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THE ILLUSTRATED JOURNAL OF AGRICULTURE

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[Translation].

Council of Agriculture of the Province of Quebec.

Quebec, May, 4th, 1881.

PRESENT: The Hon. Messrs. Chapleau, Gaudet and Ross; Messrs. Marsan, Guilbault, Casgrain, Blackwood, Ouimet, Pilote, Faribault, Massue, Gauthier, Deblois, Somerville, and Beaubien.

The President having taken the chair, the Secretary read the minutes of the last meeting, which were approved.

A letter was read from M. S. Lesage, the Assistant Commissioner of Agriculture, informing the President of the Council that, in order to make known the fertilising properties of *Superphosphate*, and to extend its use among the farmers of this Province, the Government had bought 500 tons of "Goëmon-Biphosphaté" (Biphosphated kelp): that the Government intended to divide this manure among the Societies of Agriculture, at the rate of \$26.00 per ton, and to retain the price from the ordinary grant made to the said Societies: in consequence, the President was requested to call a special meeting of this Council to take the subject into its consideration, and to promote the views of the Government in the matter.

The Hon. Messrs. Chapleau, Ross, and Beaubien, and many other members of this Council, addressed the meeting in favour of the new manure.

Mr. Beaubien, seconded by Mr. Gauthier, moved: that two tons of "Goëmon-Biphosphaté" be sent to the secretary of each Agricultural Society in the province, with instructions to sell it, in preference, to the members of the Societies; and that as payment for the two tons, a sum of \$52.00 will be retained from the next grant: that, moreover, the So-

cieties shall have the privilege of obtaining an additional quantity by giving notice to the Secretary of the Council of Agriculture. Carried.

The Hon. Mr. Ross, seconded by the Hon. Mr. Ouimet, moved: That a circular be addressed, at once, to all the Societies of Agriculture for the purpose of informing them of the decision arrived at by the Council of Agriculture as to the distribution of the "Goëmon-Biphosphaté"; and, at the same time, to say, that it is the wish of this Council, in the interest of agriculture, that the manure in question should be distributed as much as possible to all members of the Societies, if it be practicable; and circulars giving all necessary information on the subject of the best way of employing this manure shall be forwarded to them. Carried.

A petition from the Agricultural Society of the county of Verchères was read, praying to be relieved from holding a competition this year, and for permission to employ its funds for the extinction of its debt, contracted by the purchase of a piece of land and the buildings erected upon it, for the County Exhibitions.

Resolved: That the petition of the Society of Agriculture of the County of Verchères be granted.

The Council then adjourned.

GEORGES LECLÈRE, Secretary.

Factories vs. Dairies.

A gentleman occupying an important position in Prince Edward's Island desires information on this subject: What advantages have cheese factories and creameries over the ordinary dairy?

The question might be answered in a couple of sentences; but without insisting upon the advantage of skilled over unskilled labour, or upon concentration as opposed to divarication (pardon me the word), I will show, in as few words as possible, how far superior as regards economy, excellence of production, and saving of labour, the system of centralisation is to the old fashioned plan.

When I left England, in 1858, the factory system had not been introduced into that country. Our own family tenants were all makers of Gloucester cheese. Men and women endured, throughout the season, extreme bodily toil; their time was entirely taken up from 5 a. m. to 7 p. m. in milking, setting, pressing, etc.; and, in consequence, they were as far inferior in manners and education to the grain-farmers employing the same amount of capital in their business, as a Welsh Runt is inferior in quality to a thoroughbred Short-horn. It is no exaggeration to say, that, of all the agricultural population in England, the cheese-makers are the most backward in every respect.

But it is not necessary to go as far as England to show the truth of this. Take any part of the Townships where dairy farming has been long practised, and what do you see? The mother, whose life has been spent in the heavy travail of the

churn and vat, bent as to her back; worn, wan and weary in her face; her voice laboured, her words slow to come, and her attention hard to fix. The daughters, whose happy chance it has been to have escaped the never ending mental worry and bodily exertion of the farm-house, are upright in form, lively and intelligent in conversation, their time has been much at their own disposal, so their manners are pleasant and their minds well informed; they have a considerable knowledge of the occurrences which are taking place in the great world around them; they play croquet, and even lawn-tennis, and the keys of the piano (1) are as familiar to their, almost invariably, pretty fingers, as the keys of the dairy and of the cheese-room were to the thin, worn hands of their over-wrought mothers. Poetry apart, it could not have been a pleasant life, that of the mothers. The country, God bless it, is next to heaven; but look at the faces and figures of the women of fifty and upwards, and in them, you will read the sad history of a hard, uninteresting, almost sordid life. Do I exaggerate? I appeal to any medical man living in the Townships.

Well, this over-work is no longer necessary. The cows are milked, the cans driven to the factory, the whey brought back, the calves and pigs fed, and there an end—except receiving the money.—No woman's work at all in the business, barring, perhaps, washing the cans and pails (2).

So much for the labour-saving side of the question. I now proceed to show that factories, from their very constitution, should yield a more excellent product than can be expected from the ordinary dairy, and that the cost of the one is, or at least ought to be, less than the cost of the other.

The dairy woman, whether maid or mistress, has, as a rule, more than one occupation: meals to prepare, chickens to feed; clothes to wash and keep in repair. *Nomen illis legio*. Her attention is often taken away; her presence is wanted elsewhere; a visitor calls: *Figaro quâ, Figaro là*. Sometimes, maternal cares interfere with her business for weeks; at others, a desire for relaxation tempts her away from home; in all such cases, it is clear the quality of the product of the dairy must suffer, even if the quantity is not diminished. The manager of a factory, on the other hand, has one sole duty to look after; his work is perfect routine, and unless he is a lazy *vaurien*, he will allow no temptation to seduce him from his one post; he has no business cares, for his office is simply to make good cheese, and to receive his salary, and as long as there is a *pressi copu lactis* of good quality, his patrons have no right to worry him with complaints. It would be very remarkable if, with the undivided attention of an expert entirely devoted to the production of one article, that article were not immeasurably superior to one of the same sort brought out under all the difficulties mentioned above. And that, as a rule, it is better, may be seen in any newspaper report of the markets, where factory cheese and creamery butter are invariably quoted at the highest price.

Look, again, at the economy involved in the one manager treating the milk of, say, 500 cows! At 20 cows per farm (a large estimate), it would require 25 dairy women to convert it into marketable stuff. How many farms are furnished with an ice-house? Shall we say one in ten? And yet we know milk cannot be properly treated in summer without means of adjusting its temperature. The regular system on which factories are conducted, too, must make every one

(1) I have heard Beethoven's and Rossini's music as well played in an ordinary farm-house, at Compton, as ever I did in a London drawing-room. I do not mean to say that such talent is common, but it exists in more than one instance.

(2) And on the new plan, now starting at St Devis (en-bas) the milk will be carried to the factory and the cans brought back free of all trouble and expense to the farmer.

connected with them handier at his work, and the butter and cheese more regularly of the same texture and flavour. We see no longer, except, alas, in some of our still dormant districts, the cards and the loom at work in the farm house; the mill and the cloth factory have long ago taken that species of toil out of private hands; and, I ask, is not the yarn better spun and the web better and more economically woven, than when the manufacture was carried on by the hands of our farmers' families? And so it will be in the future, when the factory system has gained the entire confidence of our agricultural population. Many a blessing will rise to the lips of the once "overscathed housewives," when, freed from the carking cares, and the weary, ever-returning labours of their earlier days, the equal, nay augmented, profits of their herds flow, almost unsolicited, into their purses, on those far-sighted men, who in spite of opposition, jealousy, and obstruction, persisted in their self-imposed task; and, almost unaided, secured for their countrywomen an easy, simple means of converting into a rich treasure the once poor and nearly wasted produce of its pastures.

Deus nobis hæc otia fecit,
Ille meas errare boves, ut cernis, et ipsam
Ludere, quæ vellem, calamo (piano?) permisit agresti.

ARTHUR R JENNER FUST.

Tobacco Growing under the present laws.— Its preparation for sale, &c.

Tobacco cultivation is at present engaging the attention of farmers, more particularly in this Province (Quebec), and judging from the immense quantities now consumed, there seems to be a good market for all that is produced; notwithstanding this industry is yet in its infancy.

The production of this luxury is one, if not the most profitable, of any industry that our farmers are engaged in; and its rapidly increasing demand will add considerably to their welfare.

The law, as it at present stands, has been framed solely with a view of benefiting our farmers; and so long as it remains it what it is, must be recognised as the greatest blessing to them.

Hitherto, under the old laws, tobacco cultivation, although carried on to a certain extent, has been regarded as illegitimate, those engaged in the growing and sale of it being in constant danger of having their entire stock seized by the Government officers, on its being offered for sale: the purchaser likewise ran the same risk and the business was a constant source of trouble to all concerned in it; the whole being brought about by an excessive tax of 20 cts. per pound on cut, and 10 cts. on twist and roll tobacco.

The writer knows of several farmers losing their entire load, oftentimes consisting of 300 to 500 pounds; their horse and vehicle, as well, being declared contraband.

Now the face of all this has changed: the farmer may, upon payment (by stamps) of the small duty of four cents per pound, come to market and offer his products with equal safety as he would a load of butter.

At the same time being a legitimate business, Canadian tobacco commands a better price than formerly, and a ready sale.

Over production of tobacco should be guarded against as much as possible, as it must tend to reduce both quality and price; and growers should have but one object in view—the production of as good an article as soil and proper care will permit.

A great quantity, as now seen exposed for sale, is green, raw and uncured, and resembles cabbage leaves more than anything else. Care should be taken to properly cure and

sufficiently dry the leaf previous to its being rolled up for sale; the extra labor being well repaid in the increased price obtained.

As the present law permits farmers to sell roll and twist only, no cut (which latter must be left to regular licensed factories), it would be well to bear in mind that rolls of handsome, uniform size, and of uniform weight, always command a good price; whereas rolls of all shapes and sizes, or badly made up, do not sell at all.

A carefully selected leaf for the outside wrapper, of a glossy bright color, goes far to make it saleable, while the fillers (or inside leaves) should be stripped of all stem, and rolled as dry as possible without breaking; any stem left rots the whole tobacco and makes it smoke bitter and strong; and what may at first seem as a loss in the stripping of all its coarse stems, will soon be discovered to be a gain; the tobacco will keep better, smoke decidedly sweeter, and the product of the farmer who exercises these precautions is sure to be sought after, and as I said before, the trouble repays itself in commanding a better price.

I now come to another important point—the size and weight of the rolls; the most saleable is the half pound roll, although a fair percentage of quarter pound and one pound rolls are always in demand. A little extra weight should be allowed on each roll, for the moisture soon evaporates and they lose their weight.

