to 100° F. is suited to those beasts that drink water unmixed with other things; if hotter, it would be less aerated, insipid, and indigestible; colder, it might arrest the digestion, produce colic, suppress perspiration, and cause serious complaints. Nine-tenths of the diseases prevalent among our stock come from the general or local suppression of cutaneous or pulmonary perspiration."

It is for this reason, we will add, that cows frequently abort from no other cause than the imbibition of *cold* water. And more; as a general rule, farmers who water their cattle at springs, have no means of watering them in their barns.

(1) The centigrade thermometer, the one used in France, starts from the point of melting ice, equal to 32° F., and makes one hundred divisions between that and boiling-point. Hence to convert Centigrade indications into those of Fahrenheit it is clear we must multiply by 1⅘ and add 32. Thus 40 degrees of. centigrade=⅘×9=7232+=104° Fahrenheit; and the boiling point of centigrade, multiplied by ⅘+32=212° the boiling point of Fahrenheit's scale. Celsius, the inventor of the centigrade, was a Swede. A. R. J. F.

Whence it comes, that in fine weather or the contrary, their stock must go out of doors to drink, and many a time it happens that, annoyed by the wind and drifting snow the poor brutes return to their stalls as thirsty as when they left them; and so, the next watering time finds so parched with thirst that they swallow an extra quantity of icy-cold water. Thus, not only the in-calf cows but the whole of the stock suffer from this enforced abstinence followed by an excess on the other side.

Let us sum up our argument:

1. As to the economical view; a beast that goes out of doors in cold weather, though it may be fine, will take much more food to keep itself in good order, whatever may be its destination (for the butcher or for milk production. Trans.), than a beast which is always kept in a barn well ventilated and sufficiently warm.

2. For the same reason, the beast that drinks *cold* water, will be more costly to its owner.

3. As regards health; drinking *cold* water exposes cattle to the attacks of colic, diarrhœa, chills, checks of perspiration, abortion, diminution of milk production, &c.

J. C. CHAPAIS.

(*From the French.*)

A most irrefragable argument and well worthy the attention of all our readers. I wrote much in the same sense in the 4th volume of the Journal, p. 151 and elsewhere, in a series of articles published about that time. Still, I must hold with the practice of giving young stock exercise on every fine day throughout the winter, feeling convinced by long experience that the benefit they derive as regards health, and the free growth of their limbs, joints, &c., far overbalances any extra consumption of food. A. R. J. F.

DE OMNIBUS REBUS.

July 1st, 1888.

State of the crops.—In this neighbourhood, as well as in many parts of Ontario, the hay-crop is the worst known for years. There seems, however, to be, on well-farmed lands, a superabundance of straw, and it is to be hoped that, during next winter, a proper use will be made of it.

Of all the different sorts of straw that of pease is the most valuable, especially for sheep. Then follow, in order of merit, oat-, barley-, and wheat-straw. Oat-straw, when cut early and well saved, is as useful as half the late-cut hay we meet with in this province; in fact, it is really better than a great deal of the leafless clover brought to market.

To prepare straw for animal consumption in the most profitable way we should proceed as follows: First cut the straw into chaff about $\frac{3}{8}$ of an inch long, and spread it out in a layer about three inches deep in a large shallow tray, or on a level brick or stone floor. Then sprinkle over it a few pounds of corn- or other meal – pease-meal by preference—and having set $\frac{1}{2}$ a pound of crushed linseed, per head, to steep in a gallon of water for three or four hours, pour it equally over all parts of the chaff and meal, turning the whole over until completely amalgamated. After allowing the mess to stand soaking in its juice for three or four hours it may be given to the cattle. A little addition of salt will make it still more palatable. If linseed is dear, or difficult to get crushed, a good substitute may be found in cotton-seed meal, but $\frac{3}{4}$ of a pound a head will be necessary instead of $\frac{1}{2}$ a pound. Or a good appetiser is common molasses, which in England we call treacle. This should be plentifully diluted with *hot* water and sprinkled over the chaff as before. The object of these preparations is to get the cattle to devour as much straw as possible, and so to fill their bellies and produce a contented disposition, which, in the absence of their accustomed richer food, is a more important point than people in general suppose.

Mr. Barnard speaks very highly of the straw of the ordinary haricot-bean, and I see no reason why, if cut early, it should not be as valuable as the straw of the other leguminous crops, all of which contain a high percentage of nitrogen. As this bean haulm is usually pretty hard and rigid, I should allow it a longer period of steeping, and soak the linseed in boiling water, pouring it over the chaff before it had time to cool. Beans are usually pulled, and care therefore must be taken to shake off all the adherent dust and pebbles before passing it through the chaff-cutter, lest the knives be blunted. After all, the quantity per acre of this haulm cannot be very great, and I should prefer giving it whole to running the risk of damaging so costly an implement.

English farmers.—"The New York *Post* thinks there is little chance of getting English farmers to come to America and occupy the cheap farms of New England. It says the English farmer is not an emigrating man; that he can get farms to suit him at his own price (rent) at home, for very little more than the labor of cultivating them. This is certainly in the nature of news, and we should like to hear what our intelligent friend, Mr. Jenner Fust, of the Montreal *Journal of Agriculture*, will say to it. We are not an expert in Englishmen, and don't know more about that country, or its people, than they do themselves; but we have an idea that a good many English farmers have already come to America, and can be found in both Canada and the United States. We seem to have heard something about their emigration to the antipodes, and the rapid progress of agriculture in Australia and New Zealand. It may be all a mistake, but if they do emigrate to those far off regions, and if many of them are to be found in the states, and still more in Ontario, Manitoba, and other American provinces, we do not see any intrinsic improbability in some of them being made to realize the advantages of good farms, dirt cheap, in New England, because of the migratory tendency of a part of our population. We are all essentially of one race in Old and New England, and we have already in Vermont one county (Caledonia) so thickly sprinkled with families descended from British emigrants of an earlier generation, that the fact was commemorated in the name. If these good Scotch farmers could be got over here, in days when the inducements were far less than now, we see no reason why it would not pay to let the exceptional state of things now existing here, where farms are selling for less than one-half what they were worth ten years ago, be known to men who, by frequent reports, well confirmed, we have been led to believe to be not doing well at home. It wouldn't cost much to try it, any way."

DR HOSKINS.

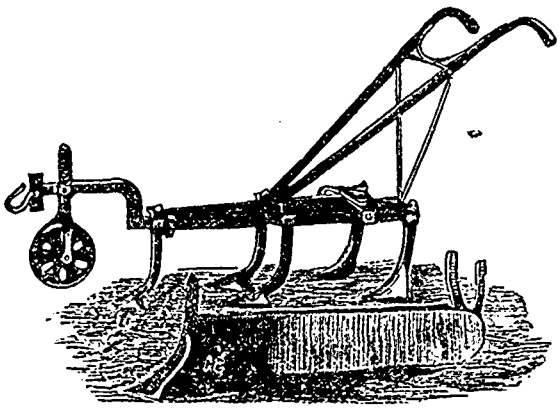
English farming.—Our friends and fellow-labourers in England have had a pretty hard time of it since 1879, as all the world knows. And now, I fancy, things will, nay are already doing so, take a turn for the better. You see the English farmer has so many things to contend with that our yeomen—properly so called—have no idea of. Rent, tithe, poor-rates, road-rates, county-rates, and Saturday nights' wages to meet! And a nice sum these amount to on the whole! Here is a table showing the actual hard cash paid out on a farm of 320 acres of fairish land in Essex in the year 1852:

Rent.....	£565.0.0
Rates	62.0.0
Wages.....	645.0.0
	£1272.0.0=$6181.92

The farm was *tithe-free*, but, of course, that was to the advantage of the landlord. According to the above figures, the annual expenditure on the farm was some few cents less than $20 00 an acre, to say nothing of the farmer's capital laid out in stock, implements, &c., which in this case was £3.750 = $18,000, the interest on which at 5 % would be $900 a year, to say nothing of an allowance for deterioration. These are irrefutable facts, and are taken from my own account-books. The "acts of husbandry"—such as ploughing, &c.,—grass-seeds, manures, hay and straw, had to be paid for to the out-going tenant by the in-coming tenant immediately on entry, and in this case they amounted to £620 = $3,100. So, you see, the capital and expenditure of an English tenant-farmer before he reaps his first crop is by no means a trifle.

Well, things are better now as far as outlay goes. There would probably be a reduction on all the items mentioned above in almost every part of England, and the account would stand something like this:

Rent	£426.0.0	
Rates	48.0.0	
Wages	520.0.0	
	994.0.0	
Balance	278.0.0	= $1390.00
	£1272.0.0	



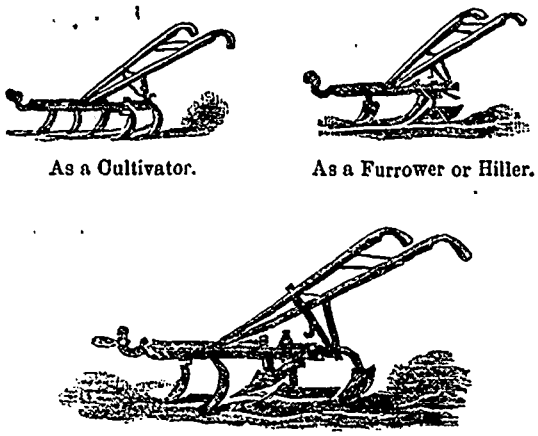
IRON CULTIVATOR.

Together with this saving of about $1,400 a year, we must not forget that the price of every thing bought by the farmer for household use is very much lower than it was, and the cost of implements, too, is much less. The reduction in wages is owing, not to lower weekly payments per man, but to the more universal use of harvesters, mowing machines, &c. Even what might have been regarded as fixed fees, such as doctors' and schoolmasters' charges, have been reduced to meet the altered circumstances of the farmers. Thus, though owing to the low prices of his produce, the farmer's money returns are much less than they were, things that he sells are produced at far less cost, and a given amount of net income goes further. In fact, I do not feel any very great fear as to the ultimate fate of the British farmer, and I believe that the misfortunes of the last dozen years will, in the long run, have had a beneficial influence on the race. The landlord will have learnt to look more closely into *his* business, and in judging of the condition of his tenantry will refuse to be guided by an irresponsible land-agent—very probably a lawyer in the next town, who knows no more about the value and cost of crops and cattle than I do about the Chrono-thermal theory of medicine.—The tenant-farmer will look more closely into *his* business, and in the management of his household will exercise a stricter economy than he has hitherto thought necessary, and above all things attend a little more to the marketing of his produce to the best advantage. A. R. J. F.

