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THE ILLUSTRATED

# JOURNAL OF AGRICULTURE

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## Table of Contents.



(Translation)

## Deliberations of the Council of Agriculture.

[Copy of the report of a committee of the honourable executive council, dated January 19th 1881, approved by the lieutenant-governor, January 24th 1881.]

*On the approbation of certain resolutions adopted by the Council of Agriculture.*

The honourable Commissioner of Agriculture and public Works, in a report dated 19th January, 1881, states, that having taken into consideration the report of the proceedings of the Council of Agriculture, at its two sessions of November 24th 1880, he recommends that the resolutions adopted by the said council be approved and sanctioned, excepting, nevertheless, the last resolution but one, inserted in the said report, which must be the object of farther consideration before it can be approved.

The committee concurs in the above report, and submits it to the approbation of the Lieutenant Governor.

Certified,

FÉLIX FORTIER, Clerk Ex. Coun.

### COUNCIL OF AGRICULTURE OF THE PROVINCE OF QUEBEC.

*Montreal, Nov. 24th 1880.*

Present: MM Beaubien, Benoit, Blackwood, Browning, Casgrain, Gaudet, Gauthier, Guilbault, Massue, Marsan, Ouimet, Pilote and Somerville

The secretary read the proceedings of the last meeting of the council, which were adopted.

Mr Browning seconded by the Rev Mr Pilote, moved That Mr Massue be re-elected president, and hon. Mr Gaudet vice-president, of the Council for next year Carried.

Mr Guilbault, seconded by Mr Benoit, moved That the following gentlemen form the executive committee:

Messrs J. M. Browning (president), A Somerville, L. H. Massue, L Beaubien, P. B Benoit, A. Casavant. Carried.

Mr. Benoit, seconded by Mr Gaudet, moved that the visiting committee of the Agricultural Schools be as follows Messrs. Ouimet, Browning and Beaubien.

Mr. Pilote, seconded by Mr Marsan, moved in amendment: That the visiting committee of the agricultural schools be as follows:

Messrs Ouimet, (president). Blackwood, Gaudet, Benoit, and Beaubien, of whom three shall form a *quorum*.

This amendment put to the vote was carried on the following division

For: Messrs. Casgrain, Gauthier, Guilbault, Massue, Ouimet and Pilote (6)

Against: Messrs Benoit, Browning, Gaudet and Somerville (4).

The principal motion being put was lost on the same division

Mr Pilote, seconded by Mr Somerville, moved: That the committee of the fruit-growers' association be as follows: Messrs. Browning (president), Beaubien, Massue, Casgrain and Gauthier. Carried.

The council approved the report of the committee of the fruit-growers' association recommending that a sum of $50.00 be paid to the Society of Missisquoi for the year 1879.

Mr. Marsan, seconded by Mr. Casgrain, moved: That the committee for the amendement of the *Agricultural Act* be as follows: Messrs. G. Ouimet (president), L. H Massue, J. M Browning, Revd. S. Tassé, and those members of the council who form part of the *Legislature* of the province. Carried.

The council adjourned till 2 p. m.

*Session of 2 P. M.*

Present: Messrs. Benoit, Blackwood, Browning, Casgrain, Gauthier, Guilbault, Massue, Ouimet, Pilote, Somerville and Tassé.

The Secretary read the reports, for the year 1880, of the agricultural schools of St. Anne, L'Assomption and St. Francis, together with the report of the School of Veterinary Surgery of Montreal.

Mr. Browning, seconded by Mr Pilote, moved. That the reports of the Agricultural Schools and of the Veterinary School just read, be received, and that the Council of Agriculture recognizes, with pleasure, the punctuality with which these schools have conformed to the demands of the council by transmitting the different reports within the alloted time. That the Agricultural School of St. Francis be invited to complete its report by a more detailed statement of accounts. Carried.

The rules for the competition for the best cultivated farms, as revised at the meeting of the council on the 31st of last March, were read

Mr Guilbault, seconded by Mr. Blackwood, moved: That the rules governing the competitions for the best cultivated farms, as revised and sanctioned by the council, be definitively adopted; and that, as the competitions are to take place next year, the rules be printed and distributed to agricultural Societies between the present time and the 1st of January next. Carried.

Mr. Browning, seconded by Mr. Ouimet, moved: That this council regrets that the Government has thought it necessary to refuse to sanction a resolution adopted by the council, almost unanimously, on the 14th January, 1880, forbidding agricultural societies to offer prizes for bulls *not thorough-bred*: That the opinion of the council was sustained on the 30th of March last, on the occasion of a demand made by the Agricultural Society of the county of Quebec; that on the 31st of the same month, the question was brought afresh before the council, by the hon. J. J. Ross, was discussed minutely, and it was decided to maintain the decision of the council, only two members having voted against the motion. Under these circumstances, the Council of Agriculture, still believing that it is for the benefit of Agriculture and for the advantage of farmers, that this rule should be put into operation, suggest to the Government that it might, perhaps, re-consider its decision, and give its approbation to this measure of the Council, which has already been appreciated and adopted by many of the Agricultural Societies. That Messrs. Ouimet, Massue and Browning be appointed a committee to submit the present resolution to the Government, and to come to an understanding on this subject, with the Committee of Agriculture of the Local House, at the opening of its next session.