Well made *torquette* or twist of ten to the pound also commands ready sale, but unless these are properly made of choice leaf and uniform size, they are best left alone.

The price varies as to quality from 13 cts. to 18 cts. per pound for large lots, and retail from 18 cts. to 25 cts. for good quality; although in some instances extra fine grade brings as high as 30 cts.: the figures above quoted including duty.

Tobacco grown in the county of Joliette, more especially at St Jacques, where the soil is evidently better adapted to tobacco cultivation than any part of this Province, commands a better price than tobacco from other districts; though I have seen some splendid specimens from other districts; notably from L Assomption.

There is no reason, if Canadian tobacco is properly handled, why it should not come into general use and take the place of the American leaf, which is now so largely consumed in this country.

Our farmers have a bright prospect before them. I trust they will profit by the opportunity afforded them, and make the tobacco industry take front rank—a position which can be easily obtained, by giving the cultivation of the weed their earnest study and care.

B. GOLDSTEIN.

Montreal, April 2nd 1881.

The Illustrated Scientific News.

ONE of the handsomest of publications is the ILLUSTRATED SCIENTIFIC NEWS, published by Munn & Co., New York. Every number contains thirty-two pages, full of engravings of novelties in science and the useful arts. Ornamental wood work, pottery, vases and objects of modern and ancient art are finely shown.

The March number contains, among various other subjects illustrated, a full description of the manufacture of paper hangings, with engravings how the deceptive curve is produced in casting the ball by the baseball pitcher, his attitude, how he holds and handles the ball, all fully illustrated. The number before us also contains engravings of Capt Eads' proposed ship railway across the Isthmus, and a novel hydraulic railway locomotive.

In addition to all this it contains many valuable recipes for artisans and housekeepers.

This publication will be found instructive and entertaining to all classes, but will be best appreciated by the most intelligent. Published by Munn & Co., 37 Park Row, New York, at \$1 50 a year, and sold by all news dealers.

AGRICULTURE.

Paris, March 24.

A few notes on the recent Fat Stock Show held in this city. As a general observation, all the native races exhibited, prove, that marked progress, in the sense of fattening, has been made; that while precocity is an attribute peculiar to certain breeds, it can be developed in other cases, where attention is paid to selection and alimentation; also, animals not intended for the butcher were remarkable for their excellent condition in respect to age. The eminent chemist Chevreul draws attention to the quality of tallow, &c. of animals fattened to excess, as the diversity in the proportions of the immediate principles of its composition, can influence very materially its value. Among the most remarkable exhibits were pigs; the crossings with English races have completely transformed French breeds. Formerly pigs were sent to the fields, to the woods, or left free to roam in the farm-yard, or along the highways, to find their food—the sty being the last of places to count upon for a meal. Dealers drove the animals, at sale time, from fair to fair. These necessities implied long limbs and flat sides for locomotion; muzzles like plough shares; arched backs, falling ears, and bristles approaching those of the wild boar. To-day pigs go to market by rail, and are fed in comfortable cots; hence no necessity for long legs or lance snouts; special and punctual feeding develop precocity and rapid fattening. In 1880, the mean weight of crossed breeds, of the prize pigs, was 504 lbs; and in 1881, 496 lbs; their ages were 307 to 350 days, and so represented an average daily increase of 26 to 28 ounces respectively. On the other hand, in 1880, the mean weight of pure English prize pigs, was 507 lbs, and in 1881, 496 lbs, their ages 186 days, thus representing a daily increase in weight of 44 and 42 oz. (1) It has also been remarked, that when a pure race does not receive, from time to time, infusion of new blood from the parent breed, it tends to degenerate.

The agricultural society instituted some very carefully conducted experiments to test the yield of meat, its nutritive value, &c., proportionate to the weights of the prize animals. These scientific examinations have fully confirmed the points followed in practice for judging and estimating fat stock for slaughtering. Cattle prepared for a show exceed in fattening those intended for commercial ends; the former can never be sold for what they cost; they attract public attention by prominently showing the extreme limit that certain aptitudes can attain. To ascertain the commercial value of an animal we must study the cattle market.

The convertible value of meat, that is, of the quantity digested or utilized, is in proportion to the amount of dry matter it contains, and a certain relation between the latter and the azotized and fatty substances. The superior morsels of meat unite these characteristics; they cost dearest at the butchers', and are always found in certain parts of the animal. Hence, of two animals, as similar as possible in race, and convertible quality of flesh, the superiority will rest with the one that puts on the largest quantity of the choice morsels. The Show Committee selected, as standard of comparison, the weight of the hind quarters as compare with the other parts of the carcass, to determine the monetary value of the beast; the eminent chemist Müntz, chose a sample of the muscle and fat of each animal for analysis. For the bovines, the sample of meat was taken from the neck, because of all parts of the body, that is the most difficult to fatten, hence, differences are more significant in that which refers to fattening propensities, and the nutritive value of a food. With all

(1) Hardly possible, one would think. Two pounds and a half, a day, is double the usual increase on our best prize pigs in England, and quite equal to that of the best bred bullocks.

animals the choice morsels of flesh fatten with facility; on the contrary, the chemical composition of such morsels, in the majority of cases, differ but little whether the animals be fat or lean.

The animals on entering the show, are weighed; they remain six days exposed; they are weighed again on entering the slaughter house; the differences between the two weighings vary as much as 95 to 165 lbs. Evacuations cannot explain the difference; the heaviest animals represented the greatest loss in weight. If this loss were real, it must be at the expense of the fat, eliminated under the form of carbonic acid; but an animal weighing 19 or 20 cwts, does not give off during 24 hours, a quantity of carbonic acid representing 18 lbs of fat; physiology fixes that figure at 3½ lbs. The weighing machines then must be faulty. Of two oxen, one weighed 16½ the other 17½ cwts; both were of the same breed, Durham, but the second was six months older; the first yielded 66 per cent. of meat net, the second 71, the tallow being 15 and 15½ per cent. respectively. The second animal was more profitable for the butcher; its choice morsels were greater; but the second ox was smaller, and its flesh rather superior. In the case of fat cows, there was a difference of 6 per cent. of water in their flesh, which means about 7 per cent. of interstitial fat; while the prize oxen above alluded to, contained only 32 p. c. of such fat, the cows had 65—the difference not being comestible matter. The remarks apply also to sheep with equal force; a Southdown outlet weighing 18 ounces, but only having a prime morsel of flesh of 1½ oz., is more nutritive than a Dishley (1) outlet of 32 oz. with only a morsel of 1½ oz. of first class meat. In the fat of bovines, oleic acid amounts to 58, and concrete acid to 42 per cent. Also, as animals become fat the oleic acid augments. M. Regnard confirms, that the blood of these prize animals is very rich in red globules, thus indicating a large quantity of oxygen. But the destruction of the nutritive combustible materials is not in a ratio to the respiratory capacity of the blood. Were it so, the high degree of fattening obtained would be impossible, with a blood so rich in oxygen. Calves become equally fat, and yet their blood is very poor in rich globules. But this anomaly does not affect the doctrines of fattening—it strikes only the old doctrine of respiratory combustion.

Respecting the outcry against trichinæ, and the embargo placed on American pork by the French government Mr. Bonley, the head veterinary inspector, has examined 600 cases of said pork at Havre, and has found them free from all disease. Milne Edwards repeats, that good cooking will destroy the trichinæ, and Boussingault adds, that in order to roast meat uniformly, metal skewers ought to be plunged into a joint, so as to conduct the heat into the interior.

The lambing season in France is arranged so as to take place between the last fortnight of January and the first fortnight of February; each ewe on the point of lambing is placed separately, and provided with good litter; she is aided, in case the lamb presents itself irregularly; if the mother refuses to lick the lamb, the latter ought to be dredged with salt, to induce motherly tenderness; some lambs are awkward in finding the teat, so they must be assisted, and where the mother refuses to be suckled, place her in a narrow space with the lamb, when she will soon change; if she have no milk, place the lamb with a ewe that has lost hers, or feed it with the bottle on lukewarm milk, or milk slightly heated with water. At the age of 2 or 4 months, the lambs are weaned, and generally received a pint of oat daily, till 5 months, then three-quarters till 8 months old, rising in proportion. The ration of meadow hay is about 6 per cent. of the live weight of the animal. The increase in weight of

lambs, is from 2½ to 3 oz. per day, during ten months; those intended for breeding should have moderate exercise, to develop their form and avoid obesity; after the age of a year, they must not be overfed, that would make them sterile, and affect even the fineness of the fleece; if extra-fine wool be the end in view, the young animals ought to be comfortably lodged, the litter kept very clean, and the shed warm, the rations good, and not excessive.

An egg farmer has two poultry establishments: in one the fowls are enclosed in a yard and fed on grains: each hen, during four years, lays 103 eggs annually and its keep is valued at \$1 per year. The second establishment allows the fowls to find their own food about the yards, and in a large cavalry manure pit; these hens lay 111 eggs each per annum; the birds are sold when in their fourth year. To mark their age, when 1 to 3 month's old, one toe, of the right foot is cut off; the following year, a second, and the next, a third; the fourth year tells its own tale. To preserve eggs during ten months and fresh, place them in a bath of white-wash; turning them every second or third day. The poultry shed ought to be swept once a week; fresh straw added, and the walls washed with a solution of one-twentieth of sulphuric acid and water.

The agricultural situation is satisfactory; the weather has been favorable for fields operations; grain fetches a fair price; lean cattle are in demand for fattening, and pigs are very remunerative. In some localities, the frost has affected the vines a little, and the phylloxera is not quite so destructive as heretofore; the insect is being clearly checked—preparatory, it is to be hoped, to being exterminated. The prospects of the wool campaign are bright. The extent of land under beet will be this year about the same as last, and everywhere the counsel is being given—select suitable seed, and success is one-half assured.

Boussingault laid down, that the soil is richer in carbonic acid than the atmosphere, being poorer (1) in that acid, however, as it contains more of oxygen; Müntz & Schlosing showed, that the production of nitrates in the soil is due to fermentation, that is to the presence of animalcules; Wollny has now demonstrated, that these also produce carbonic acid.

Composition of the ash of sea-weed burned in the open air; mean of twelve analyses, by Professor Johnston:

Potash.....	17.40
Soda	12.70
Chloride of sodium (common salt).....	16.50
Chloride of potassium.....	0.93
Iodide of sodium	0.95
Lime	7.39
Phosphate of lime.....	7.24
Magnesia	9.89
Oxide of iron	0.24
Sulphuric acid	24.76
Silica (sand)	1.84

100.00

The above may be of interest in connection with the *varech* manure imported from France, by the Quebec Government, for distribution among the farmers of the province. I should like to see it tried by the side of the same value in bone-dust. It will be observed that this *goémon* is about the same as the sea-weed so largely used on the coast in the West of England, in Fifeshire, Scotland, and in the Channel Islands,

(1) I think our correspondent must mean that, though the soil is the richer in carb. ac., that carb. ac. is of poorer quality!