Autumn-cleaning of stubbles.—By the time that this number of the Journal is in the hands of my readers, the season for autumn cleaning of stubbles will have arrived. This is really one of the most economical as well as most beneficial operations of the whole year, particularly as regards land subject to couch-grass; and occurring, as it does, at a time when there is very little doing on the usual run of farms, I feel surprised at its being so seldom practised.

The implements required for autumn-cleaning are a grubber, a set of harrows, a horse rake, and perhaps a roller, all of which are to be found on most farms. I do not mention the plough, as I consider that to be the very worst tool for our purpose. The great object in this work is to keep the weeds above ground, avoiding as much as possible cutting those that propagate themselves by means of their roots or joints: docks are an example of the one kind, and couch-grass of the other. Now a plough, with its cutting action, will if it meet with a dock slice it into at least two pieces, and as to a length of couch, why that may be divided into half a dozen fine healthy sets in as many turns of the plough, each set ready to send out its little "dog's tooth" of a rootlet on the least encouragement.

The "Planet Jr," Horse Hoe.



As a Cultivator. As a Furrower or Hiller.

"Planet Jr" Horse Hoe, Cultivator, &c., &c.

The grubber.—Of this implement there are various sorts, some made to sell, and others of the greatest utility. The best kinds of this tool have the teeth curved and elongated so that the weeds instead of accumulating round the part of the tooth that is just above ground, ride up the stem and fall off behind, without the man in charge being obliged to stop and clear the rubbish off every ten or twelve minutes, as in the case with the grubbers with straight teeth. Coleman's drag and those on the same principle, are the best. The accompanying engravings show the best and the worst forms of this implement. They should be fitted with both broad hoes for paring and narrow ones for stirring, and will require teams proportionate to the hardness of the ground to work them. If the land is a little damp, that need not hinder the operation; indeed, it is all the better, for the root-weeds will draw out more easily, and with less danger of being broken.

And now to set the grubber to work: Two inches, as a gene-

ral rule, is about the proper depth for paring with broad hoes, and the horses should not be hurried in their pace, as, unless the very large and heavy tools are used, a rapid pace very often causes the implement to jump and miss a perhaps important piece of land. From six to eight acres a day may be easily gone over the first time.

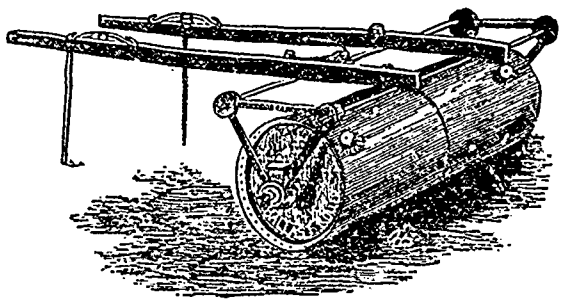
Now, for the second grubbing, I should recommend the use of the narrow points. The grubber should, of course, cross its former path, and be set about half an inch deeper than before, to ensure its completely under-cutting the old work. Ten acres a day will not be too much for a quick stepping pair of horses to get over.

The land and weeds are now ready for the *harrows*. A quick motion is the best for these implements, and, in general, a double-tine or stroke will be sufficient; but if the land is at all heavy, I should pass the *roller* over it and harrow again, until the clods are sufficiently pulverised to allow the *horse-rake* to gather the couch and other root-weeds into rows.

Sometimes, it will be advantageous to look over the field after the horse-rake has done its work and, to collect with a rake any small pieces of docks or grass-roots that may have escaped the teeth of the horse-rake.

The rubbish now being collected into a handy shape can be burnt, or, preferably, carted away to form the bottom of mixens.

When the harvest is an early one, that is, finished by the



WATER BALLAST ROLLERS.

20th August, the sun will generally be powerful enough to desiccate the weeds after the harrowing, beyond any fear of future growth. But, in September I should not like to run the risk of trusting to the weather: rains soon revive weeds that are apparently dead. So, we must perforce rake, gather, and burn the rubbish as above.

The cost of thoroughly cleaning a field after this fashion will be about $2.30 an acre:

Two grubbings	$0.60
Harrowings	.40
Raking	.30
Gathering and burning	1.00
	$2.30

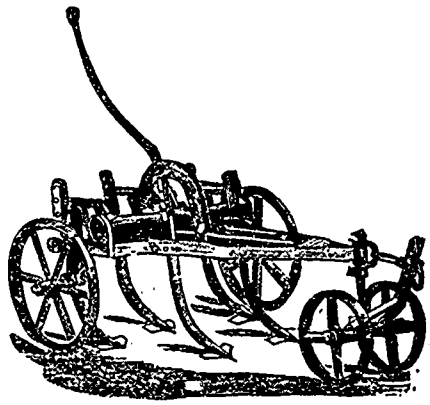
Most of the seed-weeds in the upper two and a-half inches of pulverised soil will start into life, to be destroyed by the subsequent fall-ploughing; many grubs, insects, and eggs of the latter, will be deprived of vitality; the work of cleaning land in spring, which is never half done, will be rendered unnecessary; the manure may be applied for the root-crop as soon as the frost is out of the ground; and, if the plan is persevered with, the whole condition of the farm will in a very few years be materially improved. A. R. J. F.

Washing sheep.—There has been a good deal of discussion in England lately on the question whether sheep should be washed before shearing or not; but as the opposition to the invariable practice of British flock-masters came from a suspicious quarter, I do not think the shepherds will blunt their shears over many more fleeces of unwashed wool than heretofore. The interest of certain of the manufacturers and staplers was the only thing regarded; the health of the sheep and the profit of the farmer were not considered at all.

However, the real state of the case may be gathered from the opinions of certain persons well skilled in the trade, who have no purpose to serve in decrying this invaluable practice of washing sheep before taking the fleece off.

Of two agents, buyers for large Yorkshire firms, the former speaks as follows: The value of wool not washed would be considerably less than the value of washed wool; also, unwashed wool would lose its colour much sooner than that which has been washed previous to shearing, and, consequently, would not answer the purpose for which it was required, and, if kept, would considerably deteriorate in value.

The other agent writes: We could not buy any unwashed wool unless we could get it for six-pence or seven-pence a pound. (1) Do not be led away by what the papers say about not washing the sheep; it will be a great loss to growers who do not wash.



Coleman's Drag-harrow—Awarded 200 first prizes.

A large wool-merchant writes to an inquirer: I beg to say that the difference between washed and unwashed wool is from 25 °/₀ to 35 °/₀. For instance: washed wool at, say, from 6d., 8d., 10d., 12d. a pound, would be for unwashed, 4½d., 6d., 7d., 8½ a pound.

Mr. Turner, another man well known as an expert in wool, and who in consequence of his reputation as such was chosen as judge of fleeces at the last meeting of the Suffolk Sheep Society (England), spoke strongly in favour of washing before shearing; and gave the following reasons for his opinion:

"Mr. Turner said he had taken great pains to go into this important question, and he had been asked over a hundred times by letter what was his opinion on the subject. He had no hesitation in saying that he was very strongly of opinion that English wool ought to be washed on the sheep's back. Objection, of course, was taken to this in many cases, but if they knew as much as he about the source from which these objections came they would not think much about them. In 1887, 23 000 000 lbs weight—about one-sixth of the whole produce—was exported from England, and if the wool was not washed this export trade would be ruined. For instance, there was

(1) Best down-teg wool is worth from 12d. to 13d. a pound in England.

an import duty on wool to the United States of 5d. a lb. — whether the wool was washed or not the duty was the same. It was quite clear that under these circumstances the Americans would buy washed wool which would only shrink 20 per cent., when they certainly would not buy unwashed wool which would shrink 40 per cent. The Bradford Chamber of Agriculture had made an inquiry into the subject, and he believed their decision would be against the non-washing of sheep."

If dirty unwashed wool is offered for sale, immediately the buyer begins to find fault, and to make out that there never was such a filthy lot brought to his factory; whereas, when a nice well-washed fleece is shown, the bright, clear look of the wool fascinates the eye of the manufacturer, and he jumps at the lot in a moment. I have mentioned before in this Journal that when the late M. Amable Demers, of Chambly, allowed me to tub-wash his 60 ewes, Mr. Willett, tweed-maker, Chambly Mills, told him that he had never seen such a set of fleeces since he had been in business.

No! I do not think we will give up washing our sheep yet.

A. R. J. F.

The Escutcheon Theory.

Some months ago, I said, in this Journal, that I was perfectly ready to reconsider my opinion on the Guénon theory, if any one would tell me *why* the position of certain hairs in the perineal region of a cow should be a sign of her milking capacity. Nobody has, at yet, given me the desired information, so my scepticism in this, as in many other matters, remains constant. When I hear such men as Mr. James Drummond, Mr. Thomas Irving, Professor Brown, Dr. Hoskins, &c., &c, &c., say that they have not the slightest belief in the escutcheon theory, and when I find that the American Jersey cattle club has erased the escutcheon from its place among the *points* in the Judges' list, I am confirmed in my incredulity.

I reprint, in the present number of the Journal, two articles, one from an American, and the other from an English source; the former being written evidently by a man who, although he is in a state of vibration, is, still, in search of truth; and the other, by one who looks at the question from a purely philosophical point of view, asking the same question, though in more exact terms, that I have so often asked: what connection can there possibly be between the set of certain hairs on the perineal region of a cow and the quantity of milk she will give, or what indication can this escutcheon be of the length of time after calving she will continue to yield milk? A. R. J. F.

The Guénon System.