This motion having been put to the vote was carried on the following division:

For: Messrs. Benoit, Blackwood, Browning, Casgrain, Guilbault, Marsan, Ouimet and Tassé (8).

Against: Messrs. Gaudet and Gauthier (2).

Mr. Benoit, seconded by Mr. Casgrain, moved: That the Agricultural societies be allowed to omit holding their competitions for the best cultivated farms this year (1881), on condition that they employ their funds in the purchase of breeding animals of pure race; these

purchases, however, must be submitted to the approbation of this council before the first of March next.

The motion having been put to the vote was carried on the following division:

For: Messrs. Benoit, Blackwood, Browning, Casgrain, Guilbault, Gaudet, Gauthier and Marsan (8).

Against: Messrs. Ouimet and Tassé (2).

The Council then adjourned.

Certified true copy,

(Signed) Georges Leclère, Secretary.

## Feeding for Manure.

The farmer is compelled to keep stock and feed them to save his farm from impoverishment as well as to diversify his products so as to avoid overcrowding the markets, with too much grain, hay, or other crops. If it were not for the live stock kept on farms, the coarse waste products, such as straw, could not be returned to the soil with any benefit, and what with the rapid exhaustion of grain growing and the absence of any return to the soil, a few years only would be required to render it completely barren. This final result may be postponed for a time by returning the straw to the soil in some manner, but it may be averted altogether by feeding all the coarse crops, as straw, hay, and corn stalks, with some part of the grain product, to cattle. Some farmers even enrich their soil far beyond its virgin condition by the skilful feeding of cattle upon purchased food, in addition to the coarse products of the farm. By doing this, double profits are made; one on the cattle fed, and one on the manure made, or rather on the increased products grown by the use of this manure. This practice is of the greatest value in agriculture and can be made more or less profitable as greater or less skill and experience are brought to bear upon it. It matters not what kinds of animals are fed. Some farmers prefer to feed sheep, and some cattle for the butcher; and some choose to feed cows for dairy purposes. It is not so much the choice of means to the end as the use of whatever means may be chosen, upon which depend the advantage and profit of the operation; and the most important of these means which should be considered first is the kind and nature of the feeding substances that may be used, and their relation to the production of rich manure. The value of the manure made by feeding any kind of food depends upon the character of the food altogether, and not upon the animal. It depends somewhat upon the condition of the animal, and whether it is young or old or making flesh or fat; because a young and growing animal procures its increase of substance from the mineral and nitrogeneous elements of the food, while a full grown or a fattening animal requires only to support its existence or accumulate fat, and for these purposes only carbonaceous matter is required which does not enter into the calculation of the values of the manure (1). Manure is valued for its mineral matter, chiefly phosphoric acid and potash, and the nitrogeneous matter contained in it. So then foods, regarded as materials for making manure, are considered too for these same mineral and nitrogeneous matters. Animals consume a certain quantity of food A certain portion of this is used up in maintaining the animal heat and in supporting the respiration, these functions consuming for their support only carbonaceous matter. But every animal wastes a certain quantity of muscular fibre by every exertion of the muscles, and this loss is repaired from the blood, so that a portion of the food is used up in the production of blood which is required to repair this continual waste. This waste is however very small compared with that of the carbonaceous elements expended in respiration and vital heat. The following tables show how the food of the animals mentioned is spent in their different functions of growth, of excretion, and of vital force. For instance an ox consuming 100 pounds of dry mixed fodder of the best kind consisting of linseed oil cake, clover hay and turnips expends as follows:

| | In increase. | In manure. | In vital force |
|---|---|---|---|
| Nitrogenous substance.... | 0 8 | 29 1 | 57 3 |
| Carbonaceous substance... | 5 2 | | |
| Mineral matter..... | 0 2 | 7 4 | |
| Total 100 lbs..... | 6 2 | 36 5 | 57 3 |
| A sheep with similar food expends of | | | |
| Nitrogenous substance.... | 0 8 | 25 1 | 60 1 |
| Carbonaceous substance... | 7 0 | | |
| Mineral matter..... | 0 2 | 6 8 | |
| Total 100 lbs..... | 8 0 | 31 9 | 60 1 |
| A pig fed on 100 lbs of barley-meal expends of | | | |
| Nitrogenous substance.... | 1 7 | 14 3 | 65 7 |
| Carbonaceous substance... | 15 7 | | |
| Mineral matter..... | 0 2 | 2 4 | |
| Total 100 lbs..... | 17 6 | 16 7 | 65 7 |

It is seen that the expenditure of nitrogenous and mineral matter is very small indeed, and that nearly all of these is recovered in the manure. The richer the food may be in these elements of course the richer will be the manure, and it is therefore of great importance in choosing food to procure that which furnishes the largest quantity of these elements for the least money. As a guide for this purpose the following table is given. It shows the quantity of phosphoric acid, potash and nitrogen contained in 100 lbs of each substance and the money value of that portion of them contained in the manure made by feeding one ton of them, as based on the market prices of standard artificial fertilizers.