A. R. J. F.

(1) i. e. Leicester. Bakewell lived at Dishley. A. R. J. F.

where the crops are certainly prodigious. I wish the new importation, heartily, success. The beet-crop should benefit by the potash, azote, and phosphoric acid.

A. R. J. F.

Goëmon-Biphosphaté.

The Government has received the manure from France. The analysis is as follows:

Analysis (dry) of the Goëmon-Biphosphaté:

Organic matters	36.00
Nitrogen	1.93
Soluble phosphoric acid.....	5.60
Insoluble " "	2.50
Alkaline salts.....	1.90
	47.93

Any one can obtain the manure, at \$26 a ton, on application to the Secretary of the Council of Agriculture.

GRASSES.

I do not suppose that the better class of farmers in this province are likely to alter their plan of cultivating grasses. So many fine crops of hay are cut every year composed principally of timothy, and the custom of the country of trusting to that plant has obtained for such a length of time, that the prejudice in favor of it is probably ineradicable. But in spite of the practice being almost universal, I must be allowed to say that there are many other grasses which are just as valuable for hay; and, inasmuch as they produce a far greater amount of aftermath, are much more profitable to the farmer; it being notorious that timothy should never be grazed, if its retention as a hay-bearing crop be desired for a succession of years.

I have already explained, in this journal, that certain grasses find themselves more at home on certain soils than do others; and that, in consequence, if a grass finds itself in a situation where food and exposure suitable to its tastes are provided, it will set all its wits to work to drive out its less happily situated neighbours, and in the end, will reign in its little kingdom without a rival.

Now, among the first requisites for a comfortable home demanded by gramineous plants is, that the geological formation shall be congenial to their habits. In this part of the world, the underlying rocks have been, almost invariably, covered up by accumulations resulting from the operations of rivers; these are called *alluvial deposits*. We see how streams and rivers cut out for themselves, channels, glens, and valleys, and transport the eroded materials in the state of mud, sand, and gravel, to some lower level: the sand and gravel, being the heaviest, is deposited first, the clay remaining longer in suspension only leaves its bearer when the water becomes tranquil; and this may be seen all along the valley of our rivers by any one who chooses to look. These operations have been going on ever since the land received its present configuration; and thus we have accumulations, often of considerable thickness, which consist of alluvial silt, masses of gravel and shingle, with occasional beds of fine blue unctuous clay, and layers of peat moss. (1)

Our farms lie principally on these alluvial deposits. The subjacent rock affects them but little, except where the two, on the slope of the hills, meet and modify each other, as at

(1) Chambly will afford a good instance of this to an observer. Above the *Canton*, sand and gravel; at the *Bassin*, dark blue unctuous clay, and in the *Savanne*, a thick bed of peat.

St. Hilaire, Rougemont, Abbotsford, &c. I take it, our best plan would be to consider what grasses are best suited to these accumulations, without troubling ourselves with the rarer cases in which the Silurian, or the primitive rocks, may come to the surface. And for convenience these beds may be divided into the four following classes: rich loams; poor stiff clays on a clay subsoil; light soils on sand; together with a not uncommon case, light sandy loam on clay. We propose to lay down a field in grass on each of these divisions, to lie out four of five years, or permanently.

1. Rich loams.

	lb oz.		lb oz.
Perennial rye grass.....	10 0	Timothy	3 0
Smooth meadow grass... ..	2 0	Red clover..	4 0
Cocksfoot(Orchard) " ...	5 0	White clover	3 0
Meadow fescue	3 0	Cow grass(Perennial red	
Hard "	3 0	clover)	4 0
Meadow foxtail	2 0		

2. Stiffs soil on clay.

	lb oz.		lb oz.
Perennial rye grass.....	12 0	Timothy	2 0
Smooth meadow grass... ..	3 0	Cocksfoot(Orchard grass)	6 0
Rough meadow grass....	2 0	Red clover	4 0
Lolium fescue	2 0	White clover.....	3 0
Hard fescue.....	2 0	Cow grass.....	5 0

3. Light soils on sand.

	lb oz.		lb oz.
Perennial rye grass.....	14 0	White clover..	5 0
Smooth meadow grass... ..	3 0	Birdsfoot clover (Lotus	
Hard fescue	3 0	corniculatus)... ..	0 8
Soft oat grass	1 0	Yarrow	0 8
Sweet vernal	0 8	Sheep's parsley (Petrose-	
Cow grass (Perennial red		linum Sativum)	1 0
c. Trifolium pratense)	6 0		

In number 4, light loam on clay, I should be inclined to sow nearly the same seeds as in number 3, timothy never holding out on such soils, and very often not taking at all; I should take off two pounds of the rye grass and substitute the same weight of Alsike clover, and wherever the land in any of the classes had borne red clover lately, I should sow Alsike in its place I believe all these grasses will last as long as they are fairly treated, that is to say, as long as they are not allowed to seed down, and as long as the land is kept in fair heart. They are called, most of them, *perennial*, i. e. everlasting; but if they seed they will probably die off.

Meadow foxtail (fig. 1)—This is one of the earliest and best; Cocksfoot (fig. 2); Rough stalked meadow grass (fig. 3); Meadow fescue (fig. 4); Sainfoin (fig. 5); Cow grass (fig. 6).

The meadow foxtail does not come to its best for the first three years, so where the land is to be broken up soon it may be omitted and a little more *cow-grass* or *orchard-grass* sown in its place.

I hope it will be well understood that if the rye grass is allowed to ripen, or even form, its seed before being cut, the land will be as much exhausted as by growing half a crop of grain. If cut in blossom, no injury will be done to the productive power of the soil. The *cow-grass*, a most valuable plant, was for a long time held in utter contempt, being mistaken for the *meadow* trefoil, which is an utter abomination, and never fails, by its obtrusive character, to destroy the more valuable pasture plants round it.

Most of the descriptions of the different grasses in this article are taken from "The Illustrated Book of Grasses," a most excellent work on the subject, by Mr. Wheeler, Gloucester, England.

MEADOW FONTAIL.—*Alopecurus pratensis.* (fig 1).

One of the earliest and most valuable grasses for permanent pasture; cattle of every kind are fond of it. It constitutes the principal herbage in most of our richest pastures and meadows. It grows to the height of from two to three feet; and it is remarkable not only for its earliness but for its highly nutritious qualities and for the abundance of its aftermath. It does not acquire its full productive powers till about the fourth year from the time of sowing. It is admirably adapted for a medium loamy soil; and is altogether, for a permanent pasture, one of our most valuable grasses. It flowers in May or beginning of June. Sometimes a so called giant form of this grass is recommended. but, in as far as our experience goes, we are prepared to state it is not a different species from the above, which indeed, under some circumstances, will grow to a great height, and urnish a large quantity of highly nutritious keep.



Fig. 1. Meadow Fontail.
COCKSFOOT.
(Dactylis glomerata.)
(fig. 2.)

The Cocksfoot—a well-known and highly valuable grass—is admirably adapted for permanent pastures, also for “seeds” for one or two years’ lay. After sowing, it soon arrives at maturity, and produces an extraordinary quantity of highly nutritious keep, and especially on deep retentive soils, or under the shade of trees. It is found in all our most valuable pastures, and grows rapidly after mowing. When sown by itself, it grows tufty, but when combined with other grasses this is not so objectionable. It is one of the most rapid growers of all our native grasses, and succeeds admirably on medium loamy soil,—but is not so well adapted for light sandy soil.



Fig. 2.

Rough stalked meadow grass. (fig 3).

The *Poa trivialis* (Rough-stalked meadow grass) and *Poa Pratensis* (Smooth-stalked meadow grass) are much alike; but they are readily distinguished by looking at the ligule, or little tongue of the leaf, which is pointed (see figure a). The Rough-stalked Meadow Grass grows commonly in moist pastures to the height of 18 inches to 2 feet. Its root is perennial, fibrous, but very slightly creeping, and shoots are produced from the root at the base of the culms, which trail on the ground and send down small roots at their joints in moist weather. These rooting shoots begin to grow pretty early in spring, but become dried if exposed to the effects of much sunshine during summer;

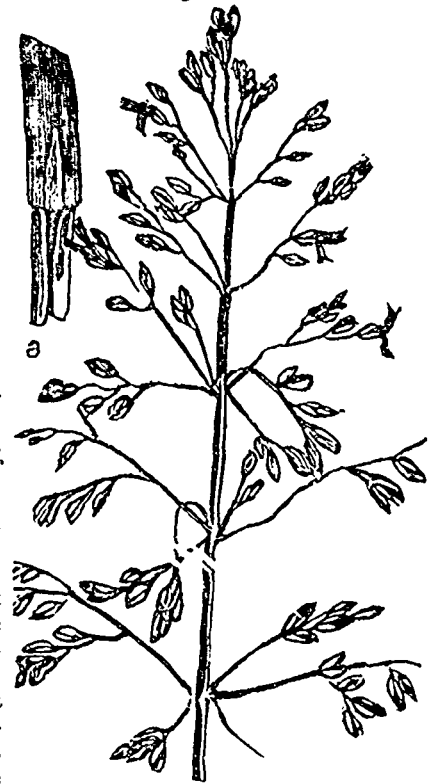


Fig. 3 Rough stalked meadow grass.



Fig. 4.

they, however, shoot out again towards the end of the season, when the weather becomes more moist, and continues green during the greater part of winter. This habit of growth fits it admirably for growth in mixture with the more upright sort of grasses, such as Italian Rye Grass, Meadow Fescue, &c. When grown by itself, and especially on dry exposed situations, the produce of this grass is nothing to boast of; but when grown in combination with other grasses, and taking into account its highly nutritive qualities, as shown by a marked partiality which oxen, horses and sheep have for it, and also the sea-

sons in which it arrives at perfection, or rather its habit of early and late growth, it may be distinguished as the most valuable of those grasses which affect moist, rich soils, and sheltered situations. Upon the whole, *POA TRIVIALIS*, when sown upon good land, and in mixture with a number of other herbage plants, may be considered one of our best grasses for either pasture or hay. This species blooms in June, ripens its seeds from the middle to the end of July, and contains most nutritive matter when the seeds are ripe; it yields a greater bulk of hay than the Rye Grass, and by analysis, is also superior to it in nutritive elements.

MEADOW FESCUE.—*Festuca pratensis*. (fig. 4.)