EDS COUNTRY GENTLEMAN — Twenty-five years ago I was as firm a believer in the Guénon system as Mr. Blight but observation and experience have convinced me of the correctness of the conclusions to which Mr. Flint arrives, after a careful and impartial survey of the Guenon system. In "Milch Cows and Dairy Farming," he says: "It is safe to lay it down as a rule that in the selection of milch cows, as well as in the choice of young animals as breeders, we should, by all means, examine and consider the milk-mirror, but not limit or confine ourselves exclusively to it, and that other and long known marks should be equally regarded."

I have also noticed, or thought I noticed, that the system, as a test of quality, is more generally applicable to Short-Horns and Ayrshires and their grades, than to Holsteins, Herefords, Devons, Swiss, or especially to the Jerseys. Among these latter, the Jerseys, I have seen many animals whose utmost energies and strength seemed devoted to the incessant production of rich milk, but whose mirrors would consign them to Class 3 of "middling and little below middling," if not to Class 5 of "very bad milkers."

I have now two two-year-old heifers which afford a remarkable instance of variation from what I still think is a noteworthy general rule. They are by a registered Jersey bull, a grandson of Pedro; and their dams, granddams and great-granddams, were direct crosses of Short-Horn and Ayrshire, extraordinary milkers, and with the most perfect escutcheons I ever saw. These heifers have escutcheons which would barely admit them to the third class, while their large, well-formed udders and generous yield of rich milk abundantly entitle them to a place in the first class, "very good or extraordinary."

It is also, to me, an interesting circumstance that half-sisters of these heifers, by other Jersey bulls, have the same beautiful escutcheons as their mothers and grandmothers, and prove and promise to possess the excellences which their parentage led me to expect.

I do not understand that my experience materially conflicts with Mr. Blight's conclusions. He admits that he has not found the system infallible, while I still believe that its teachings are worthy of attention. Perhaps the statement of our respective views may draw out others, and so help the readers of the COUNTRY GENTLEMAN to a clearer comprehension of a very important and somewhat complicated subject.

J. C. D. *Amherst, Mass.*

THE ESCUTCHEON THEORY.

We do not hear so much of this system of determining the milking qualities of a cow now as we did some few years ago. The practice of actually testing the amount yielded by each animal, by weighing at stated intervals and keeping a record has been very much developed since then, so that escutcheons have rather fallen into the background. In the Royal Agricultural Society of England's Journal for 1885 there is an elaborate paper from the pen of an American gentleman, who first published it in the United States, in which all the different forms are given, and a disquisition on the probable causes or reasons for their existence. To our mind the writer has missed the point in this latter respect altogether, and if the basis is wrong, it follows that much of the superstructure is wrong also. The "escutcheon" is the name given to the hair which grows in the perineal region, between the udder and the root of the tail, and in which the whole or part of the hair grows upwards relative to the ground level. On the size and shape of the space covered by this upturned part GUENON founded his famous theory about milk yield. But a little consideration will give us some fresh ideas as to what this escutcheon really is.

The hair of mammals, the feathers of birds, and the scales of reptiles and fishes all follow the general line of the body, and point from head to tail, the roots being towards the anterior part, while the free ends point towards the posterior parts. This being so, it is manifest that the hair, &c., on the back must necessarily meet that on the belly at some part of the body, and in an opposite direction. This part is, of course, about the tail or perineum, and in a large animal like the cow, an inch or two, or even a foot, more or less off is of little account. In other words, the escutcheon is simply the hair of the underparts continuing the same direction as the rest, and is not turned up at all with reference to the cow's body, but only with reference to the horizontal plane of the ground. If the cow were to stand up on her hind-legs, the real arrangement of the parts would be much better seen, and most people would be convinced that there is nothing peculiar or mysterious in the direction of the hair, and no need for such absurd

and far-fetched theories to account for it as the direction of the circulation of the blood, the development of the arteries which supply the milk vessel, &c. There would be more cause to wonder and make surmises about it if the hair had been turned downwards at this particular part of the body. But after all, the proof of a thing lies in trying it, and if there were any true guidance in it, all that is said above would count for nothing. It is in practice that we have seen the theory fail: many cows with good escutcheons we have known to be bad milkers, while good milkers have often bad escutcheons. In regard to this latter we have a case in point in the Red Polled cow Strawberry No. 1,469, which we had an opportunity of examining during the recent visit of the Dairy Conference to Ickworth. This animal is a famous milker, having given about six gallons in a day at the show at Norwich, while she has—not the worst escutcheon we have ever seen—but certainly a very bad one. The fact is, the appearance is so often misleading that we have come to the conclusion that the size of this "upturned" patch of hair is simply due to the "accident of birth," and has no more connection with the milking powers of a cow than has the colour of her hair. As well say that if the corresponding part of an old hen is large, she must be a good layer, as we take it that a plentiful milk yield and large supply of eggs are analogous in being both nutriment for the young: the theory is quite as applicable in the one case as the other. It is more than likely that some have found it a useful guide to knowing the character of a cow, but, for ourselves, we can say that we have never found it to be depended upon. *English Ag. Gazette.*

Ripening of grain.—An article from the English Agricultural Gazette which will be found at p. 135 of this number is well worthy of perusal. There is a slight exaggeration that may strike the reader's eye "after the grain begins to form, the plant ceases to absorb, &c." The writer should have written: the plant begins to cease absorbing, &c. For, if the plant ceased entirely to draw its nutriment from the air and soil the moment the grain began to form, there could be no reason why the crop should not be severed as soon as the formation of the grain began.

It is no new thing for the readers of the Journal to hear that all grain should be cut some time before maturity is reached, but I own I was not prepared to see so strong an instance cited in proof of the correctness of the theory as that "oats removed from the soil with their roots attached, and placed in distilled water, will ripen their seed."

A. R. J. F.

CROPS.

So far as corn crops are concerned, we shall shortly have arrived at a period of waiting and watching. Wheat is coming into bloom, and the success of the crop greatly depends upon the prevailing meteorological conditions of the next few weeks. All that the cultivator can do has been done, even the soil can do no more; for after the grain begins to form the plant ceases to absorb food from the soil, and its energies are devoted to what is termed "translocation," or the transference of albuminoids, starch, and mineral matter from the leaves and stem to the grain. It is impossible to fix upon the precise time at which the plant ceases to take nutriment from the soil and air, but during the last month of its life the vital forces are acting independently of root absorption, or of leaf absorption, and the grain is being fed from the plant itself. The practice of cutting wheat before it is dead ripe is based upon this fact. It has been proved that oats removed from the soil with their roots attached, and placed in distilled water, will still ripen seed, proving that the seed is formed by translocation of matter already within the plant. The same holds true in the case of grass crops. The maximum amount of nutrient matter exists in the plants, which constitute a hay crop, shortly after blooming, and probably when the seed is just beginning to form. At this period the transference of material from the leaves and stem, towards the seed, begins to take place. The leaves become pale and thin, and the stem becomes strawlike. The nutrient material concentrates itself in the seed, and the opportunity for securing a succulent and nutritious hay crop is lost. Neither must the change of cellulose into woody fibre be forgotten, as it is an important factor in the value of a hay crop. Up to the flowering period it gradually alters into the condition of insoluble fibre. It becomes, in a word, straw instead of hay.

The development of a corn crop may be divided into periods or stages. First comes the process of germination, during which, as in ripening, growth consists in *translocation*, only at this time the movement is outwards from the grain. The tide is turned and what flowed in from the plant tissues to form the grain during ripening, now ebbs out from the grain to nourish the germ, and cause the appearance of the upward and the downward axes of the young plant. Next comes a period of root formation, during which little show is made above ground, but a mat of rootlets is developed. In the third place, there is a rush of leafy herbage, and the formation of heads or ears follows in due course. Lastly, there is the concentration of the properties of the plant in the seed or fruit known as maturation or ripening.

It is during the first three of these stages that the agriculturist can control the conditions under which the plant lives. His object is to produce a seed bed suitable for fermentation, and to provide plant food in abundance so as to induce rapid root formation. The success depends in a great measure upon its being early sown. As a rule the early farmer is the successful farmer, and, conversely, the leading agriculturist of a locality is generally well forward with his work. Early-sown wheat, barley, oats, mangold, rape, &c., &c., are most likely to succeed simply because they have a better opportunity of making root. Similarly, land in high condition and in a fine state of tilth encourages root formation, and thus the plant is, so to speak, pushed forward, and the later stages are characterised by strength and luxuriance.

The principal use of superphosphate to the turnip crop seems to be its influence upon causing a rapid root development in the earliest stages of growth. The progress of the plant then becomes almost a geometrical progression. It is able to multiply its root and its leaf surface earlier in the season, and the full and luxuriant development of the crops follows naturally and as a matter of course.

Woburn Experimental Crops.—My readers will perhaps recollect the very interesting report of the experiments on ensilage at the Woburn farms, which were commented on in this journal a month or two ago, and will not be sorry to see a considered report of the experiments on Field-culture which have been carried on this year—the eighth of the series—at the same place, under the supervision of Dr. J. Voelcker, the chemist—in succession to his lamented father—of the Royal Agricultural Society of England.

The soil is a light sandy loam, resting on the Greensand, a portion of the *chalk* formation, 500 feet thick, consisting of 150 feet of clay, with about 100 feet of a greenish, more or less indurated, sand above, and 250 feet of sand or sandstone below it. The Upper Greensand forms a very productive arable soil, but the lower sand is generally unproductive.