| | Phosp. acid. | Potash. | Nitrogen. | Money value manure |
|---|---|---|---|---|
| Linseed cake meal..... | 1 92 | 1 65 | 4 75 | $19 72 |
| Cotton seed cake meal. | 7 00 | 3 12 | 6 50 | 27 86 |
| Beans..... | 2 20 | 1 27 | 4 00 | 15 75 |
| Peas..... | 1 84 | 0 96 | 3 40 | 13 38 |
| Malt dust..... | 5 23 | 2 12 | 4 20 | 18 21 |
| Indian cornmeal..... | 1 13 | 0 35 | 1 80 | 6 65 |
| Fine middlings.. ..... | 6 44 | 1 43 | 2 60 | 13 53 |
| Coarse middlings..... | 7 52 | 1 49 | 2 58 | 14 36 |
| Wheat bran..... | 7 95 | 1 45 | 2 55 | 14 59 |
| Clover hay..... | 1 23 | 1 30 | 2 50 | 9 64 |
| Meadow hay..... | 0 88 | 1 50 | 1 50 | 6 43 |
| Bean straw..... | 0 90 | 1 11 | 0 90 | 3 87 |
| Pea straw..... | 0 85 | 0 89 | 1 00 | 3 74 |
| Wheat straw. ..... | 0 55 | 0 65 | 0 65 | 2 68 |
| Oat straw..... | 0 48 | 0 93 | 0 60 | 2 90 |
| Mangels..... | 0 09 | 0 25 | 0 25 | 1 07 |
| Swede turnips..... | 0 13 | 0 18 | 0 22 | 91 |
| White turnips..... | 0 11 | 0 29 | 0 18 | 86 |
| Potatoes..... | 0 32 | 0 43 | 0 35 | 1 50 |
| Carrots ..... | 0 13 | 0 23 | 0 20 | 80 |
| Parsnips ..... | 0 42 | 0 36 | 0 22 | 1 14 |

It is to be considered, in regard to the valuations given, that the manure made from any feeding substance after it has passed through the intestines of an animal is of more value than the substance itself would be. If one were to give a ton of clover hay and a ton of bran to a cow, the resulting manure would be worth $ 24.23, according to the above table. That is, that the phosphoric acid, potash and nitrogen contained in the manure could not be purchased in the form of guano, superphosphate of lime or any other standard fertiliser for any less money than that. The manure too would be greatly more valuable than the raw hay and bran; because in passing through the animal these have undergone a process of digestion or decomposition, and are in a far more available condition as plant food than they were before they were eaten. The whole subject is worthy of the most careful and thorough study by the farmer as one of the most interesting in agricultural che-

(1) Because, after the first start, plants take all their carbon from the air.—A. R. J. F.

mistry an farm practice. The tables given, throw a preliminary light upon it, and serve only to present it as a matter for further consideration. *Exchange.*

### Artificial Manures for Grass Land.

Dr. Voelcker was surely wrong about the application of artificial manure to grass land. About two years ago the writer dressed over 100 acres with 4 cwt. of mineral superphosphate (costing with carriage and carting to the farm, under £4 per ton), 26 to 28 % of soluble phosphate, and 2½ cwt. of Peruvian guano. The dressing has changed the grass completely. The pasture during the summer was almost white with clover. One field had scarcely anything in it but pink grass, but now there is scarcely a bit to be seen, and it has carried about one beast to the acre. Before, it would have taken 3 or 4 acres to keep one, and you could see but little improvement in them. On another field, exceeding 30 acres, 7 cwt. of boiled bones and 2 cwt. of guano were put to the acre, and on the coarsest part 1½ cwt. of nitrate of soda in place of the guano. There has been a great change for the better in this field, but one part of it was dressed with superphosphate and guano, and, according to present appearances, that is the best. The land is a loamy soil on a marl subsoil, and was drained before these manures were applied. That part which was left unmanured was not worth a third as much rent as the land that had been dressed. A 20-acre field had 3 cwt. of superphosphate and 1½ cwt. of guano. It has done very well, but the 4 cwt. of mineral and 2½ cwt. of guano seem to be the best spent money. The manure should be put on in January. It takes some time for the phosphate to change the herbage, but all who have seen the land say they could not have believed so great a change could have been made in the time. Many people, hearing of the good bones have done in Cheshire, have tried them, and seen no benefit come from them. A field had £60 worth of bone put on, which did not do a bit of good. Bones do not seem of any use put on and near a smoky town. On a large poor field for swedes 5 cwt. of mineral superphosphate and 2½ cwt. of guano were put on, and it has grown a good crop; but another field received the same quantity of artificials and a good dressing of farmyard manure as well, and it has produced an extraordinary crop.

*Ag. Gazette.*

### Birmingham Cattle Show.

There are only four entries for the four prizes, amounting to £40, for Oxford Downs. The 1st goes to a good pen bred and fed by Mr. Albert Brassey, Heythrop. The three sheep weigh 7 cwt. 2 qr. — the heaviest pen of sheep in the show. Mr. H. Cooper, Houghton, Dunstable, takes 2nd, and Messrs. J. & F. Howard, of Bedford, 3rd.