This is a valuable grass for permanent pasture, predominating in our more valuable meadows. In the Vale of Aylesbury it constitutes a considerable portion of the most valuable and fattening pastures of that rich grazing district; it makes excellent hay, and, although a large plant, the leaves are succulent and tender. It does not grow tufty, as is the case with most of the larger grasses, and does not arrive at its full productive powers so soon as either the Cock-foot or Foxtail. No species among our native grasses, Foxtail excepted, produces so great a quantity of early food as the Meadow Fescue, and it appears to be far superior in nutritive qualities. It is of a perennial habit, flowering towards the end of June, and growing to the height of 1½ to 2 feet, thriving best on rich and rather moist soils, but is suited for and succeeds well on all good land, and is much relished by every description of stock. It is one of the six—Sweet Vernal, Meadow Foxtail, Smooth and Rough Meadow Grass, Crested Foxtail, and Meadow Fescue—that were especially recommended by Curtis beyond all others for laying down meadows for permanent pasture; and although modern practice and experience might lead to a partial alteration in the list, the species before us will still hold its place.

SAINFOIN.—*Onobrychis sativa*. (fig. 6.)

“The enlarged area of Sainfoin cultivated in the corn-growing counties is one feature in the present movement. Its quick growing vigorous nature and its spreading foliage which shades the ground and enables it to retain its moisture, and the better to withstand drought, are no doubt the reasons for the increased popularity of this excellent plant.”—*Journal of the Royal Agricultural Society*.

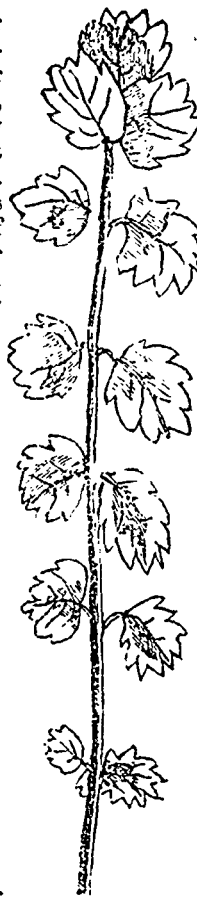
This plant is much grown in Chalk and Oolite soils, and from experience it is known to produce the largest amount of fodder of any of the clover allies. During the moist season of 1871 Professor Buckman cut his crop twice, making upwards of 3 tons of hay the first cut, and half that quantity the second; and afterwards it came fairly into flower for the third time. This was the sort known as the “Giant Sainfoin,” which flowers more than once, the ordinary kind only flowering once, but making up as a soiling plant by growing a fine secondary crop of green leaves. Sainfoin seed is sold in two form—“unmilled,” where the seed is invested by its wrinkled covering; and “milled” where this latter is removed by mechanical means. In purchasing the former, care is necessary to see that it is not mixed with the seed of the Burnet, which is sometimes met with in a crop of Sainfoin to a ruinous extent, as it is a coarse and comparatively useless plant, soon overpowering the real crop plant, and so

doing irreparable mischief. They have both of them *pinnate*, or winged, leaves, but in the Sainfoin the leaflets are entire, that is, not notched. In the Burnet the leaflets are broader and toothed at the margin. (See a, fig. 5.)

THE TRUE COW GRASS CLOVER.

Trifolium pratense perenne. (fig. 6.)

The True Cow Grass or Perennial Red Clover is a great favorite with our best farmers and is more lasting than the Broad Red Clover. When Clover is required to stand more than one year, the Cow Grass Clover should be chosen. It produces a large quantity of highly nutritious fodder, is more permanent and lasting in its character, and for this reason, it is exceedingly valuable in seeds for two, three, or four years' lay, and for Permanent Pasture. We recommend this variety with great confidence; as will be seen on referring to the preceding tables we use it freely in our mixtures. No seed varies more in quality than Clovers, nor is there any



Burnet.

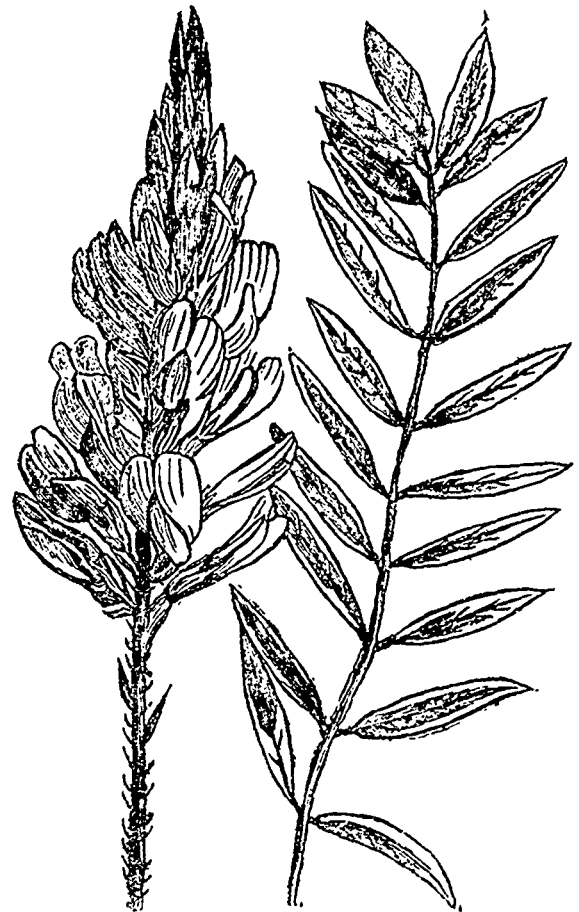


Fig 5. Sainfoin.

which requires more discrimination in selection. We are in receipt of gratifying and encouraging letters, speaking in the highest terms of our Clover Seed, and for the luxuriant and heavy crops which they have produced.

TOMATOES.

When this number of the Journal reaches the subscribers (?), tomatoes will, or should, be just beginning to grow. I tried a few, last year, managed after a fashion I saw practised, many years ago, in the south of France. No sticks are required, which is one trouble saved. As soon as a bunch of flowers is formed, stop the shoot from growing any farther. That is all.

You will have a nice, low bush with quantities of fruit, but not more leaves than are necessary. I found the tomatoes ripen quite as soon as when treated on my *single stem* principle: v. *Journal for July, 1829*; vol. 1. p. 44. The shoots from the *axils* which sprout after the fruit is set must, of course, be pinched off, as in tobacco growing. Two feet, each way, will be found sufficient distance between the plants. It will not answer at all, to let the bush grow as it likes for a month and then stop the shoots: it must be begun as soon as the flowers form. I think this will be found to be the best way of getting an early and plentiful crop. Liquid manure I should not use until the fruit was all set: it encourages leaves and branches. Much, however, as much as you please, with well rotted pig or cow-dung, working it into the ground, and replacing it with fresh, once or twice in the season: when the fruit is nearly turning colour, it can hardly get too much liquid manure. When the tomatoes are ripening, clean, dry straw should be put round and under each plant to keep the fruit from worms and dirt.

A. R. J. F.



Fig. 6. Low-grass.

POULTRY DEPARTMENT.

Under the direction of Dr Andres, Beaver Hall, Montreal.

EXHIBITIONS.

Some may think that it is a little too early to prepare for the shows of the coming year, but I think it better to do so now than to put it off to the last moment. Our Provincial Agricultural Society has announced an exhibition to take place in September. While I knew that it is not a favorable time to exhibit full grown fowls, because of the fact that they are just in the moulting season, it is a good opportunity to bring out early chickens, particularly of the smaller breeds.

It is none to early to make plans for breeding and raising better stocks than last year

The breeding pens should be properly and carefully mated up, remembering the results of last year's work, where failures were made in so doing, with a view to improvement for the year to come. I simply desire to urge upon the readers of this paper to become exhibitors. If they strive to raise a large number of birds for exhibition they will take greater care of their flocks and, becoming interested in them, will constantly aim at a higher ratio of success each following year. Then, not only will the few birds that are placed on exhibition be put in the best condition, but the whole stock will be improved, not only in health cleanliness, and the consequent general good looks, but in laying qualities and condition for the table. At the same time, they themselves will become educated, and will help to educate their neighbors, in distinguishing the different qualities of the various breeds exhibited. Exhibitions, when properly conducted and well judged, are educators of the people who attend them, and should be thoroughly sustained, and every effort be put forth by the people of this province to make them a success. The exhibits of poultry this year should be better than that of last year, both as to number and quality.

Some breeders who raise poultry for sale never exhibit. Some are afraid of being defeated, and some will not incur the expense. They are afraid that there will be unjust judging, and that they will not gain the prizes they think are their due. Some prefer to advertise that they are "not exhibitors"; laying the flattering unction to their souls, that those who read their advertisements will think that if they did exhibit, they would carry every thing before them.

But we assert that these objections are not justifiable. Every man should know his own stock, and not fear defeat. Studying carefully the standard for poultry, he should learn to score his own birds. Those having good birds, if defeated by those having better ones, should bear it gracefully. They have shown their birds, and having had their names on the coops, it has been an advertisement for them; and if the prizes have been awarded badly, others will know it as well as themselves. Every exhibitor should be willing to do his part towards the common good of all; to make that successful which tends to the greatest possible advantage of the object to be benefited.

There is much to be learned in attending exhibitions; examining closely the birds shown, and reading the score cards, you will soon learn the points of good birds, and know in what way you may have made mistakes.

Make up your minds at once to enter your stock at the exhibition, and begin now to make arrangements for it.

Langshan Fowl.

Having received communications from several parties in regard to the above named fowl, we propose to give our readers in the June number of this Journal an illustration engraved from birds bred by Major Crood, the first importer of it into England.

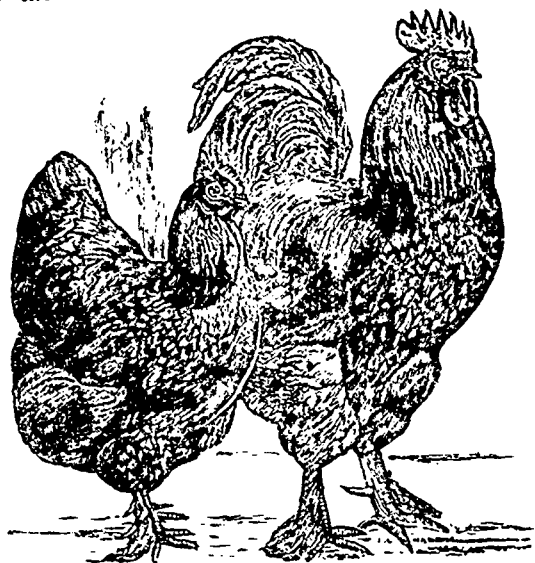
D. D. Bishop in the *Poultry Monthly* says, in alluding to the fact that the bird had been called an improved Black Cochon:

"I suppose that I have made my share of fun at the so called Langshans. And I should repeat the same sarcastic expressions today upon the same specimens. If they had been fair repre-

representatives of the genuine fowls they were as worthy of contempt as are inferior birds of any other breed. Whoever chooses to call this a case of Langshan conversion, is at liberty to do so. My partialities in the Asiatic class are for the Cochins, and I have been known as a "Cochin man."