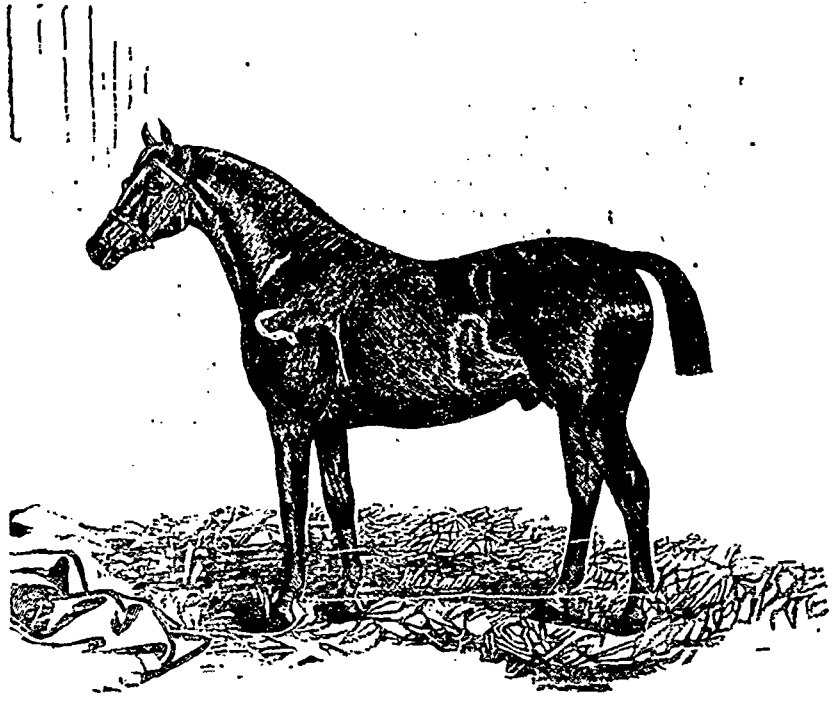
Where the chalk and the green-sand mix, extremely fertile patches of country present themselves. In such a concurrence of soils at Sittingbourne, in Kent, my cousin Colonel John Hart Dyke has 720 acres of land, the average crops of which are, in a good year, 52 bushels of wheat, 68 bushels of barley, 104 bushels of oats, 4½ tons of clover (twice or thrice cut), and 25 to 30 tons of swedes! Analogically, we may compare the soil at Abbotsford, at the foot of Yamaska mountain, where the débris of the mountain rock mingle with the alluvial soil of the old pelagic valley.

The great misfortune connected with this Woburn farm is that the land has never been sufficiently exhausted by repeated unmanured grain-crops to admit of its showing the real effects of experimental treatment. Up to 50 or 60 years ago, it had always lain in permanent grass, and the accumulated riches of that long rest are not yet exhausted. To give an idea of this it may be mentioned, that the first 9 inches of the soil contain 50 % more nitrogen than does the clay of Sir John Lawes' farm at Rothamsted; and this is one of the chief lessons to be learnt from these experiments; namely, that land of such a light sandy texture can permanently retain so much natural fertility. If this farm had been treated as Lawes' farm was, that is, sown with a succession of wheat-crops and turnips, before experiments on the manure requisite for those two crops were begun, the results, valuable enough even now, would be doubled or tripled in their significance.

Here, the *unmanured plots* give, of course, the least yield, but even in their case the crop is about equal to that generally grown in the district under the usual four-course system. In previous years they have given 17 bushels of wheat per acre, against 37, obtained from *nitrate of soda with mixed mineral manure*. Of course, the land is, in reality, *barley-land*, and of this grain it has produced a yearly average of 23 bushels in the unmanured plot, against 55 with nitrate of soda and mixed minerals. Curiously enough, the weight of the entire crop of wheat and of barley is about the same; that is the wheat straw plus the grain is equal to the barley grain plus the straw.

Here we have a reduplication on light land of what Lawes and Gilbert have long ago proved to be the case on heavy land: it is useless to attempt to grow crops of grain without nitrogenous manures. On the plots where mixed mineral manure was used alone—containing potash, soda, magnesia, and superphosphates—the results were just about equal to the unmanured plots, so that, in practice, such a mixture is almost thrown away. But wherever nitrogen—*in spite of the immense "natural" richness of the soil in that element*—(1) is added in the form of an ammonia salt or of nitrate of soda, the produce is more than doubled, although nitrogen alone does not give a very notable increase.

Well, I suppose the majority of the readers of this periodical are convinced by this time that the experiments they have had put before them are of some value. It will be observed that none, absolutely none, of the parties under whose patronage the experiments at Rothamsted and Woburn have been carried out have had the slightest connection with the government, but on the contrary, the one is under the sole control and is carried on by the enthusiastic devotion of a private individual, the other by a society composed of all classes of the agricultural population, from the hair to the throne down to the ordinary tenant of 200 acres! A writer in a recently published report states that in Germany and Austria there are 80 government experimental stations, in France 25, and in Belgium 5; while in the United States $15,000 have been devoted by Congress to each state of the Union for a like purpose. And yet in my own poor land, which, however, is not by any means the most backward of countries as regards its agriculture, nothing of the sort exists! Some trifling aid to a farm-school at Glasnevin and to the dairy-industry in Ireland there is, I believe, and I hear of a grant of the enormous sum of 25,000 dollars for the same purpose in England,



PRIZE-WINNING ENGLISH THOROUGHBRED STALLION AERIDES.

(1) *Please* observe this very important fact. A. R. J. F.

but it is clear, from the papers, that the English dairy-farmers are puzzled what to do with this immense sum!

If what I hear is true, it is proposed to invite the government of the province to establish a "Laboratory of Agricultural Chemistry" in connection with one of the classical colleges. Nothing can be better. It is a thing I have long wished for, as I very often want analyses done, and there seem to be no funds for the purpose. But if we do have a public laboratory started, I do hope and trust it will confine its operations to feasible work.

What use, for instance, would there be in "determining the fertilising elements of our soils which, here, in the province of Quebec still yield good crops of wheat, and thereby finding out what elements must be added to such of our soils as have become sterile, for the purpose of restoring them, as far as possible, to their primitive fertility?" when we know perfectly well, 1st, that *no analysis* of a soil will tell us what is wanting to make it yield crops of any kind, since a soil may show by analysis ever so many cwts of nitrogen, phosphoric acid, &c., per acre, and yet these elements may be in such an inert condition that they are not available for plant-food; and, 2nd, when the practical experiments of Lawes and Gilbert, of Voelcker, and of Aitken, in England and Scotland, have shown us all that we want to know of the matter.

The analysis of chemical manures would be of the greatest utility, provided always that it be full and explanatory. For instance: when I am told that a certain manure contains 4 % of nitrogen I want to know the source of that nitrogen, whether derived from blood, from sulphate of ammonia, from nitrate of soda, or from leather or shoddy: worth in the three first cases 14 cts to 16 cts a pound, in the last two, hardly anything for the crop sown in the first year of their application!

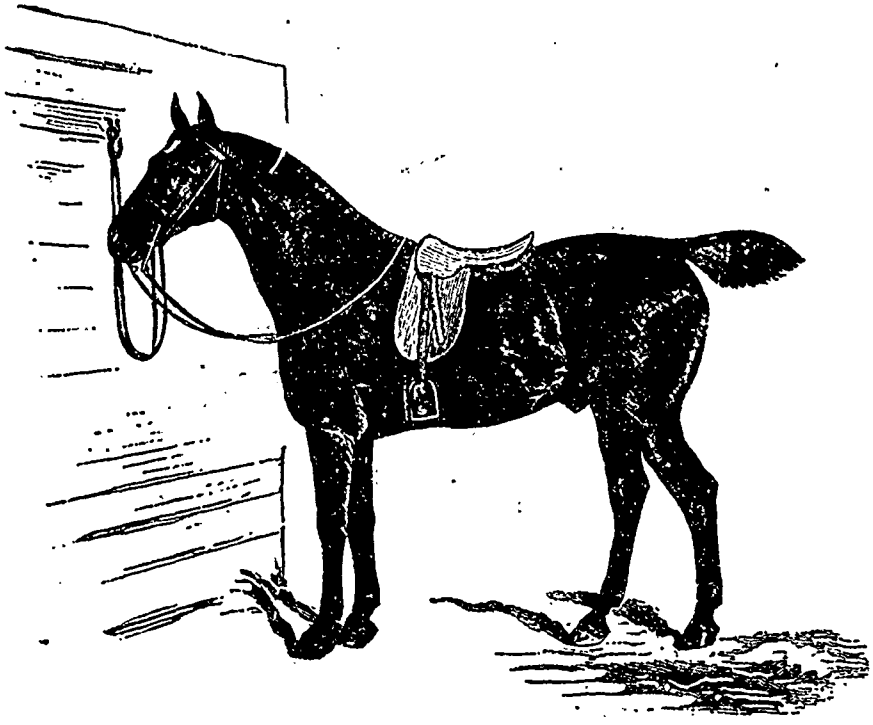
The waste matters of our factories, &c., have been too well studied during the last 40 years to need any further investigation.

As for recipes for feeding stock, I fancy farmers, though they may not make use of their knowledge, have but little to learn on the subject. At all events, I do not think the purely theoretical teaching of the chemist is equal in value to the practical knowledge of the man who has been feeding stock all his life.

The above pp. were written before I saw Mr. Barnard's well considered article in the *Journal d'Agriculture Illustré* on the Abbé Chartier's letter to the Hon. Premier of the province, requesting him to establish a "statation agronomique" in connection with the College-farm at St. Hyacinthe, of which the Abbé is the Procureur, or manager. I entirely agree with Mr. Barnard in his earnest desire for "the establishment of an experimental station, provided that it is placed under the superintendence of conscientious men, interested in the success of agriculture;" but I disagree entirely with many of the rev. Abbé's positions, and I hope that all my readers who understand the French language will take the trouble to send to the publisher for the French Journal of the month of August, and study Mr. Barnard's observations on the Procureur's proposals, in all of which observations I entirely concur. I will, if possible, condense the leading passages of Mr. Barnard's article for the ensuing number of that Journal, but the whole is so convincing that I fear any condensation will fail of doing full justice to the subject.

One passage of the Abbé's statement I cannot refrain from quoting: "We have remained stationary even if we have not fallen into the rear." By which, I suppose, is meant, that we have made no progress during the last few years! *Is this the case?*

ARTHUR R. JENNER FUST.



A TYPICAL ENGLISH HUNTER.

We give herewith the portrait of a very excellent English "hunter"—a brown gelding named Champion—to whom was awarded what we should call the sweepstakes prize, in the hunter class at the Royal Agricultural Hall Horse Show at

Islington, London, last month. Champion belongs to Mr. A. Byass, Norton Hall, Daventry; breeding not stated. The picture is reengraved from a larger plate in the London Live-Stock Journal.