In the Hampshire, Wiltshire, and other Downs, the three entries of Mr. Alfred Morrison, of Fonthill, are magnificent sheep. Few breeds have made greater strides within the last twenty years than the Hampshires, and, on suitable soils, no breed is more profitable. One pen weighed 6 cwt. 1 qr. 1 lb. The quality of the mutton is first rate.

It should be remembered that the Oxford Down is a cross between the Cotswold and the Down sheep; whereas the Hampshire is a pure breed, and worth a halfpenny per pound more than the Oxford in any market in England. A. R. J. F.

ROOTS.—For size, quality and number of entries the show of roots has never been equalled in England. Throughout the whole of the Midland, West, and Northern counties the season has been remarkably favourable for the growth of swedes, whilst throughout the same district, the low mean temperature has been unfavourable to the full development of the mangel crop; hence by far the best specimens of that root this year come from the south. In class 1, for the best collection of three varieties of mangel and one of swedes, six roots of each, there are sixteen competitors. Mr. R. Webb, Beenham, carried off the cup with a magnificent collection. Some long reds averaged 36½ lb. each and swedes over 22 lb. each; the general quality of the roots was far superior to anything we have ever seen. We are apt to associate coarseness and inferior quality with heavy weight; it is not so in this instance, all the largest and best swedes were fine in the neck, and particularly free from a profusion of sid roots. Mr. John Perry, a successful exhibitor of former years, carried off the prize in class 2 for twelve swedes and twelve globe, or intermediate, mangel. The same exhibitor was successful in the next four classes. Mr. Thomas Penn, Morninghall, Thame, Oxon, was successful for the best six roots of long mangel, with an average weight of 42½ lb. per root. For globe or intermediate varieties, Mr. H W. Champion, of Witley Manor Sewage Farm, Reading, was successful with an average of 32 lb. per root. For the best twelve swedes, Mr. Perry was 1st with an average of 17 lb. per bulb. For the best six specimens, Mr. Perry was again 1st with an average of 21 lb. per root. Common turnips, carrots, and cabbage, were a magnificent collection. The show of potatoes is very extensive and exceedingly interesting. All the known varieties of this useful esculent are shown in perfection. The value of such an exhibition for educational purposes cannot be over-estimated.

## PROTECT THE BIRDS.

I

Providence, we must acknowledge, has cast our lot in a country richly endowed by nature with all that can please the eye and satisfy the imagination. Our climate is healthy, our territory unlimited, and its productions are as rich in quality as they are varied in number. Still, it cannot be

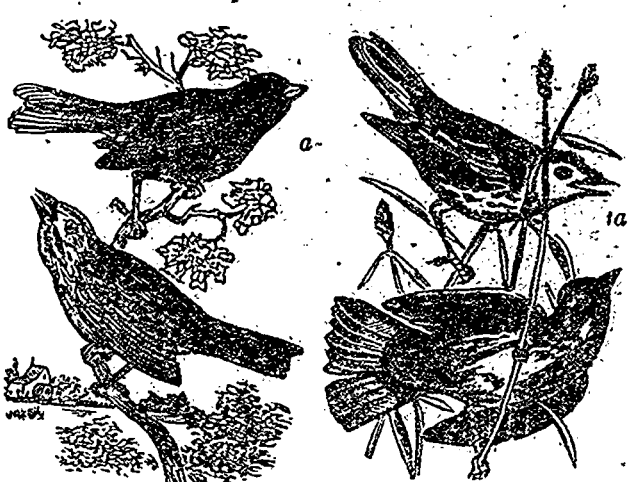


Fig. 1 — *a* Snowbird, *Junco hyemalis*, Plater.
Song sparrow, *Melospiza melodia*, Baird.

Fig. 2—*a* Tit-lark, *Dendroica maculosa*, Baird.
Gold-finch, *Chrysomitris tristis*, Bonap.

denied that our use or, frequently, our misuse, of the benefactions is marked with an extravagance, with a want of foresight, that may not unreasonably call in question our wisdom and intelligence.

The time will come, nay, in some places it is already come, when our folly will appear clear even to ourselves; when we shall be forced to acknowledge and condemn the prodigality with which we have dissipated the incalculable wealth which we once possessed, and to seek with many a weary effort, and

perhaps bootlessly, a cure for those evils which our own greediness and want of caution have brought upon us.

Already our enormous forests are rapidly disappearing under the axe of the blind and improvident farmer. It would sometimes seem as if the mad fury of a destructive energy had aimed at the ruin of all our forest glories. Fire, even, is called in as an auxiliary to the axe. The woods are swept off so completely, that already in many parishes vast spaces are to be seen where not a solitary tree exists in the midst of the cultivated soil to yield its refreshing shade to the cattle, or around the dwellings of the husbandman, to enliven their appearance, and purify the air which the inhabitants breathe. To such an extent has this been carried, that in many places, farms of sufficient extent to afford all the land necessary for cultivation and, at the same time, plenty of wood for the wants of the owners, have not enough to-day to make an axe-


Fig. 3 — *a* Fly-catcher, *Contopus virens*, Cab. King-bird, *Tyrannus Carolinensis*, Baird.

handle, a fence-rail, a post, or even a shackle! Fire-wood has to be carted 5, 6, even 7 leagues! And how will it be 20, 30, 40 years hence?