Nor do I own a Langshan. I have simply this to say, that I have seen the bird himself, and am satisfied that I was wrong in applying to the true and genuine specimen the terms which are still merited by those mongrels which have, before this, been introduced to me by an honorable name. In this season's shows, where I had occasion to judge, I came across the veritable specimens. It was no more possible to mistake them, if any one had seen them, than a good Cochin could be mistaken for a good Brahma. If one chooses to contend that some Langshans are much like some Black Cochins, I shall not deny that, but that it is as poor a specimen of a Langshan, as it is of a Cochin, which he is said to resemble.

I do not like to suspect interested motives, but I know of Black Cochin breeders, who are perhaps the loudest in crying down the Langshan, while, on the sly, they have put a Langshan cock into their Black Cochin Yards to improve the size of their birds."



Langshan

From correspondence with Chas. Marland Esq. of Ballardvale, Mass. who has been breeding the bird, we quote this: "I have been breeding Fancy Poultry the last twenty (20) years, and I am free to say that I never kept a breed of fowls that I thought combined so many good points of excellence as the Langshan.

First, they are almost unsurpassed as layers. I sometimes get as many eggs in a day as I have hens; and what is better, they keep laying, and not a few days; then, stopping for days. They are of a quiet disposition, although my fowls have free range I seldom find any of them more than one hundred feet from the fowl-house.

The flesh is white in color, fine grained, making, when dressed, a fine table fowl and very palatable.

Every person who sees my yard of Langshan fowls admires them for their beauty, particularly when the sun shines upon them, bringing out the beautiful greenish lustre of the plumage."

I am importing eggs this season from Major Croad's yards, the introducer of the breed into England, and this fall shall import some fine stock, and intend that my yards of Langshan Fowls shall not be surpassed on this side of the water.

S. J. A.

Seasonable hints.

The season is upon us, when the mind as well as the hands must be more active than at any other time of the year. The heat of summer is coming upon us, it behoves the poultry breeder to beware of the worst enemies he has to contend with, lice and vermin of all kinds. If the ounce of prevention which is better than a pound of cure is not attended to and applied in time, he will find the enemy upon him in myriads of battalions, where there was at first only a skirmishing party, and he will find them harder to fight than an army of Boers, for they stick fast and tight when once they get into the breach left open for them through carelessness. Remove from the inside of the house everything that can be moved, even the supports for the roosts, whitewash the inside of the house, removing the roosts; and washing them with kerosene every week, thoroughly cleanse the nest boxes, and burn all old straw and material that has been used through the spring; renew the earthen floor with fresh dry earth, then close the house up as tight as possible; put live coals in an iron vessel, burn roll brimstone, keep closed for twelve hours, and you will pretty sure of peace for the summer. S. J. A.

Poultry Food.

There are many kinds of grain used as food for poultry, but in the main, corn seems to be the staple diet in this country. Through the influence and diffusion of poultry literature, we are taught to regard diet as a matter of real importance as it affects the health of fowls, and also their productiveness.

All kinds of grain, if sound, have certain constituent properties, but they differ in their nutritive value, which varies with their chemical composition. Some tend to promote the growth, some to promote fattening, and some to egg production.

Oats and barley, which are rich in protein compounds are best adapted to develop muscular tissue and growth in young fowls. Corn, which is specially rich in oils, is best adapted for heating and fattening, and for this purpose has no equal among grains. Wheat and buckwheat, being rich in gluten and albumen, are best adapted for egg production. Rye, although a wholesome grain, is not much relished either by young or old fowls, and if used at all, it should be ground and combined with other grains. Bran and middlings are largely used as food, but middlings alone are too sticky, and fowls do not like it. Good middlings, and wheat bran mixed, and to these, if oatmeal, or cornmeal be added and scalded with boiling water or milk, makes an excellent food, and may be profitably be given once a day, the year through, and constitute the staple morning meal of soft food.

Milk in any form, for either growing or adult fowls, is an excellent drink, and is a good substitute for insects, worms, etc.

Poultry Monthly.

Chickens.

Some of our farmers complain that it is not profitable to raise and keep chickens. At which we are not very much surprised, when we see and know of the careless manner in which they are kept.

Chickens will pay if properly attended to in supplying their wants when young, and giving comfortable quarters instead of allowing them to run everywhere, and roost any where, on the farm utensils, carriages, wheel-barrow handle, and mowing machine, throwing the soft food down on the ground, where the most of it is trampled upon and spoiled instead of being eaten: under such circumstances they will not pay; but with proper food given at the right time, and kept clean, warm and dry, they will pay a greater percentage than any other animals kept on the farm.

S. J. A.

INSECTIVOROUS BIRDS.

Are they beneficial to the farmer and fruit grower ?

SIR.—In the Eleventh Annual Report of the Entomological Society of Ontario, the President, Wm. Saunders, in his annual address, states his conviction that but comparatively little help is got from birds in keeping in subjection injurious insects, and having examined the contents of the stomachs of a large number of birds, he has only found occasionally an injurious insect therein. He mentions the swallows, HIRUNDINIDÆ; kingbird, *Tyrannus Carolinensis*, pewee, *Sayornis fuscus*; nighthawk, *Chordeiles*; yellow warbler, *Dendroica aestiva*; red start, *Septophaga ruticilla*; red-eyed and yellow-throated vireos, *Vireo olivaceus*; and *V. flavifrons*; woodpeckers, PICIDÆ; blue bird, *Sialia sialis*; cat-bird, *Galoscotes Carolinensis*; brown thrush, *Harporhynchus rufus*; sparrows, FRINGILIDÆ, cuckoos, COCCIDÆ, nuthatch, *Sitta Carolinensis*; chickadee, *Parus atricapillus*; kinglets, SYLVIDÆ; meadow-lark, *Sturnella magna*, Baltimore oriole, *Icterus Baltimore*; wren, *Troglodytes ædon*; black-birds, ICTERIDÆ; and especially the Robin, (*Turdus migratorius*) as a great fruit thief, de-roying a far greater quantity than it would eat, therefore, should not be protected by legislation. I trust the above extract will induce readers of the *Canadian Sportsman and Naturalist* to give their experience respecting the usefulness of Insectivorous birds to farmers, fruit-growers, and gardeners. E D W.

The above named birds are all insectivorous, but the question regarding their being beneficial to agriculture is a matter which we have always contended, was overstretched. Mr S. A. Forbes, an American naturalist, has examined the stomachs of 150 birds of the Thrush family, with quite unexpected results. "Forty one of these were Robins; thirty-seven Cat-birds; twenty eight Brown Thrushes, eight Alice's Thrushes; six Swainson's Thrushes, and one Wilson's Thrush. They were shot in various months from March to September and during four successive years. The number of specimens is, of course, too small to allow conclusive generalization; but as no equal number of specimens has been previously studied with equal care, it will probably be fair to state some of the result as hypotheses, more or less probable, but requiring verification by further study. The most fruitful peculiarity of the method used was the careful estimate, for each specimen (after a critical microscopical examination of the contents of the stomach), of the relative amounts of all the elements of the food, and the subsequent averaging of these ratios for the species. By this means I determined the hitherto unsuspected fact that the family is inordinately destructive to predacious beetles (HARPALINI), seven per cent of the food of the 150 specimens consisting of these highly beneficial insects. When we remember that one predacious insect must destroy many times its own bulk of other insects during its life, we see the importance of this fact in respect to the economical value of these birds. Between the TURDIDÆ, and other families, I can make only the following crude comparison. Of the 150 Thrushes examined, forty-six per cent. had taken CARABIDÆ, while of 194 birds of other families in whose stomachs insects were found, less than five per cent. had eaten these Coleoptera. The worst sinner in this respect was the Hermit thrush; while the Alice thrush and the Wood thrush had eaten comparatively few. Curiously, the ratio of CARABIDÆ continued undiminished during the fruit season when the total of insect food fell away very rapidly. For example, the Cat birds ate in May, June and July, eighty seven per cent., sixty-four per cent., and eighteen per cent., respectively, of insect food, while the CARABIDÆ for those months averaged seven per cent., six per cent., and ten per cent., the corresponding fruit record standing nothing, thirty per cent. and seventy one per cent.

The following genera were distinguished among the CARABIDÆ: *Scarites*, *Dyschirius*, *Platynus*, *Evarthrus*, *Pterostichus*, *Amara*, *Brachylobus*, *Geopinus*, *Agonoderus*, *Anisodactylus*, *Bradycellus*, *Harpalus*, and *Stenolophus*. The absence of all, or nearly all, the specially protected genera is noticeable (unless the obscure colour of many is reckoned a special protection.) A single Cicindela (*C. lecontei*) was found in the stomach of a Cat bird. It is further interesting to notice the apparent specific difference in the food of allied species, occupying the same ground at the same time, and drawing their food from the same sources of supply. The Robin and the Cat bird differed materially in the number of ants and myriopods destroyed, the former eating very few of either (one per cent. and two per cent. respectively) The Brown thrush departs from all the other members of his family in his fondness (perhaps it is stern necessity which forces him to this miserable shift) for insects and fragments of grain picked from the droppings of stock. Twenty-eight per cent. of the food of those shot in April was derived from this source, and another eight per cent. consisted of carrion beetles (SILPHIDÆ). This bird was further distinguished from the Robin (as is the Cat bird also), by the absence of the larva of *Bibo albipennis*, Say, which made over half the food of the Robin in March. It is important to recall, as throwing light on the question of fixity of food habits over large areas, that Professor Jenks, now of Brown University, found nine tenths of the food of a large number of Robins, whose stomachs were examined by him in Massachusetts, in March and April, 1858, to consist of this same larva."

The above particulars and conclusions will serve to give some idea of the interest and promise of this subject, if it is studied with as near an approach to the strict scientific method as the circumstances will permit.

Canadian Sportsman and Naturalist.

Montreal Fish and Game Protection Club.

Sir,—You will confer a favor on the members of this Club if you will be kind enough to expose the enclosed notices in a conspicuous place in your school; the Club would also be under a further obligation if you would point out to your pupils the cruelty of destroying the birds which frequent our fields and orchards during the summer season, or of disturbing their nests, as well as the injurious results to Agriculture and Horticulture which arise therefrom.

The immunity from the ravages of caterpillars and destructive insects which this district has enjoyed during the past two years, is in a great measure due to the increase of insectivorous birds which has taken place since the law for their protection was passed. It is to be hoped that soon such a healthy and enlightened public sentiment will exist on this subject, as will effectually protect all our small birds from molestation, this can most successfully be brought about, by instilling into the minds of the young a sense of the cruelty and impolicy of injuring creatures which are at once so beautiful and so useful.

I am, Sir,

Your most obedient Servant,
W. H. RINROUL, Sec.-Treasurer.

VETERINARY DEPARTMENT.