Instruction in Cheese-making.

The Dairymen's Association, which has already done a great deal for the advancement of the business whose name it bears, continues to follow up the road of progress which it entered upon at its foundation. It seizes upon every chance of improving the products of an industry which is now recognized as the most important resource of our agricultural population.

This year, it has started a series of lessons in cheese-making to be given in those districts where the art is well developed. The lessons we believe to be calculated to do an immense deal of good, if the cheese-makers take the trouble to attend them.

The Association, by selecting as the giver of these lessons Mr. McPherson, an Ontario cheese-maker, at the head of the well-known Allan Grove Combination, has ensured the success of the undertaking. For Mr. McPherson is the very model of a good maker, and enjoys as well the power of a good practical teacher, a power not possessed by every skilled cheese maker.

The first practical lesson was given at St. Hyacinthe in M. Archambault's model factory.

More than seventy cheesemen, says the *Prix courant*, whence we borrow these details, answered to the call of M. Taché. Mr. Eger, the owner of thirty factories in Ontario, thought it not lost time to come and profit by the experience of Mr. McPherson. Every district of the province of Quebec, from Ottawa to Gaspé, from Lake St. John to Beauharnois, sent their representatives. We could not find out all their names, but we observed the following:

Hon. B de la Bruère, president of the Dairymen's Association. MM. McDonald et Painchaud, inspectors; MM D. C. E. Roy, J. B. Vigneau, Toupin, I. Brodeur, A. Chicoine, F. Borduas, B. Laroche, G. Gaudette, J. Archambault, P. Lapointe, C. Lapointe, C. Letourneau, M. Beaudry, Jos. Fortin, N. Bernatchez, J. Giasson, Morin, Angers, F. Blouin, V. Gareau, St-Pierre, D. Bourque, F. X. Proulx, J. Desroches, F. Racicot, Alex. F Bédard, Gadbois, Laporte, Laporte fils, Chagnon Sr. and Jr., A. Dumoulin, Lemonde, Geo. Chabot, Dufault Sr. and Jr., H. Paquette, J. Carignan, Treffié Brodeur, Jos. Marion, Sicard, Quintal, Marsan, J. Lambert, Fradette, etc., cheese-makers.

Mr. McPherson surrounded by an audience both intelligent and attentive, began his lesson by conducting himself before the eyes of the cheese-makers, all the successive operations of the making of cheese, from the time of adding the rennet to the putting the curd into the moulds; each operation being accompanied by detailed explanations of the precautions to be taken, the dangers to be shunned, and the epoch to be chosen for such or such an operation, &c.

Then, with the aid of explanatory tables, he showed, theoretically, the different changes that milk undergoes in the divers operations of its conversion into cheese; and in spite of the explanations being given in English, every maker present could understand them, and we feel sure that they will not be thrown away.

After the lesson, M. de la Bruère, in the name of the cheese-makers and of the Dairymen's Association, thanked Mr. McPherson for his lesson.

Mr. McPherson's second practical lesson was given on the 15th June, at the factory of M Bernatchez, St. Thomas de Montmagny. Among the audience were Mr. Walter Hall, factory-proprietor, New York State, Messrs. Ed. A. Barnard, D. A.; Painchaud, Côté, and Macdonald, inspectors of the Dairymen's Association, Bernatchez, M. P. P.; a score of cheese-makers and factory-proprietors of the district, and the chief inhabitants of Montreal and its environs.

Mr. McPherson, again under the auspices of the Dairymen's Association, gave a practical demonstration of the proper mode of making cheese, and we trust that his visits to our centres of industry, in which are manufactured such a vast proportion of the products of the dairy, will bear the fruits we have reason to expect from them.

We said above, and we repeat the statement: the dairy-business is now the chief resource of agriculture in the province of Quebec. It is therefore necessary that all who favour its development should unite to insure its future and to establish it on a firm foundation. Now, the true basis of the dairy-work is the cultivation of the soil with a view to the rearing in the best manner of milch-cows, and their proper treatment for the production, the greatest possible amount of milk. Follow, then, the best methods of making butter and cheese, the true cornerstones of the fabric of national prosperity. The farmers and the factory-and creamery men, are those who hold in their power the fate of this grand industry. "A plentiful and economical production of milk": this should be the motto of the farmer, and "The perfection of butter- and cheese-making," should be the motto of the maker of these articles. Let neither lose sight of these two devices, and they may be sure that all the operations of cultivation and manufacture will, in their hands tend continually to the proposed end: the constant progress toward the perfecting of the dairy-business.

(*From the French.*) J. C. CHAPAIS.

(1) In justice to McPherson we beg to say that it was in answer to our own invitation that he offered his services to the Dairymen's Association, and we are sure that he received no remuneration, at all, for his most important assistance; an additional reason for our being grateful to him. And, here, we wish to draw the attention of factory-men to the establishment of the McPhersons at Montreal for the storage and sale of dairy-products. We do not believe that there existed in Canada, before Mr. McPherson's built his, such an arrangement of vaulted cellars, with their great ice-refrigerators. In our opinion, these vaults and the special knowledge of the Messrs. McPherson will soon enable us to get an additional quarter of a cent a pound for all our butter and cheese treated in accordance with the McPherson system.

ED. A. BARNARD.

(1) We state here, with great pleasure, that M. Bernatchez, of St. Thomas, has put into practice what we have been recommending so long. His factory is a perfect model, and deserves to be pointed out as such to all those who are interested in the business.. Mr. McPherson, himself, praised it highly. Either butter or cheese can be made there according to the demands of the market. This is the style of factory the Journal has been advising to be set up for the last ten years.

ED. A. BARNARD.

OUR ENGRAVINGS.

Coleman's Drag-harrow. v. p. 133.

Iron Cultivator.—v. p. 132.

Planet Jr. horse-hoe, &c.—v. p. 132.

Typical English Hunter.—As this darling is in exhibition order, he is too fat for work. Is he a little tiny bit too short in the pasterns? No fear of his rapping the top bar of a gate with his hind-feet! Carries the saddle well, though he does not rise quite enough on the withers, but as he is only a five-

year-old, he will gain another half-inch there. Good manners, I should say, judging from his head, and never dreams of rushing at his fences. Do, please, admire his loin and quarters!

Aerides, a prize-winning English thoroughbred. Fat as a mole, but likely to get such hunters as the previous cut portrays.

Water-ballast roller.—v. p. 133. A. R. J. F.

J. Abbot, Jr., of Philadelphia, Penn, sends to the *Country Gentleman* the results of the analysis of milk in his laboratory for the year 1887. Twelve Jersey herds average 14.75 per cent of solids. The highest herd averaged 15.31 per cent. Three Guernsey herds averaged 14 59 per cent. Herds of grade Guernseys and Je eys averaged 13 75 per cent. Seven herds of general breeding for a part of the year analyzed 13.32 per cent and five herds for the entire year 12.96 per cent. The highest herd analysis was 17.12; the lowest 11.54.

I should like to know very much what was the breeding of the herd that gave 17.12 *per cent* of solids. Clearly, they were not Jerseys, and it is not probable that they were grades; so the fair conclusion is that they were Guernseys.

THE PROSPECTS OF HARVEST.—Detailed reports have been obtained from twenty-one districts of England, most of them being of a decidedly encouraging character. (All over alas!) A fair hay crop appears to be expected in most counties, though in nearly all the "seeds" are said to be light. Fine weather is now desirable for haymaking, which has been commenced in many places. Wheat in nearly all reports is spoken of as variable, but as promising to be up to or above the average where it is not too thin on the ground. There are but few complaints of barley and oats, the worst estimates being those from Norfolk and East Kent. Mangolds seem to be nearly everywhere thick in plant and flourishing, while potatoes, in spite of checks in the early stages of growth, are now regarded as highly promising. By common consent, the pea crop is one of the best of the season, but beans are in most counties too short to attain a full standard of productiveness. From the fruit districts reports vary a good deal, the chief complaints being loss of stone fruit from frost, and attacks of maggots and caterpillars on various kinds of fruit. Cherries appear to be generally plentiful; while strawberries and raspberries should yield abundantly, if sunshine follows the recent rains.

Petite Côte, July 23, 1888.

Dear Mr. Jenner Fust,—I have never given the thinning and cleaning a regular test, but I think that you are not very far wrong according to my calculation. I should say that 5 hands can *clean and thin* an acre of mangolds or turnips in ordinary land, if very clean, in a day, as you say; but you know that it all depends on the state of the land, and experienced hands. I generally make my drills 27 or 28 inches wide which will make a little difference. Yours truly,

JAMES DRUMMOND.

Mr. Drummond allows 5 hands to thin and *clean* an arpent in a day, which would amount to 60 cents more than my charge for the job, but then I merely thin or single, he thins *and cleans;* so the accounts would stand thus:

S. GUÈVREMONT. (1)

Two women chopping out.....	$1.20
Two do singling by hand.	1.20
	$2.40

(1) Four years ago, when I first went to Sorel, M. Séraphin Guévremont had never grown a square rood of roots in his life. He has now, on his farm of 140 acres, six acres of swedes, one and a-half of mangels, and one of Belgian carrots! A. R. J. F.

JAS. DRUMMOND.

Two women chopping out.....	$1.20
Two do singling.....	1.20
One do hoeing	60
	$3.00

A. R. J. F.

Potato-beetles.—The farmers below Quebec are complaining that the potato-beetle is as numerous as ever this year. I really do not see how it can be different. Men use Paris-green, or London purple, for a certain time, and then, when they think the crop is safe, they cease to apply the remedies. A new *couvée* is hatched, the young beetles grow into adults, hide away in the ground or in crevices of the fences, and the following season are all ready to propagate their species. Consequently, the breed is never exterminated, and never will be, until the poisoning is carried on whilst a single beetle is in existence. Just examine the stalks of the potatoes in the beginning of September, and you will find hundreds, nay, thousands of the beasts halt asleep at the roots. Let every farmer destroy this latter brood and in process of time the whole stock will be destroyed.

When M. Demers, of Chambly, took the fleeces of 60 ewes I had washed for him in tubs supplied with water from a small brook to the factory of Mr Willett, the latter declared that he had never seen such a lot, and that the saving to him in the cleansing process, if all wool were brought to him in the same condition, would be very great.