But I will leave aside the question of wood-wasting for the present, and restrict myself to the blindness which characterises the dealings of the farmer with insectivorous birds.

These birds, though protected by law, and of great importance to the countryman, are persecuted with a foolish vigour only equalled by the vigour displayed in the destruction of our forests. And when I say *foolish*, I do not think I am using too strong a word. Is not the useless destruction of beings full of the enjoyment of life, sensible to pain like ourselves, beings who actually seem to seek our society, not as enemies but as friends—is not this folly? What is more charming than the twittering of the swallow, the note of the song-sparrow, of the goldfinch (figs. 1 and 2), who at break of day pour forth the glad feelings of their grateful hearts, and before the first ray of the rising sun has struck the window of the cottage, have already provided their young with the necessary aliment of their morning repast.

The swallow, quitting the river-side, its beak full of mortar for its new nest, seems to amuse itself by meandering in a hundred gyrations on its road to the eaves of your house, warbling at the same time its amorous song (What! with its beak full of mortar? A. R. J. F.); does it not seem to say to the ploughman, as he wearily leans on the stilts of his implement, that he too should do his work gaily? That the regard, the love of the beings who are there, in his abode, will well repay him for the sweat which he pours forth for their good.

I must be allowed to quote from Buffon, that great painter from nature, the following passage with regard to the lessons we may derive from the love shown by birds for their families.

"Every marriage, says he, presupposes the necessity of an arrangement for our own benefit, and for the benefit of the beings which are the results of it; the birds, who are obliged to build a nest for their eggs, at which nest the female works from necessity, and the male from complaisance, during this


Fig. 5—The Golden warbler, *Setophaga ruticilla*, Swains.

Fig 4—*a* Black-cap. *Parus atricapillus*, Lin. Hudson's Bay titmouse, *Parus Hudsonius*, Forst.

labour become attached to each other; the multiplied cares, with her as an alleviation of her loneliness. The love which the mutual assistance, strengthen this sentiment, which is still more increased and made more lasting by a necessity of a second sort, that of not allowing the eggs to become cold, and of preserving the fruits of their love, for which they have taken such pains, from destruction; the female cannot leave them so the male brings her food; he sometimes, even takes her place, and occasionally adds his own warmth to hers for the better cherishing of the eggs, and shares the nest succeeds to passion subsists in all its force during incubation, and it seems to flourish and expand still more when the eggs are hatched; now comes a new pleasure, but at the same time new cares; the education of the young is a novel work, at which both parents labour together. Birds thus represent to us all that passes in the chaste union of human beings: love followed by undivided tenderness, restricted, in the sequel, to the bosom of the family. All this springs, as we see, from the necessity the parents are under of occupying themselves together in these indispensable cares and in these common labours; and is it not easy to see, that as, among men, the necessity of working is only found in the lower orders, so

men of the upper classes being able to dispense with it, indifference and unfaithfulness are more usually found in their marriages than in those of their inferiors?"

"Our domesticated birds," says Buffon, in another place, "spoiled by the abundance in which they live, and by all the conveniences we furnish them, are freed from all necessity of united labour; they have tasted luxury and plenty, and quickly show their effects, sloth and libertinism."

And it is these charmings beings, these gay companions of our labour, these unwearied songsters, whom the countryman remorselessly pursues to death. Not only does he kill them whenever he gets a chance, but he even seems to desire their extermination; he attacks the family in their very home, he robs them of their eggs, and destroys the nest! See the traps and snares laid by the children of the farmer, watch the pride with which they show the long chains of eggs which decorate the walls of their abode, and would not one think that they regard the birds as so many enemies, and the chaplets of eggs as trophies of their victories?

And too often these trophies are not the product of injurious birds, but of those whom the law protects, and whom the farmer would find his best interest in saving from injury. Most of them are insect-eaters, birds of the sparrow-kind. They frequent your gardens, your orchards, and your fields, because


Fig. 6—*a* Tufted pic, *Picus villosus*, Lin. Woodpecker, *Colaptes auratus*, Swains.

Fig. 7—Bobolink, *Dolychonyx oriziverus*, Swains.

at all times, but more especially during the time of their bringing up their little ones, they find there plenty of food, insects abounding. The *King-bird* (fig. 3) builds its nest in your orchard, because of the number of caterpillars which ravage your apple- and plum-trees; the *Goldfinch* conceals its cradle in your currant bushes, thence it seizes the flies as they pass, and saves the fruit from the devastation of its enemies; and so of a thousand others. I would add, in favour of the King-bird, that the *Crow* had better keep his distance; he is fond enough of pease and other newly sown grains, as well as of newly hatched small birds: hence his presence is regarded with suspicion by the King-bird, and your chickens, ducklings, and goslings will be quite safe under the protection of this bold little sentinel.