Under the direction of D. McEachran, F R C. V. S., Principal of the Montreal Veterinary College, and Inspector of Stock for the Canadian Government.

The management of the Horse's Foot, and Horse-shoeing.

The object of applying an iron covering to the foot, is to protect the hoof from the effects of friction. The horn of the hoof, though admirably adapted for resisting wear and tear, on his native prairies or hillsides, when exposed to the hard rough surface of a macadamized road wears and breaks, so as to expose the sensitive structure which it covers to injury — rendering the animal lame. The principal use of the shoe is

to protect the foot. It is used also for the purpose of increasing the power and usefulness of the horse by adapting him to the more efficient accomplishment of the duties required of him, whether they be speed or draught. Under an intelligent system of shoeing, both can be materially increased. The great object of the farrier, therefore must be to apply an iron covering to the foot, which, while affording protection to the sensitive structures, will not itself be productive of injury to the foot.

The different modifications of the iron rim which from time to time have been advocated, need not here be considered. We agree with Professor Dick, who, after the experience of fifty years, and experiments with nearly all the different forms of shoes, came to the conclusion that for all practical purposes, no shoe was capable of the same general application as that of Osmer and Moorecroft, the common seated shoe now in general use.

In all well conducted forges, a stock of ready-made shoes is constantly kept on hand. These are usually made by the farriers themselves during the interval when no horses are in the forge. In some forges, shoes made by machinery are used. The hand-made shoes, however, are usually preferable, are more hammered, and being harder, are more durable. In the manufacture of the shoe, the most important points to be observed are its thickness, width, and the positions in which the nails are placed. The shoe should be of medium weight, and this should vary with the size and purpose of the horse. We believe that if the foot requires protection at all, it should be covered by a shoe of sufficient weight and strength to provide against it bending, as often happens when it is light, we refer more especially to draught horses of all kinds, and to hackneys and roadsters; of course race-horses and hunters require special shoeing, but we are convinced that both these often lose more by loss of power and confidence, than they gain by saving weight, shod, as they often are, by almost weightless plates which afford them little hold of the ground in making their strides or jumps. We decidedly prefer to have all horses shod with as solid a shoe as is consistent with the purpose for which he is used.

The width should also be indicated by the nature of the foot, and the roads he has to work upon; thus a horse used mostly on soft roads of turf had better not have the shoes too wide, while a horse with flat feet working on macadamized roads must be protected by a wide webbed shoe, in this, the work and the nature of the roads will indicate the width necessary, thus in the racer and the hunter width of web is objectionable by increasing the liability to be pulled off in soft ground; in the heavy dray horse, whose feet are often more or less flat, and the roads on which he works rough and stony, a wide web is indispensable.

The placing of the nails is very important, and while as a rule they should be placed where the wall is strongest and thickest, each foot requires special consideration on this point; the rule is that they are best placed, supposing seven to be the number, four on the outside and three on the inside; those on the inside being placed nearer the toe than those outside. The holes should be punched in a direction corresponding with the degree of obliquity of the wall at the part; oblique at the toe, getting gradually straighter as they approach the heel.

With the object of making the shoes last longer and increasing the leverage by lessening the liability to slip, caulking at the heels, and toe-pieces at the toes, are generally made use of. We do not, like many, condemn the use of such additions to the shoe altogether, knowing as we do that in many cases they are indispensable, and greatly increase the power of the horse in moving loads, and especially during winter in this country, when they are sharpened to prevent

them from slipping; but we cannot too strongly condemn the careless manner in which these additions are too often applied. If the farrier would always bear in mind the necessity for keeping the shoe perfectly level, whether it is flat or raised by caulking, they could be used with impunity—for after all they are simply a means of thickening the shoe with little increase of weight, and if kept perfectly level, for draught horses especially, they are very serviceable: it is not their use so much as their abuse we object to. The careless manner in which a farrier will raise one heel higher than the other, in this way distorting the whole limb, leads to sprains of tendons and diseases of bones. A little reflection on this subject will repay any horse-owner, and convince him how injurious it must for a horse to be forced to stand on shoes which twist and distort his joints, and how much more it is so, when he is forced to draw heavy loads on these distorted limbs. Fortunately, during the winter, the irregular caulking sink into the snow, and injury is thus avoided, but on the hard roads, and in the stable, it must be agonising to be compelled to throw their weight on them, and we need not be surprized to find spavins, ringbones, and other chronic lamenesses, being developed.

Diseases caused directly and indirectly by shoeing.

Pricking. The farrier of the present day, as a rule, does not even take the trouble to familiarize himself with so much anatomical knowledge as to know even the thickness of the hoof; were he to do so, he would be more cautious in driving nails into the wall of the foot. Were owners to take the trouble also, it would impress them with the risks of injury, and the necessity of employing none but skilled farriers to shoe their horses. This accident arises in the hands of careless or unskilled farriers from a variety of causes; in some cases from the foot being worn or broken, affording but little hold for nails, sometimes, from the nail holes being punched in wrong directions; bad nails splintering in driving; all predispose to the accident, but as a rule it is due to carelessness and too much hurry. In all cases the nail does not actually enter the sensitive structures, but causes a bulging of the inner or laminated surface of the wall on to the sensitive laminae, in others the nail is actually driven through the latter. In this case it immediately acts as an irritant, causes inflammation, heat, pain, and lameness, followed by suppuration; while in the former instance the lameness may be gradual in developing, and it may not reach the stage of suppuration for eight or ten days. It is easily recognized by the circumstances under which it occurs, and by the heat and pain of the foot, which is placed on the ground in such a manner as to take the pressure off the injured part; thus, if the offending nail is on the inside quarter, the weight will be thrown on the outer quarter and toe: on tapping with a hammer, or squeezing with a pair of pincers, pain will be evinced.

The shoe will be removed with pain and difficulty, and frequently a black fluid puss will escape from the nail hole, which infiltrates the horn in its course with the pigment which colours it. In cases where it is not diagnosed for some time, the suppuration under-runs the sole and causes separation, and unless a dependent opening is made for the escape of the pus, it will form fistulae which run in all directions, and finally burst at the coronate, producing a very troublesome disease called *quittor*.

The treatment of injury from pricking by nails consists in the removal of the cause, free opening of the wounded part, poulticing, and rest, and the subsequent judicious application of the shoe in such a manner as to remove the pressure from the injured part of the wall.

P. E. Buck, of Ottawa, chairman of committee on fences, submitted a report, as follows.

Ottawa, March, 6th, 1880.

To the President of the Fruit Growing and Forestry Association of Ontario

Your committee on fences having examined into the subject have the honor to report:

1st. That the existing laws regarding fences are unjust to land owner, and occupier, because if he has no need for a fence around his farm, society should not compel him to build one.

2nd. That if a farm chooses to soil his cattle he should not be required to expend on fences a tax estimated at two dollars per acre per annum, to keep his neighbors' or highway cattle out of his property.

3rd. That no law should compel a land occupier to make a road or division fence to protect himself from the public at large; that the public are just as much interested in the welfare of the state as are the individuals of the public. These last, therefore, should be protected by a public law compelling individuals to inclose their own stock.

4th. That although the public have a right to travel on the roads they have no right to use said roads for a cattle run or pasture ground.

5th. That every farmer, or property owner either by paying taxes for road construction or repairs, or by the performance of statute labor, has a certain vested right in the roads surrounding his lands, and in newly settled townships being less than half cleared, a majority of owners should say whether the public roads may be used for any other purpose than the legitimate travel or driving of stock, when required, along them.

6th. That during winter these roads are fenced in such a way that they harbor snow-drifts, thus blocking to a considerable extent the travel along them.

7th. That the maintenance of fences is an excessive burden on the farmer, now that timber is becoming scarce and dear, and it behoves the Legislature to make such provision by law as will assist in doing away with such an oppressive expense.

8th. That in the early settlement of this country when cultivated lands were scarce, and there were no pasture lands for cattle, it was in the interest of individuals to fence in their crops and allow the cattle to run at large. Now the case is different, the principal part of the country is cultivated, and the pasture and waste places are in the minority, these, therefore, should be fenced and not the larger tracks of farm lands.

9th. That the owners of stock are the individuals who reap the benefit of such stock, and that, therefore, non-stockholders should not be put to the expenses of fences in order that stockholders may make a profit out of their cattle.

10th. Therefore your committee, taking into consideration the above facts, respectfully suggest that, in counties where a majority of the acreage of the soil is arable land, all cattle, horses, pigs, sheep, and geese, be prevented by legislative enactment from running at large. That owners of all kinds of stock should be compelled to keep them inclosed, or pay all damages that may accrue from their depredations, that it be the duty of any one finding cattle straying along the roads, streets, or any unfenced lot, when not accompanied by a suitable attendant, in such county, to drive the same to pound, that for every head of cattle so pounded, the individual who owns such stock shall pay to the pound-keeper, over and above all other fees or charges, the sum of 50 cts. per head to be paid to the individual who puts them in pound; that all damage to trees—whether set on the land of the owner, or along the roadside fronting his land—done by animals, be assessed at the full value, having in consideration the age of

the said trees, and the number of years planted; that such damage be paid by owner of said stock to the owners of said trees; that suitable attendants be employed when cattle are being driven to market, or from one part of the county to others, so as to keep them from straying off the road, that any one turning off the road into a neighboring field either on foot, in a vehicle, or on horseback, shall be liable to be apprehended as a common trespasser, and, as such, be amenable to the law in such cases made and provided.

P. G. BURKE, Chairman.

A very excellent and practical suggestion. Mr. Rigden's farm, at Hove, near Brighton, Eng., where I learned farming, had not one fence on the whole 850 acres. In fact, no farm on the Downs is ever enclosed: the sheep are always either within the fold, or under the eyes of the shepherd and his dog; the cattle are soiled as well as the horses. A. R. J. F.

CORRESPONDENCE.

Dear Sir, — Some time ago, I promised you a letter on practical cheese-making, and as the season has now opened, I send you the promised article. My aim is to produce a cheese to meet the requirements of the British market; as I understand, they want a cheese that is solid, still, rich in butter, and with long keeping qualities. My mode of producing such a cheese is as follows:

The first essential is good milk, and in receiving milk, I pay great attention to see that it is of the desired quality; and besides watching my patrons, I watch myself also, and see that my vats and other utensils are kept in good order. Having got my milk in a pure and sweet condition, I proceed to heat it to 80° for the rennet; I then add rennet enough, so that the beginning of coagulation is perceptible in fifteen minutes. In stirring rennet in, I am careful to mix it thoroughly with the milk, by stirring it from four to five minutes. In an hour, the curd will be ready for the curd-knife. I cut it lengthways of the vat, with the perpendicular knife; after the whey begins to separate from the curd, I cut it again crossways with the same knife, and when the whey covers the curd, I cut it lengthways with the horizontal knife, then heat it gradually, working the curd carefully with my hands, until it reaches 90°; I then work it faster, using an agitator, as there is not the same danger of injuring the curd as there is before it is exposed to that heat; I continue the heat until the mass has reached 98°, and then run the heat off. In running to 98°, I take from one hour to one and a quarter. I then work the curd ten minutes, after the required heat is reached, and after the curd has set ten minutes, I stir it again for a few minutes. I then let it set until it becomes slightly acid to the taste and smell (as I consider this a very particular point in cheese making, I run the bulk of my whey off while sweet during hot weather). I then dip it and stir it well in the curd vat, salting at the rate of 2½ lbs. of salt to 1000 lbs. of milk. In salting, I like to have the whey well drained from the curd before applying the salt, mix the salt thoroughly, the curd being well aired and salted, is fit for the press.