One opponent of the practice of washing sheep says: "It may run a lot of sand from the wool, but how much grease does cold water wash out of the fleece?" All men know, or ought to know, that *tub washing* is the proper mode of conducting the operation; retaining as much as possible of the water in use, and filling up the tub with fresh water as seldom as possible. The *yolk* (*yelk*, if you like, MM. les Américains), which acts as a soap, will thus be retained in the tub, and the fleeces will be far cleaner than pool- or river-washing can make them. Ten days should elapse between washing and shearing, to allow the yolk to rise again, during which time the sheep should be kept in a clean pasture or meadow, and if no road runs through the field, so much the cleaner and the easier to shear will be the sheep; for as most farmers have observed, sheep, particularly in sunny weather, always select the hardest part of an enclosure to lie on, and if they lie on a road, it is marvellous to see what a lot of little clods and stones their wool will pick up and retain.

A. R. J. F.

Carbon and Nitrogen.

The query of a Louvain student and the reply by Mr. J. F. Lloyd open up a difficult question, supposing any discussion is under the circumstances advisable. The paragraph (A) in the reply seems to take up a position which does not leave a satisfactory impression as to the condition of the question on the point at issue. On reading it I think one would naturally conclude (1) that we know the connection between plants and carbonic acid as far as the absorption of the latter is concerned; (2) that we do not know with any certainty the same of nitrogen; but that at present we have no absolute knowledge which would lead us to believe that plants do not take up their nitrogen from the air by the same means as they take up their carbon, *i. e.*, through their leaves. The first conclusion would be, I presume, correct, as it seems to be generally allowed by scientific men that plants take up all their carbon by means of their leaves directly from the air.

The second conclusion would, I judge, be erroneous as far as assuming that there is nothing in our present knowledge adverse to the idea that plants may take up as large a pro portion of their nitrogen, as of their carbon by their leaves. Evidently many, if not all, plants take a proportion of their nitrogen, and, in many cases, a large one from the soil by their roots, which is not the case with carbon.

Again, as far as can be ascertained by experiment, it is not possible to grow plants fairly to perfection in an artificial soil devoid of available nitrogen, whilst if that is added the plants will obtain all their carbon from the air, none being supplied in the soil.

The absorption of carbonic acid and ammonia by the plant does not seem to be intimately connected as it is in varied proportions at different stages of growth; and with grasses, when potash is deficient, although less carbon is absorbed, there appears to be no falling off in the absorption of nitrogen (see p. 13 Plant Life, Handbook of the Farm). Clover is particularly referred to in the reply, and of course it is more especially in connection with the leguminosæ that the doubt as to the absorption of aerial combined nitrogen rests. Here then, come in two statements, one of the proportion of carbonic anhydride ·04 per cent., and another of the proportion of ammonia ·0005 per cent. The former appears to be a definite statement, the latter somewhat hypothetical.

Anyone naturally examines these figures and compares them in various ways. This is not very easy for a non-scientific reader, and I only put forward the following for correction and as a guide to the drift of the difficulties which occur to such a reader.

Allowing ·0005 per cent, to be a reasonable estimate of the ammonia by volume in the air, this puts the proportion of anhydride and ammonia as 80 to 1 by volume, and about 200 to 1 by weight, and consequently carbon to nitrogen as about 32 to 1. If in a good crop of clover hay there are 2,400 lb. of carbon, in the same crop there will be not far off from 120 lb. of nitrogen—that is, 20 to 1 will be the relation of carbon to nitrogen. Supposing I am right in the above figures, I do not see the exact meaning and intention of Mr. Lloyd's statement.

That ·0005 per cent of ammonia is present in the air as an average seems high, according to any authorities I can come across. Ville reckons 1 part in 28,000,000, and Truchot, in some observations at 359 meters elevation, found the highest proportion by weight to be 600 carbon to 2·7 ammonia. Now, as this was the highest percentage of ammonia in a series of observations, and we know that carbonic acid diminishes as height increases and ammonia increases, it is difficult to see what chance we have of finding so large a proportion of ammonia near the earth, as estimated by Mr. Lloyd. Of course diffusion may in all cases bring about a supply when abstraction is taking place. Recognising as one must that plants or soil, or both together, absorb and receive nitrogen in some form from the air, yet it seems difficult to accept as a possibility that plants receive all their nitrogen directly from the air by their leaves. I may have been wrong in inferring that the passage in question would bear this construction.—W. G.

OUR LIVE STOCK.

PEDIGREE DAIRY CATTLE.

There was a breezy little discussion at the Cirencester Chamber of Agriculture lately, when Professor LONG read a paper on dairy farming. In the course of his remarks, Professor LONG said he believed most sincerely that pedigree in their cattle had had much to do with diminishing the quantities of milk yielded—he meant that the more pedigree blood (he referred especially to Shorthorns) was introduced into their herds, the more the supply of milk had diminished. He was speaking in the presence of Mr. CHARLES HOBBS, who, he thought, would support him in this remark, viz., that in too many cases they had only a pedigree of meat, and they ought to have a pedigree of milk as well. If they bred, as Mr. HOBBS had done, from cattle which had essentially been milking cattle, then they were in a position to produce more milk; but by buying pedigree bulls which were known only as members of the Gwynne family or of the Waterloo family, they got meat instead of milk.

Thus challenged, Mr. CHARLES HOBBS said he could not allow Professor LONG's rather sweeping condemnation of pure-bred Shorthorns to pass without saying a word. As regards his own herd, he believed them to be quite up to the average of cattle in that neighbourhood in milking qualities, for every year he bought some four, five, or six cows in the autumn to fill up the winter dairy, and they did not give more milk than the average animals of his own breeding, pure-bred Shorthorns. He should, however, add that he bought those cows with the two fold object of giving a certain quantity of milk in the winter and with a view of their being grazed and made into beef when done with. Two strains Professor LONG particularly condemned—viz., the Gwynne and the Waterloo. He had never used the former, but he once used a Waterloo bull with much success, so much so that in 1886 he sent a cow by a pure-bred Waterloo bull to the Dairy Show, and she was awarded the first prize as a milk producer, taking both quantity and quality into consideration.

Other speakers expressed themselves to the same effect. Colonel CURTIS HAYWARD, however, said he thought the breeders of pedigree Shorthorns had a great deal to answer for in respect of the deterioration in many cases of the breed of dairy cows. (1)

This question of the alleged effects of the pedigree system in the milking properties of Shorthorns has frequently been discussed. It is evident, from Mr. HOBBS's effective retort, that it is not safe to mention any particular family as being defective in milking quality. Of course, in a breed that is characterised by high merit both for beef and milk, there are cases in which one of these properties has been cultivated at the expense of the other. But we think that in the majority of herds attention is devoted to both, and there is ample evidence that increased care is being taken in developing milking properties, and in keeping registers of milk yields.

EXPERIENCE WITH ENSILAGE.

EDS. COUNTRY GENTLEMAN - I want to ask Mr. Havemeyer, Mr. Moulton and Mrs. Jones if they are still using ensilage, and if they like it as well as when they commenced. I understand that Mr. Havemeyer has lost 60 per cent. of all the calves born this last winter. Mr. Moulton and Mrs. Jones, I understand, have given up feeding ensilage. S. *New-York.*

Mr. HAVEMEYER'S STATEMENT.

Mr. Havemeyer requests me to reply by saying that we have fed ensilage to our cattle for the past seven years. The first year we fed it three times a day, *without any hay*, mixing with the 30 lbs. ensilage for the three daily rations, 6 lbs.

(1) Of course they have. If you dry off a heifer of any breed as soon as possible after her first calving, she will not be likely to turn out a good milker thereafter. Continue the process, and in a few generations the habit of giving milk will cease at a few months or even weeks after parturition. Why are the Galloways, the Polled Angus, and the Herefords, such bad milkers? Because the calves suck their dams, and the latter give just enough milk to satisfy their young. A. R. J. F.

corn meal, 3 lbs. ground oats and 2 lbs. bran to our Jersey cows in milk. The results were most satisfactory. During the past six years, we have given at the noon fed, in place of the 10 lbs. ensilage, with above ration of grain, either 5 lbs. of hay, unthreshed oats or millet, and the noon ration of grain, 2 lbs. corn meal and 1 lb. ground oats, fed dry. We should be at loss to find a substitute which would give us as satisfactory results as our ensilage does, both in the condition of our cattle of all ages, and in our dairy. We recently opened a silo which I filled seven years ago, and found the corn in perfect condition. I will send you a sample of it, and also sample of a silo filled last September. Shall be glad to show you our 24 silos of 2,000 tons capacity. JOHN MAYER.

Mountainside Farm, Bergen Co, N. J.

Mrs. JONES' EXPERIENCE.

I *do* use ensilage—do not see how I could well get along without it.

I have no farm; we only own eight acres around our house, and barely outside the limits of a large town. The land is shallow and barren; just across from our lawn it drops to the river, a straight bluff of 80 feet of rock. I certainly would not sell our home, nor would I keep my Jerseys on a distant farm, away from my own eye. Therefore the barn they occupy is on our own place, and I rent the nearest land I can for pasture and cultivation. This is a piece of 65 acres, wretchedly poor, and badly fenced; a good barn on it, but no house. Twenty acres are in pasture, a creek running through it, but, as I average 30 head daily on the pasture, it will be easily seen that I labor under great disadvantages: 1. My cattle never have really first-rate pasture; 2. What there is, is soon eaten and burned up, so that I have to soil and hand-feed, thus using up a great deal of what ought to be saved for winter use; 3. My cattle are more in need of some succulent food in winter than are those which have had a whole summer on rich, green pastures. Under these circumstances, fodder corn, both before and and after it is in the silo, may be more of a necessity to me than to others, who are more favorably situated. Yet, even to such, I should think it would be almost an equal advantage, as it would save their purchasing hay, or leave them free to sell it.