## II

Once upon a time, the Caliph Omar, as he was at dinner, saw a grasshopper on whose wing were written these words: "We are 99 in number; if there were 100 of us we would destroy the whole vegetation of this globe." Hyperbolical, no doubt, was the inscription, but when we come to study the life and habits of insects, we must confess, that were it not for the numerous causes which restrain their increase, they would, from their fecundity, soon become the masters of the world. Take for instance the *louse*: a single pair will produce in one season 27,000,000! A hundred pair would not be a pleasant population to encounter—the progeny would exceed all computation! It is true he is a small creature, with, instead of a mouth, a proboscis as fine as a hair with which


Fig 8—The merlin, *Falco sparverius*, Lin.

he sucks up the juices of the young shoots, but tiny as he is, *deinon to plethos* — as our Greek friends say — there is terror in a multitude.

A great principle of nature is the harmonious balance which exists throughout its kingdom. The destructive instincts of certain beings are kept in check by the opposite propensities of others who make war upon them. Were it not for this, one kind of animal would become exclusively the master of a whole district; but, fortunately for us, is found, in the neighbourhood, another kind more powerful still, which devours the rival tribe, and, were it not for certain resources which enables it to hide from its enemies, would cause it to disappear entirely from the earth.

But, unfortunately, this harmony of numbers and forces between these different beings is often disturbed by man himself, though he is the first to suffer from the dis-arrangement of the equilibrium. To satisfy his wants, too often, alas! to gratify his laziness and self-indulgence, he offers by his method of cultivation the most favourable opportunities for the increase of mischief-working insects. Each species of insects has, almost without exception, a certain number of plants on which it can find its proper nourishment; and these plants, intermixed as they are, with many other sorts, only occur, in their natural condition, at certain distances, in passing

over which the insect finds itself exposed to a crowd of enemies, or exposed to dangers, which may very probably be fatal to it. But the farmer separates these plants from each other; he augments their number till they occupy whole fields; and the insects who feed upon them immediately begin to multiply in marvellous abundance; they find in them all the food they want; and dwell in perfect security from the attacks of that crowd of enemies to which they were for a prey when the plants they frequent were more sparsely distributed. The Halticæ which devote themselves to *cruciferous* plants: such as cabbages, turnips, radishes, etc. The *Anthomies* (1) which devour the onions; the *wire-worms* and *cut-worms* which destroy all the young plants of our gardens: cabbages, melons, tobacco, etc.; striped (black and yellow) fly (Chinch-bug, Am ?) which annihilates our melons, cucumbers, and pumpkins; are all examples of the sort of insects I have been speaking of.

How shall we contend against these tiny beings, who, presenting themselves by thousands and by tens of thousands for the destruction of our harvests, levy the tribute they exact from us in so tyrannical a fashion that often they leave hardly anything for the real proprietor? It is a difficult question; traps and snares are of little use; their number and their prodigious fecundity enable them with ease to escape

Fig. 9—Spotted owl, *Scops asio*, Lin. | Screech-owl, *Surnia ululu*, Bonap.

from the subtlest poisons we employ for their destruction. We have too often seen our greatest efforts fail in the war we have declared against them.

But these enemies of man have, fortunately for him, their own enemies, who know, better than we do, what weapons to employ against them, who are up to all their tricks, and know how to circumvent their plots. these are our proper auxiliaries, it is these troops which we must enrol in the war of extermination we are to wage against them.

Amongst the allies, with very few of which are we acquainted, the greater part will not obey our orders, but the most powerful, the most capable of assisting us, offer us their services on very easy terms. to wit, that we do not molest them, but leave them at liberty to pursue their path in peace. They are these: *Insectivorous Birds*. Can we refuse such an advantageous bargain?

"The Almighty," says a French naturalist, "has created the birds to protect the grain, vegetables, trees, and fruits, against the ravages of the insect tribe. For every bird that dies, millions of insects are spared from death, and millions of insects mean famine." Open the stomach of a swallow, a chickadee, a fern-owl (1), or a whip-poor will, and it will be found full of caterpillars, flies, and other noxious beings, with which the creature has satiated his appetite.

Birds have resources against insects very much more efficacious than any we can employ; birds are even more at home in the air than are insects; like them, they have wings, but these aids are larger, more powerful, and assure their owners a more rapid flight. Claws, too, they have to extract their prey by night from their subterraneous hiding places, and a long bill, sharp and strong, for the purpose of dragging the insects from the crevices in the bark, from the rotten wood, and from the trunks of trees. To all these advantages add an extraordinary agility, a piercing power of vision, and you have in the bird the most perfect conceivable destroyer of the ravager of your harvest. For, as to ourselves, we must acknowledge our impotence against the majority of these plunderers, so small and yet so powerful.

Michelet, the poet, par excellence, of the bird, says:

"Above, below, to the right, to the left, these devouring hordes banded in legions which succeed one another day by day, month by month, an innumerable, irresistible levy of nature. march on their road to destroy all the works of man. With them, the division of labour is complete. To each is assigned, beforehand, his post, and there is no error on his part. Each will go straight to his proper tree, to his proper plant. And so numerous are they that every leaf will have its legion.

Fig. 11—The crested warbler, *Dendroica coronata*, Gray.

"What wilt thou do, poor man? Canst thou multiply thyself? Hast thou wings with which to follow them? Canst thou even discern them with thine eyes? Thou mayst slay them at thy pleasure; their security is complete; slay, crush them by millions; they will live by billions. Wert thou to triumph over them by destroying the plant itself, with steel and fire, still wouldst thou hear the humming of the mighty army of atomies, who trouble themselves but little about thy victory, and gnaw away without thy powers of vision being able to detect them.