I consider from 65° to 70° to be the proper heat for curd to be put to press. After remaining at press 18 to 20 hours, the cheeses are removed from the hoops, and taken to the airing room, where they are turned every day.

In regard to presses, for the last five years I have used Frazer's Gang Press, to which I must give a decided preference over the old fashioned ones, as by its use I am enabled to press every cheese alike, without variation, and they present a much neater appearance than is generally obtained by the use of the old presses. This appears more forcibly to me now than ever, as in starting other factories this spring, I have had occasion to use the old presses, and find it almost impossible to obtain a cheese that is pressed true; besides they give an extra amount of labor. As I am willing to profit by the experience of others, and willing that others should profit by mine, I should like to see articles from other manufacturers; and if requested, will answer any questions as to my mode of working that may not be covered by this article.

West Brome, May, 6th, 1881.

WM. MACFARLANE.

Sir, — Having for a long time taken a deep interest in the preservation of insectivorous and other birds, it is with great pleasure

that I find the subject so ably handled as it is in your April number in the paper contributed by l'Abbé Provancher I think the act for the protection of insectivorous and other birds should be amended by placing Bobolinks and Wild pigeons in the list of protected birds, and placing shrikes, and perhaps cedar birds, among the exceptions. The close season should also be extended to 1st Sept. The regulations regarding the granting of licenses to persons desirous of obtaining birds or eggs for scientific purposes should also be made more stringent. The licenses now granted are abused by persons collecting bird-skins for commercial purposes.

The Department of Agriculture should make it a condition, when making a grant of money to any Agricultural or Horticultural Society, that such society should undertake the enforcement of the act within its district.

I enclose a circular which I drew up, in 1868, as Sec.-Treas. of The Fish and Game protection Club, a copy of which I intended sending to the teacher of each public school in the Province, which intention was however never carried out owing to want of funds. I think the article by l'Abbé Provancher should be printed in pamphlet form, and copies of it distributed among all the public schools, together with some such circular as the enclosed, and that the same should also be sent to the different Agricultural and Horticultural Societies v. p. 26.

April 9, 1881.

The question as to the usefulness or non-usefulness of small birds is not yet a settled one. It seems at present to be in course of inquiry what birds are and are not beneficial; v. extract from *The Canadian Sportsman and Naturalist* in the present number.

A. R. J. F.

The useful Birds.

The readers of the Illustrated Journal of Agriculture will have appreciated on perusal the valuable essay of l'Abbé Provancher on the protection of insectivorous birds. The law referred to was promoted and drafted by the then Secretary of the Fish and Game protection Club at Quebec, who wrote up the subject during two or three years before venturing to submit it to the Legislature. It was deemed prudent at the time to omit birds of the hawk kind from protection, owing to the prejudice which existed that these birds lived upon the poultry of the farmer—on the contrary, the birds of prey afflicting this province are the best friends of the agriculturist, as their principal food consists of field mice and like vermin. It was also considered that the law would be more easily worked by not mentioning by name the various insectivorous birds to be protected, as that would create the necessity of having an ornithologist to attend at every prosecution brought for infringement of the law. The exclusion of the beautiful Bobolink from protection was owing to an error in the printing of the draft of the bill—snow birds were exempted from protection as they are only with us during the winter—The word "snow bird" in the draft was printed "rice bird" in the act, which is an other name for the Bobolink—The shrike, a fierce predacious bird, should not be protected, but the hawks as well as the crows should—a few words will suffice as an amendment—There is still in the game law a serious defect.—Wild ducks are not sufficiently protected—these birds are in pairs and commence breeding in the country in the neighbourhood of the city of Quebec in the end of April. All kinds should be spared between the 15th March and the 1st September—if not molested in the spring, they would increase amazingly.

Megantic, April 1881.

F. W. G. A.

I must beg to differ entirely from the writer of the above as to hawks being the farmer's friends. I had the misfortune, once upon a time, to farm in a thickly wooded district. The damage done to my poultry by hawks was something frightful. A. R. J. F.

The sale of horses, brood mares, &c., at Messrs. Dawes' farm, Lachine on Saturday, April, 30th, went off most successfully. The Clydesdale stallion, and one or two other lots, were withdrawn, but the rest fetched very high prices. I went to buy Berkshire pigs for a friend, they were all sold, one man having carried off 25 the week before. A. R. J. F.

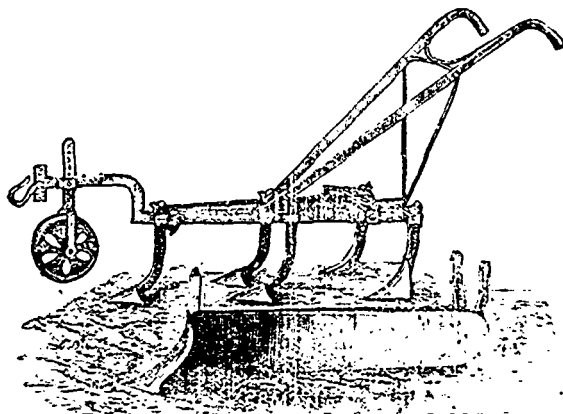
Fonthill Nurseries.

We beg to call attention to the advertisement in connection with the Fonthill Nurseries. The reputation of the firm stands high, and from all we have heard, we doubt not that the promises made by its members will be honestly and honourably fulfilled.

Hay in Stack or Barn.

"HAY: A., Montreal, says:—There are ten acres of hay out; half of it to be put into stack, the other half into a barn. The barn is double boarded, and the doors are tight and sound. One half of the hay is thoroughly made, the rest rather green. Which half would you put into the stack? (Put the dryer half into the barn)." The above, from the *English Agricultural Gazette*, edited by John Morton, ought to settle the dispute between me and Mr. Deming. But it will not, I suppose.

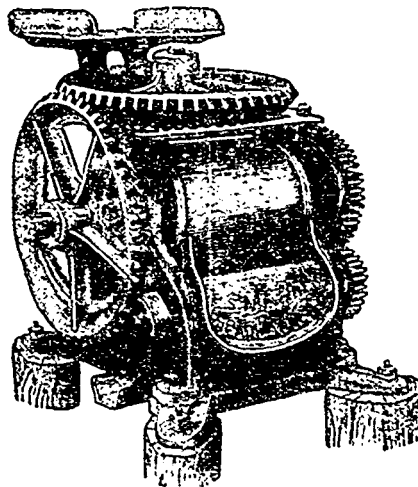
ARTHUR R. JENNER FOST.



Improved horse-hoe, cultivator, &c.

Syrup and Sugar from Sorghum.

We call the special attention of all those who cultivate Sorghum to the advertisement of Mr. E. S. Manny. From our knowledge of him as a manufacturer of great practical ability we are convinced that the implements from his factory will be satisfactory to the purchaser. Samples of syrup, both



Sorghum Mill.

from the Sorghum and from beet-root, made by Mr. Manny himself, we have tasted lately, and we found them excellent. Mr. Manny has 100 acres under Sorghum this year, on his own account, with such a quantity, he will have no difficulty in showing to every one who cares to learn the perfect adaptation of his implements to their intended purposes.

Shropshire does not seem to agree with my appreciation of the Hampshire-down sheep. I am sorry for it, but as he assigns no reason for his opinion there is no matter for discussion. He has clearly never seen the animal in his native habitat, so he can have no idea of the daily hardships

the flocks undergo. If *Shropshire* will take the trouble to read the article in the March number of the Journal, he will see that Mr. Morton, editor of the English Agricultural Gazette, is the person who speaks of the increase of weight in the Hampshire lambs. Any one who chooses may see without trouble that the "pound a quarter from day of birth," means *gain per week*; just as a farmer from Kent or Surrey would say, "this hog has made a stone (8 lbs.) since he was farrowed," i. e. at 20 weeks old he weighs 160 lbs. It is a local way of speaking and I did not think, when I quoted the passage, that it needed translation.

The lambs that weighed 33 lbs. per quarter at the last Smithfield Club show were not the property of rogues who entered them as nine months old instead of twelve months, as *Shropshire* seems to hint; and even if it were so, they would have been disqualified by the veterinary inspectors of the Club, who are quite capable of discerning between a March lamb and a December one. Hampshires do not begin to lamb *the year before*, as *Shropshire* insinuates: he is thinking of the Dorset horned-sheep, probably, which supply London with the earliest lambs.

My own statement as to the precocity of the Hampshires as compared with the Shropshires is admitted by my correspondent. Their hardiness is proved by Mr. Morton in his paper, even if my own testimony were worthless. As for the insinuation that "with cake, meal, grain, roots, &c.;" it shows clearly that the writer has never seen this breed of sheep at home.

Why should I wish to "write up" the Hampshires? I have not a sheep belonging to me of any sort, though if I had I would certainly import that breed. I never "wrote down" the Shropshires, as I have a high opinion of them as next in quality to the Hampshires, though inferior, as I believe, and as every one I know in England now believes, to them in hardiness.

Will my readers forgive a quotation from my notice of the sheep at the Montreal Exhibition, 1880? "These sheep (Shropshires) were superb specimens. Their necks, loins, and legs of mutton were splendid, and it was not till one handled them that their enormously good backs could be believed in."

Not very depreciatory—eh? But still, as a farmer's sheep I prefer the Hampshires; their home is in the almost barren downs of the chalk formation; the rich pastures of the midland counties, and the Red-sandstone soils of their own county, are the home of their rivals. I had in England a standing flock of 250 Hampshire ewes, and hardier sheep never went. *Shropshire* has a perfect right to his own opinion, but I do not think that such a statement as "The Hampshire requires more feed than &c." is a sensible way of arguing a point; it is merely "begging the question." Every one knows, who knows anything about sheep, that the Shropshire is a cross with the long-wool sheep. The Hampshire is a pure-bred as Eclipse.

ARTHUR R. JENNER FUST.

CAPONIZING.