Now, to get down to facts: Our herd will average 46 head, and we keep one pair of large farm horses and three driving and saddle horses—51 head in all. Having no pasture near the house, we have to feed a great deal of hay—more than we otherwise would—to cows kept at home that are near calving, or have lately calved, to bulls, which are all kept up in yards, to horses constantly in the stable, and to the whole herd, if kept in on very wet and stormy nights. So, as nearly as I can estimate, I use close to 90 tons of hay a year or its equivalent. Taking one year with another, this quantity of hay would average me $1,000 per annum, if it were all bought. When building our present stable, we therefore built a silo, 15 by 18, and 5 feet excavation. The walls are solid stonework, plastered inside and on the bottom. In the gable end of the barn, about 15 feet from the ground, is a large door, immediately over the silo. Outside this door, every fall, a stout platform was erected, where the cutter was placed. In addition to our own, six more teams were hired, to run the cutter and draw in the corn; also a great many men. In those days (six years ago) speed in filling was thought essential; consequently, if any break-down occurred, or rain set in, all hands were discouraged. With difficulty and anxiety the work was completed, the covering (double boarding, made in sections or leaves, 18 by 3 feet) was put on, and the whole weighted with large stones, which were hoisted up from the yard outside, through the door spoken of.

For three years we continued this mode, when I got discouraged and abandoned ensilage altogether. The silo had certainly been a great saving, but there were three reasons against its use which seemed to outweigh the advantages:

1st. Having no farm-house, or place to board help, this annual visitation of men and horses, all to be fed and cared for, for days together, is a serious nuisance in an establishment composed only of my own domestic servants.

2d. When we began to use the silo, the question what to do with the stones could not be satisfactorily met. We could not open the door in gable end of barn, with thermometer away below zero, and, even if we could, we did not want to throw out the stones into the yard below, for the cattle to stumble over when coated with ice and snow, and we had no convenience for hoisting stones up on to shoulder of wall, and not enough room there. As fast, therefore, as part of the silo was cleared the stones were lowered to the bottom, where they were very much in the way, and the next section of ensilage, in handling, crumbled down over and among them, and soured them, preventing that cleanliness and order one would like, and as winter progressed this accumulation became large and more annoying till I was out of patience.

3d—And most serious of all—every winter, in this bitter climate, frost got into the silo, and at least one foot all around the walls, wherever it was above ground, and nearly a foot on the top, was hard frozen and spoiled. The coating of frozen ensilage adhering to the walls after the good part was used, would thaw and drop down over the loose stones in the bottom, and although we daily removed all we could of it, yet it lodged among the stones and became a nuisance.

However, the next two years of buying all my hay convinced me that the silo was not in fault, but my own bad management, and we thought that now, with better facilities for working, and with new light thrown upon the process, we could secure all the advantages of the silo without the drawbacks; so we tried it last winter, and it has been the most complete success that heart could wish for. I will give the reasons:

1. We have had for some years a 5-horse-power steam-engine in use: so we do not need such an army of men and horses, and the few we *do* have "find themselves." No building of a platform outside; the bundles of corn are all tossed into the loft, and then thrown up to where the cutter stands all the year round; and as there is no hurry in filling, any interruption does not worry us.

2—And this is, to me, the chief point of all—*no more stones are needed!* For the inexpressible relief and comfort of my new system, I am indebted to Mr. V. E. Fuller, who told me to put simply dry earth, about a foot deep, over the board covers, and not to leave it on more than a few weeks, unless I wished. None but those who have tried this plan can realize the ease and comfort of it, as compared with handling tons of heavy stones, and the dry earth is always useful in the gutters, &c.

3. I filled the silo and put on the earth in September. In November, after roots were in and work was slack, I sunk stout fence posts across the gable and around the sides of my barn, as far as the silo within extended These posts were five feet above ground and two feet or more distant from the wall, and were boarded from the inside, so as to bear pressure. Into the vacant space, the earth off the silo was thrown out through the gable window, and formed the most complete protection from frost. Our ensilage, when removed, looked like pressed tobacco, was sound and good all through, easily handled, greedily eaten, kept the cattle in beautiful order, and gave a fine yield of milk and butter of the very best quality.

In estimating my herd I have counted every beast under three years old as only half a one, so that I may safely say

that I fed 30 animals chiefly on ensilage for five months. Each of these animals would have consumed 20 lbs. of hay daily had that been their only fodder, while they had but 5 lbs. of hay daily, the rest of their fodder being ensilage. Now, the saving of 15 lbs. of hay daily per head on 30 head of cattle, amounts (in rough figures) to 6¾ tons a month, and in the five months to 33¾ tons. The average price of hay this winter was $13 per ton, or the 33¾ tons would have cost me a little over $438.

Now as to cost of ensilage:

Rent of 10 acres of land	$30
Plowing, harrowing and planting	15
25 bushels of seed corn at 85 cents per bushel	21 (1)
Cultivating	15
Cutting and tying by contract	30
Drawing in and putting in silo	20
Total	$131
Cost of equivalent in hay	438
Saving through ensilage	$307

I have made no estimate of gain through increased yield of milk and butter, although that would form quite a large item, while, as to the condition of my cattle, visitors to my herd and purchasers from it can testify. In estimating cost of plowing, cultivating, &c., I did not have to hire extra help at $3 a day; I put it down at what my own farmer and team cost me, which is fair, as they did all the labor. I should not forget to add that we had only half a crop or less, owing to the worst corn season we ever had, and unsuitable land. This year, off the same quantity of land, I expect to get nearly double the crop, and at no greater expense. E. M. JONES.

Brockville, Ont., May 31.

PREMATURE CALVING

A correspondent who had charge of a large Jersey herd sends us the following notes:—As to premature calving, I will give you a little information which may throw a little light on the cause. I believe it was in the autumn of 1885, at———, the proprietor, who was most particular about the butter, wished me to alter the feeding of the cows, as the butter was so hard that it could not be spread on the bread.

The cows had been getting decorticated cotton-cake with chaffed hay and roots. I withheld the decorticated cotton-cake, and gave them meal and bran. This was mixed in small quantity of water at first, and afterwards given dry on the chaff. The butter was much softer and sweeter. Everything went well for a short time, but one morning the cowman informed me that one of cows had slipped her calf. I looked up my servicebook, and found she was fully half-way gone. She was removed from the others, and the stall where stood was washed with lime. A short time after another cow went wrong. She was also isolated. One morning I was told two had slipped during the night. Those which slipped were low in condition, and giving much milk. I then took off the meal feeding and went back to the cake; and after doing so there were no more that slipped. It appears the meal feeding went entirely to milk and cream, and there was not sufficient to support the fœtus. Meal is cheap, and good many manufacturers puff it up for milk and cream, but depend upon it the feeding has much to do with these premature births. I know there are some cowmen who are not fit to look after these gentle and docile little creatures.

I have great faith in the homœopathic medicine for milk fever. I only lost two in the fourteen years I was at——— from the above complaint; aconite cools down the system. I always kept little bottle of it and also bella-donna. I used the aconite for a few days before and after calving, but I always took the cow off succulent food about a fortnight before she was due to calve, and gave her an opening drink immediately after calving.

(1) What! 2½ bushels to the acre? A. R. J. F.

Mr. Martin John Sutton's Grass Experiments

On Thursday last a number of agriculturists from various districts accepted the invitation of Mr. Martin John Sutton to inspect his experiments in the manuring of grass land at Dyson's Wood, near Reading. It was a year within a day of the first public inspection of these interesting experiments, which were started in 1886, and those who were present on the former occasion had opportunities of comparing the results of the two seasons in more respects than one. In the first place, as they journeyed by rail and road, they could compare the crops of this year with those of last. Those who have good memories could not fail to observe that, late as the spring corn was last year, it is far later this year. As to wheat, the crops near Reading were just out in ear (some of them fully) last year on the 22nd of June; while this year, on the 21st, not an ear could be descried. With respect to the grass crops, there is more growth on the old pasture at Dyson's Wood this year than there was last, though the crop is a light one, and on the meadows in the district generally the crop is decidedly heavier. Not so, however, in the grass field in which Experiment B is being carried on. Whether because it has been laid down one extra year—now five years from the sowing—or because of the coldness of the season, the crop is nothing like as good as it was last year.

Four sets of experiments were inspected, all being identical as to manures and numbering of plots. We may, therefore, state the quantities and cost once for all, as this will save many repetitions:—

Plot	Manure per Acre. Quantity	Cost. £ s. d.
1.	None.	—
2.	1 cwt. Sulphate of Ammonia	0 14 0
3.	1¼ cwt. Nitrate of Soda	0 16 3
4.	3 cwt. Superphosphate of Lime 2 cwt. Kainit	0 15 9
5.	1 cwt. Sulphate of Ammonia 2 cwt. Kainit	1 0 0
6.	3 cwt. Superphosphate of Lime 1 cwt. Nitrate of Soda 2 cwt. Kainit	1 8 9
7.	4 cwt. Basic Cinder 1 cwt. Nitrate of Soda 2 cwt. Kainit	1 1 3
8.	10 tons Farmyard Manure	3 0 0
9.	5 cwt. Decorticated Cotton Cake	1 15 0
10.	3 cwt. Peruvian Guano	1 1 9
11.	None	—
12.	4 cwt. Basic Cinder 2 cwt. Kainit	0 10 6
13.	4 cwt. Ground Coprolites 2 cwt. Kainit	0 16 6
14	10 cwt. Gypsum	0 15 0
15.	1 cwt. Nitrate of Soda ¾ cwt. Muriate of Potash	0 17 6
16.	3 cwt. Dissolved Bones	0 18 0
17.	3 cwt. Boiled Bones	0 18 0
18.	3 cwt. Raw Bone Meal	0 17 3

Plots 1 to 6 were all that were included in the first year's

(1886) experiments. They were (except one) manured in that year and not in 1887, but again this spring. The other plots, or eleven out of the twelve, were manured in 1887, but not this year. In the case of the first six plots, we have the results in produce and in profit or loss for two seasons, and in the case of the rest for one season. We give these results for the B set of experiments, which is the most to be trusted, because the first cut of grass in the field where it was carried on was not badly injured by drought last year, as the old pasture was. This set of experiments is conducted in a field laid down five years ago with a mixture usually supplied by Messrs. Sutton on such land as that at Dyson's Wood—only 2 lb. of cocksfoot per acre being included, while there was a considerable proportion of permanent rye-grass and a fair one of all the fescues and poas. In the two years which followed the sowing very heavy crops of grass were grown, consisting largely of rye-grass, but in the third year the cocksfoot gained ground, and has maintained the ascendancy since. The results of the experiments of 1886 and 1887 in this field are condensed below:—

PRODUCE OF TWO CROPS.