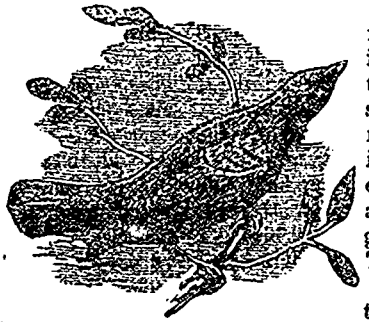

Fig. 12—The red-winged blackbird, *Agelaius phœniceus*, Vieill.

"The inactive and defenceless life of vegetation, incapable of motion by the laws of nature, would soon succumb, were it not for the protection afforded it by the indefatigable enemy of the parasite, the ardent hunter, the winged conqueror of monsters, The Bird."

Small yellow flies make their appearance on a some fine summer evening. They fly over the wheat-fields by millions; they settle on the ears, now in flower, and deposit there in thousands their almost invisible eggs. From each egg issues a little worm, so little that it is almost im-

(1) Should not this be "Anthonomies"? i. e. flower-eaters; from the Greek *anthos* and *nemomai*, to feed on flowers — I wish we had a Greek font. A. R. J. F.

(1) This bird is known in England by the four names of fern-owl, goatsucker, night-hawk, and eve-jar. The first name it derives, I think, from its colour, the second from its supposed habit of milking the goat (caprimulgus—Pliny), the third, from its resemblance on the wing in the dusk of evening to a small hawk, and the last, from the curious *strident* noise it makes. A. R. J. F.

perceptible, which, after having sucked the juices of the wheat, leaves the ear, and buries itself in the ground, to come forth in spring a perfect insect. When this *tipula*, or *daddy-long-legs*, as it is called, attacks the wheat, a great part of the crop is lost.

Against such an enemy, man is without defence; he is equally impotent against the caterpillars, the beetles, the lice, which destroy our grain, the fruit of our orchards, and the flowers of our gardens, against the butterflies which ruin the cabbages, and the cut-worm which ruins everything. It is the bird alone which can put a stop to the indefinite reproduction of our redoutable enemies.

He, then, who protects the bird, aids in protecting his country from famine; and, conversely, he who kills a bird, makes bread dearer.

The service which insectivorous birds render to agriculture is so well understood in Europe, that in very state, severe fines are levied on those who break the laws put forth for their protection. In many places, small boxes, or artificial nests, are placed in the trees of the orchards, to induce the birds to frequent the farms, and if there is no orchard, they are scattered here and there, among the trees along the road, or in the fields. Here, in Canada, we have, indeed, the letter of the law for the protection of insectivorous birds, but the spirit is almost dead (1).

Children, when they find in the grass, or in the branches of the brushwood, nests of the sparrow (fig. 1), titmouse (fig. 4), or the fly-catcher (fig. 5), immediately carry off the eggs, and destroy the nest. The charming goldfinch, with its wings of ebony and its lemon-colored body, who has selected a currant-bush, or a rose tree, close to the window in which to bring up her brood, finds no mercy at their hands. Observe what pains these little robbers take to gain the hole which the woood-pecker (fig. 6.) has hollowed out in the top of that stump, or to climb that fir in which they can descry a nest of thrushes!

And their parents do not seem to mind it in the least! They, even, lend them a hand, sometimes! The school-masters, the magistrates, the clergy, all those, in fact, who by their position and authority could soon put a stop to this abuse, seem to look upon the whole business as no affair of theirs, as if the injunctions of the law, a wise law if there ever was one, were simply permissive, as if their lights and their education gave them no other point of view from which to regard these thefts, than the point of view of their children, who are more stupid than ill-intentioned, and only guilty because they are ignorant.

The sole use of these birds is their power of destroying insects; most of them are songsters, and utterly unfit for the table. And yet they are killed, without any motive, solely for amusement and exercise.

All birds are not insectivorous, let us see which are those which we should protect.

## III

### INSECTIVOROUS BIRDS.

If we wish to distinguish between the birds which we ought to preserve, and the non-insectivorous birds, we cannot do better than adhere to the text of the law: it is as follows:

It is forbidden to shoot, destroy, kill, or wound any description of bird whatever, save and except the eagle, falcon, hawk, and others of the falcon tribe, wild pigeon, bobolink, crows, and ravens, from the first of March to the first of August, in each year; the fine for the infraction of this law is from $1 to $10, with costs, or, in default of payment, imprisonment. This is clear enough, but, precise as it is, I think it admits of some modification.

No doubt, all birds are insectivorous, that is to say, they all feed with pleasure on such insects as come within their reach; but there are some whose habitual food consists of insects, and who do not, commonly, care for any other: it is these that the law protects: swallows, fly-catchers, warblers, king-birds, etc. As to the rest, the flesh- and grain-eaters, although they willingly devour all the insects they can catch

Fig. 13—Blue jay, *Cyanura cristata*, Swains.

without trouble, still, as their usual food is grain or animals weaker than themselves, the law does not shelter them under its shield, considering that their occasional services do not make up for the damage they cause in other ways.

1o. List of Insectivorous Birds.