It is desirable to submit the cocks to the operation when they are about four months old, and it is very important to choose a time when the weather is somewhat cool, rather moist than dry, and especially to avoid performing the operation during the heat of summer. The instrument employed in the operation should be very sharp, a surgeon's small operating-knife, termed a curved-pointed bistoury, is far better than an ordinary knife, as it makes a much neater wound, and so increases greatly the chances of healing; or a curved-pointed penknife may be used. A stout needle and waxed thread are also requisite; and a small curved surgical

needle will be found more convenient in use than a common straight one. The fowl should have had no food or water for 24 hours before the operation.

It is necessary that there should be two persons to perform the operation. The assistant places the bird on its right side on the knees of the person who is about to operate, and who is seated in a chair of such a height as to make his thighs horizontal. The back of the bird is turned towards the operator, and the right leg and thigh held firmly along the body, the left being drawn back towards the tail, thus exposing the left flank, where the incision has to be made. After removing the feathers, the skin is raised up, just behind the last rib, and an incision along its edge is made into the cavity of the body, sufficiently large to admit of the introduction of the finger. If any portion of the bowels escape from the wound it must be carefully returned. The forefinger is then introduced into the cavity, and directed behind the intestines towards the back, where it comes into contact with the left testicle, which in a young bird of four months is rather larger than a full-sized horse-bean. It is movable, and apt to slip under the finger, although adhering to the spine: when felt, it is to be gently pulled away from its attachment with the finger and removed through the wound—an operation which requires considerable practice and facility to perform properly, as the testicle sometimes slips away, and, gliding among the intestines, cannot be found again readily; it may, however, remain in the body of the animal without much inconvenience, although it is better removed.

After removing the left testicle, the finger is again introduced, and the right one sought for and removed in a similar manner. Afterwards the lips of the wound are brought together and kept in contact with two or three separate stitches with the waxed thread; these must be made through the skin only.

In making the stitches, great care should be taken to avoid wounding the intestines with the needle, or including even the slightest portion of them in the thread—an accident that would almost inevitably be followed by the death of the animal.

After the operation, the bird had better be placed under a coop in a quiet situation, and supplied with drink and soft food, such as sopped bread. For a short time it should not be permitted to roost on a perch at night, but be turned into an empty room, where it is obliged to rest on the floor, previously covered with some clean straw. For three or four days after the operation, the bird should be fed on soft food; after that time it may be set at liberty, for a short period, until it has recovered entirely from the operation, when it should be put up to fatten.—*The Farmer* (Eng.).

Whitfield Stock-farm.

As will be seen by our advertising columns, a sale of young stock will be held at Rougemont about the 15th June; a favourable opportunity for purchasers of all kinds of cattle as Shorthorns, Devons, Herefords, Jerseys, Polled Angus, Highlanders or Kyles, and Kerries, will be included in the catalogue. It is needless to say more, as the celebrity of the establishment must collect a crowd of attendants.

On Virulent Diseases, and especially on the Disease commonly called Chicken Cholera.

By M. Pasteur.

Virulent diseases may be ranked among the greatest of the evils that afflict living beings. To prove this, we have merely to name measles, scarlatina, variola, syphilis, glanders, the carbuncular disease, yellow fever, typhus, and the cattle plague. This

list is far from being complete; the pathology of the most important diseases may find a place here.

When the ideas of Liebig on the nature of ferments were in vogue, each virus was considered as a substance undergoing an internal change, which could be communicated to living organisms, turning the constituents of these into a virus of the same nature. Liebig was well aware that the first apparition of the ferments, their multiplication and their powers of decomposition, present the greatest analogies with the phenomena of life, but, in the introduction to his "Organic Chemistry," he tells us that these analogies may be considered as deceitful illusions.

All the experiments which I have communicated to this Academy for the last twenty-three years have demonstrated, either directly or indirectly, the inaccuracy of the opinions of Liebig. A single method has guided me in the study of microscopic organisms. This method has been essentially the cultivation of these minute beings in a pure state; that is, by eliminating the heterogeneous substances, living or dead, which accompany them. By the use of this method, the most difficult questions are often solved in the easiest and most decisive manner. I will here recall one of the first applications which I made of this method (1857-1858).

Ferments, according to Liebig, are the nitrogenous substances of organisms, such as fibrine, albumen, casein, &c., in a state of decomposition, resulting from contact with air. There was no fermentation known in which these nitrogenous substances were not present and active. One character of fermentations, as well as of diseases, was that they were spontaneous in their origin and development. In order to show that the hypothesis of the learned German chemist was, to use his own words, "but a deceitful illusion," I made up artificial mixtures whose only constituents were as follows.—Water, the mineral constituents essential to life, fermentable substances, and the germs of the ferments which act on these substances. With these mixtures, fermentation took place with a regularity and a purity, if I may use the words, which are never found in the spontaneous fermentations of nature. As every albuminoid substance has been excluded from these mixtures, the ferment appeared as a living being, which borrowed from the fermentable substance all the carbon of its successive generations, and, from the mineral constituents, the nitrogen, phosphorus, potassium, magnesium—elements, the assimilation of which is an indispensable condition to the formation of all living beings, be they great or small.

After these experiments, not only was the theory of Liebig left without any foundation, but the phenomena of fermentation presented themselves as simple phenomena of nutrition, taking place in exceptional conditions, the most extraordinary of which is the possible absence of any contact with air.

Human, as well as veterinary, medicine made use of the light which shone from these new results. Many investigators made experiments to discover if every virus or contagion was not an animated being. Dr. Davaine, in 1863, endeavoured to show the functions of the *bacteridia* of carbuncular disease, which he had discovered in 1850. In 1868, Dr. Chauveau tried to show that virulence was due to the solid particles previously noticed in every virus. Dr. Klebs, in 1872, attributed traumatic virus to microscopic organisms. In 1872, Dr. Kock obtained, by artificial cultivation, the germs of *bacteridia*, which were similar in every respect to those which I had pointed out in *vibrios* (1865-70), and the causes of several other diseases were ascribed to microscopic organisms. To-day those who are most opposed to the theory of germs are wavering. Still the greatest obscurity prevails on the most important points.

In the great majority of virulent diseases, the virus has not as yet been isolated, and still less has it been shown, by artificial cultivation, that it is a living organism, and everything contributes to make us regard these "unknown quantities" of pathology as mysterious morbid causes. The study of the diseases which they

cause presents many extraordinary circumstances, among which the most remarkable is their non-recurrence. Human imagination can hardly venture to present a hypothetical explanation having any experimental foundation. Is it not still more surprising to find that vaccine, a virulent but mild disease, is a preventive, not only of vaccine itself, but of a more serious disease—the small pox? These facts were known from the remotest antiquity. Variolisation and vaccination have been practised in India from immemorial times, and when Jenner demonstrated the efficacy of vaccination, the common people of the locality in which he practised medicine knew that cow-pox was a preservative from variola (1)

Vaccination appears as an isolated fact, but the non-recurrence of virulent diseases appears to be general. The organism does not go twice through measles, scarlatina, typhus, the plague, variola, syphilis, &c.; at least it may be said that the immunity persists for a certain time.

Although in the presence of such mysteries, it behoves us to be humble, I dare to hope that the Academy will find that the facts which I am about to have the honour of presenting before it throw unexpected light on the problems raised by the study of virulent diseases.

There occurs sometimes in poultry yards a fearful disease, commonly called Chicken Cholera. The victim overtaken by it loses its strength, and stumbles about with drooping wings. Its feathers stand on end, and give it the appearance of a ball; its seem overcome by drowsiness; if we open its eyes it seems to awake from profound sleep, and soon its eyelids close again. Generally death comes after a dumb agony, without the victim even moving from the position it has occupied during the last stages of the disease. In rare cases, it beats its wings for a few seconds. The internal disorders are of the most serious nature. This disease is caused by a microscopic organism which, according to Tundel's Dictionary, was first suspected by M. Moritz, a veterinary surgeon in upper Alsatia; which was drawn more accurately, in 1878, by M. Peroncito, a veterinary surgeon in Turin; and which was found again, in 1879, by M. Toussaint, professor at the Veterinary School of Alfort, who demonstrated, by cultivation in neutralised urine, that this organism was the cause of the virulence in the blood.

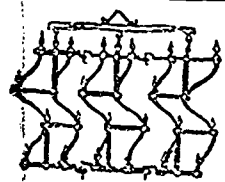
In the study of microscopic parasites, the first, the most useful, condition to fulfil, is to obtain a liquid in which the infectious organism may be cultivated with ease, and without any admixture of other organisms of different species. Neutralised urine, which I have used with so much success to show that the product obtained by the cultivation of the *bacteridia* of Davaine, is identical with the virus of carbuncular disease (1877, Pasteur and Jaubert), does not fulfil the double end in view. But a liquid marvellously adapted to the life of the germ of chicken cholera, is a broth made from chicken's muscles, neutralised with potassa, and made sterile by a temperature superior to 100° C. (110° to 115°) (2). The ease with which the microscopic organism multiplies in this liquid seems prodigious. In a few hours, the most limpid broth becomes turbid, and is filled with an infinite multitude of small articulations of extreme tenuity, slightly thinner in the middle, and which at first sight have the appearance of isolated dots. These small articulations have no motion of their own, and they certainly belong to a very different group from that of *vibrios*. I imagine that they will be classified some day with other forms of virus, now unknown, when we cultivate these, as I hope we are on the eve of doing.

The cultivation of this microscopic organism presents some very interesting peculiarities.

(1) Jenner was led to his discovery by the fact of the Gloucestershire dairy maids never having the small-pox. I do not think, however, that they knew the reason why.

Jenner Fust.

(2) 100° C. and 80° R. = 212° F.



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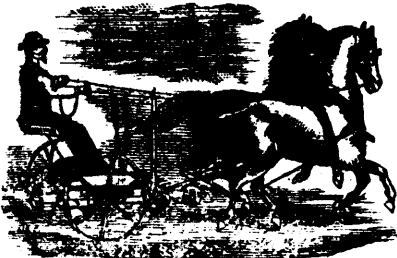
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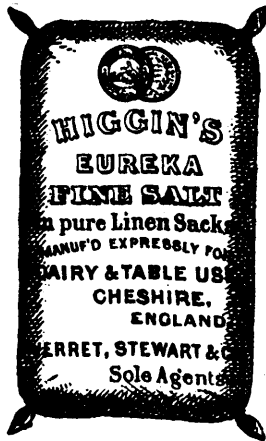


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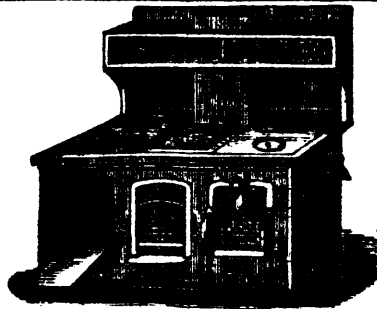
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