Plot.	Weight of Dry Hay per acre. Tons cwts. qrs.	Increase per Acre. Cwts. qrs.	Gain or Loss per Acre. £ s. d.
1	3 12 0	—	—
2	4 0 3	8 3	+1 1 0
3	4 5 2	13 2	+1 17 9
4	4 14 0	22 0	+2 12 3
5	4 0 2	8 2	+ 14 0
6	4 11 3	19 3	+2 10 3
PRODUCE OF CROP OF 1887.			
7	2 0 2	14 1	+1 15 9
8	1 17 2	11 1	— 15 0
9	1 19 1	13 0	+ 17 0
10	1 16 3	10 2	+1 0 3
11	1 6 1	—	—
12	1 14 0	7 3	+1 0 6
13	1 17 0	10 3	+1 6 6
14	1 8 2	2 1	— 6 0
15	2 4 3	18 2	+2 16 6
16	2 4 3	18 2	+2 16 0
17	1 15 1	9 0	+ 18 0
18	1 19 0	12 3	+1 13 9

The increases are those over the produce of the unmanured plots, and the gains or losses are the balances resulting from comparing the values of the increases with the cost of the manures.

From the tables given above, any reader may see which dressings of manure have given the best results up to the present year. The money test is, of course, the most important and that, for the six plots from which two crops have been taken is in favour of the dressing of superphosphate and kainit, while the same two manures, with nitrate of soda added, stand in the second place, and nitrate of soda alone is third. Among the plots for which there is only one year's record at present, that manure with nitrate of soda and muriate of potash paid best, though the one which received dissolved bones gave only sixpence an acre less profit. It is not certain, however, that those plots will stand first when the results of this year are added.

We now give our representative's remarks on the appearance of the several plots on Thursday last, as noted down on the spot:

1. A light crop.
2. Much better than 1, but scarcely any clover.
3. Heavier than 2; also very little clover.
4. Better in bulk and colour than 2 or 3.
5. Better than any previous plot; a good deal more clover, and heavier grass.
6. Not equal to 5, nor much better than 4; scarcely a bit of clover.
7. Most clover of all, more rye-grass, and least cocks foot; but not so bulky as 5.
8. Best of all, but scarcely any clover, grass having smothered it; otherwise greatest variety of herbage.
9. Light crop; more rye-grass than elsewhere.
10. Poor and light.
11. Not much worse than 10.
12. More clover than in most plots, but light crop.
13. Better than 12.
14. Most clover of all, though not very strong clover; thickish bottom, and not much tall grass.
15. One of the best, and probably second only to dung plot; a good lot of clover.
16. Fair crop of both grass and clover.
17. Nearly equal to 16.
18. Decidedly inferior to 16 or

In summing up, plot 8 (farmyard manure) was ranked first, plot 5 (sulphate of ammonia and kainit) second, plot 15 (nitrate of soda and muriate of potash) third, and plot 16 (dissolved bones) fourth. These, of course, are only hasty estimates, and it is impossible to feel certain as to estimates made with the eye alone. We shall see how the scales decide later on.

It will be seen, on comparing the observations with the table of manures, that there is least clover where nitrogenous manures have caused the coarse grasses, and cocksfoot especially, to grow strong and to smother it; and in "clover" the whole class of clovers to be found in the field are included. It will also be seen that potash, either as muriate or in kainit, has stimulated the growth of the clovers; that the residue of fertility left by farmyard manure is greater than that of any other, as it should be, to make up for the extra cost; and that cotton-cake, which has produced wonderful results on grass at Woburn, this year as well as last, has not done very well at Dyson's Wood. These are obvious conclusions. Two striking indications are those leading to the impression that basic cinder is not equal in its effects to coprolites, and that raw bones are not as good as dissolved bones.

This last indication is borne out by the appearance of the plots in the A set of experiments, next inspected. These are on old pasture, and they would be even more interesting than those in the new pasture if drought last year, and dry and cold weather this season, had not rendered the grass so very light that differences are less marked than in the other field. The superiority of the plot dressed with farmyard manure last year is even more marked in A than in B. There appears to be nearly twice as much grass on it as there is on any other plot. In this old pasture, as in the new one, plots 2 to 6 have been manured again this year, while the other plots have not been dressed since 1887. It is not desirable to go into as much detail in this case as we have given in respect of the B field, first because the differences are less marked, and secondly because rain began to fall when A was inspected, and very little time was available for examination. Some of the same indications, however, were gathered from the inspection in one case as in the other, and, if there are differences, it is not deemed desirable to dwell upon them, because, as already stated, results seem less satisfactory in the very light crop of old pasture grass than in the better one in the field first described. Still less is it desirable to attempt to base any conclusions upon results in the C and D sets of experiments, where the crops are so miserably poor that the whole field would have been broken up if it had not been for the experimental plots

in them. Mr. Sutton and Dr. Voelcker fully endorsed this view of the case, and the crops were only hastily glanced at.

When the crop in the old pasture has been weighed, differences scarcely apparent to the eye will be marked to some extent. They were small for the two last years, but may show more when the results of the third year are added.

On the conclusion of the inspection of the grass experiments, the visitors returned to Mr. Sutton's residence, close to which his nice little herd of Dexter Kerries were seen and much admired. After that, in a marquee erected close to the house, Mr. Sutton hospitably entertained his visitors at luncheon, and received their hearty thanks for the interesting excursion to which he had invited them, and for his efforts to benefit the agriculture of the country, by means of his instructive experiments.

MASSACHUSETTS.

The Thirty-fifth Annual Report of the Secretary of the Massachusetts Board of Agriculture presents in a volume of 800 pages the proceedings of the board for 1887, with the papers and ample reports of the discussions on the subjects which have come with special interest before the board during the past year.

Among the valuable papers presented is one on the success of ensilage, by Prof. H. E. Alvord, in which, among other conclusions reached, he gives the following summary: Silos may be above or under ground, or partly both; they should be air-tight, and water-tight, and frost proof, several small ones are better than one large one; properly built of wood or stone, the cost may vary from 25 cents to $5 for each ton of the contents; they may be filled slowly or quickly, in all weathers, the fodder cut or whole; weighted or not if air-tight, but heavily weighted if not air-tight at the sides, most animals prefer it to the best dry forage; the best time is when the plant approaches maturity; Indian corn makes the best fodder, yielding from twenty to twenty-five tons to acre, and ensilage may be made for $2 or less per ton; it will occupy one-eighth of the space needed for dried fodder; the weight required on the silo should be 150 pounds to the square foot; it should be fed about half-and-half with dry fodder; and it is best adapted to high-priced lands. When compared with dry corn fodder, says Prof. Alvord, it produces results so satisfactory as to surprise the chemist, and which the chemist cannot explain. In allusion to the discussion about the name, Prof. A. says, "We must accept the term *silo* for the receptacle, and *ensilage* for the product or pitted material," for which he cites satisfactory reasons. (1)

"The scrub and the runt never improve. You may breed from them for generations, and the offspring of the scrubs, will be scrubs, and that of the runts and titmen, will be runts and titmen, every time. But the thoroughbred or high blooded sire is sure to breed to an improvement over himself. We must stop using scrubs as breeding animals if we wish for improvement."

This is too sweeping, altogether, and not well considered. If the writer had bethought himself, he would have remembered that there was a time, not very long ago, when all our domestic animals were "scrubs and runts," from the breeder's point of view. The improvements which have resulted in thoroughbred stock are almost all the work of skilled breeders during the last hundred years. It is quite true to say that scrubs and runts, *in the hands of scrub farmers*, will continue scrubs and runts; but in the hands of skilled breeders the scrubs and runts can, by high feeding, good care and intelligent selection, be converted into thoroughbreds. *Ex.*

(1) Why not *silage*?

A. R. J. F.

THE NUTRITIVE RATIO.—Yeomans quotes Sir John Lawes as saying that "he never troubles himself very much with the nutritive ratio of the foods he employs; "also, that "those who work upon some fixed formula as regards nutritive ratio, cannot feed as economically as those who pay regard to the varying prices of food." But it should be remembered that what will do for a veteran and successful scientific farmer, like Sir John Lawes, might not answer for everybody. Inexperience must depend more or less upon rules. However, it is true that the ratio between the prices of feeding stuffs is much the same, as a general thing, as the nutritive ratio,—that is to say, their market value is graded closely upon their feeding value, as determined by the experience of practical men.

However, as this is the *practical* part of the question, it will be well to bear in mind that in the May (1887) Agricultural Science, Sir John B. Lawes says:

"The chemist's mode of separating digestible from indigestible substances, is totally different from the process employed by the animal. * * * At present we are not in a position to separate digestible from indigestible food. * * * When we consider that the distinction between what is called digestible and indigestible substance is measured by certain solvents used in the laboratory, we can hardly be surprised that the stomach of the animals and the reagents of chemists do not tell the same tale. * * * In my own practice of feeding I have never troubled myself very much about the nutritive ratio of the foods I employ. * * * A nutritive ratio is very good in theory, but in practice we have to consider questions of economy which are often greatly at variance with theory. At the present time I am not acquainted with any reliable feeding experiments which establish as a fact that food of one special nutritive ratio can be used with greater economy than another."

Adams County, Ill. JOHN M. STAHL

COMPOSTING MANURE DOESN'T PAY.—The *Rural New-Yorker* says that the oldfashioned method of turning and working over manure for six months or a year before using it is very rightly falling into disuse. The careful experience of Dr. Voelcker, chemist of the royal agricultural society of England, proves that manure gradually depreciates by keeping, under the very best management, gaining in water and losing in valuable organic matter, which is spent in the fermentation.

NON-OFFICIAL PART.