House swallow, *Hirundo horreorum.*
Sand-martin, *Hirundo riparia.*
Swift, *Chætura pelasgia.*
King-bird, *Tyrannus Caroliniensis,*
Warblers, *Myiodioctes, Helmintophaga,* etc.
Fly catchers, *Sayornis, Empidonax,* etc.
Woodpeckers, *Picus Hylatomus, Picoides Colaptes,* etc.
Night-hawks, Whip-poor-wills, *Chordeiles, Antrostomus.*

2o. Insectivorous and Gravivorous Birds.

Song-sparrow, *Melospiza, Spizella,* etc.
Titmice, *Parus.*
Goldfinch, *Chrysomitris tristis,*
Thrush, *Turdus, Mimus* (1).
Starling, *Molothrus pecoris,*
Redwinged blackbird, *Agelaius phæniceus,*
Blackbird, *Quiscalus purpureus.*
Grosbeaks, *Pinicola, Guiraca.*
Cedar bird, *Ampelis Cedrorum.*
Bobolink, *Dolichonyx orizivorus,*
Jays, *Cyanura, Perisoreus.*
House-sparrow, *Passer Domesticus,*

All these birds, in the second list, eat a monstrous number of insects in spring, but they seem to prefer grain when the season of ripening has begun.

Fig. 14—Northern shrike *Collyrio borealis*, Baird.

I do not see why protection has been refused to the Bobolink. It eats nothing but insects in spring and during the bringing up of its young.

On the other hand, the Cedar bird deserves no protection, for it destroys the blossoms of fruit-trees, and attacks the cherries as soon as they begin to ripen. As for the cruel *Shrike*, or *Butcher-bird* (fig. 14), who lives by assassinating the unhappy titmice, etc., he deserves no pity.

There are two other friends of the cultivator which deserve mention: the *toad* and the *bat*. Hideous as they are, they are

(1) Like a great many other laws, especially the laws for the protection of game. A. R. J. F.

(1) The Robin is a thrush, and the *mimus* is the catbird. A. R. J. F.

of immense service to gardeners and farmers, on account of the quantity of insects they destroy, and, for that reason, they deserve protection.

I hope that these considerations, joined to the different works already before the public on the same subjects, will be sufficient to open the eyes of those interested, and to induce them to protect, by every means in their power, their real friends, the INSECTIVOROUS BIRDS.

L'ABBÉ PROVANCHER.

## SAINFOIN.

Sainfoin has been the salvation of many a farmer on the poor, thin, chalky lands of the south of England. There are two sorts, the common and the giant: the latter is the one usually sown, as although it does not hold out as many years as the common sort, its yield in hay and feed is much greater. The treatment of the crop is generally as follows: two, and sometimes 2½ bushels are sown to the acre with a grain crop and harrowed in, taking care to cover the seed well—in fact, in Kent, we always put it in with a grain drill at 7 inches apart—the next summer it should be mown for hay before the blossom is more than half expanded. The aftermath is good for all sorts of stock, and the best place in the world for weaning lambs, as they never scour on it. I have known it stand for 12 years, but it is generally, in the usual course of cropping, ploughed up for wheat in the 7th year, completing the rotation, and avoiding the too frequent repetition of the red clover: thus—turnips, barley, clover, wheat, which is the ordinary shift, would become turnips, barley, sainfoin down for 5 years, wheat—a most refreshing course for the land if it will bear sainfoin. As I never saw it grown *except on the chalk* I cannot recommend it here, but I have an indistinct recollection of Jonas Webb telling me that he had succeeded with the giant Sainfoin on a clay-farm some way off from the Babraham establishment. As Mr. Barnard very properly observes, in the French Journal of Agriculture, the seed must be new, or failure is certain. I fear however, that any attempt to grow it where *white* clover fails to take would be hopeless —*no* plant will grow without plant-food, and I fear that the gentleman who asks a question as to the probable success of sainfoin on his "terre sablonneuse très médiocre," which is most likely utterly lime-less, will not find any plant to answer his requirements. The sheep's foot would work wonders, and until that is tried I see no hope for the "very moderate sandy soils."

A. R. J. F.

## Phosphates dissolved and undissolved.

It has been thought desirable that the experience of the past year in the use of dissolved and undissolved phosphates should be made the subject of inquiry. It is a difficult task, but having undertaken it, I will endeavour to strike a balance between the partizans of the two sides of the question with as much fairness as possible. I have, of course, formed an opinion on the subject for myself, but I hope to be able to divest myself of all bias, and to give the readers of the Journal a true notion of the points in dispute, and a satisfactory *resumé* of the whole discussion.

I do not think it will be difficult for the ordinary reader to understand, that phosphates are in reality composed of phosphoric acid and lime; of these two constituents, the *lime* is, comparatively speaking, worthless, the *phosphoric acid* is the thing sought for.

There are varieties of phosphate: the Cambridge coprolite, found in the *crag* on the Eastern side of England, the Charleston phosphate, and our own *apatite*, which, though rich in phosphoric acid, is unfortunately the most refractory of all. The practice, until lately, has been to crush the phosphates roughly, dissolve them by the addition of half their weight of sulphuric acid, and the mixture, boiled down to dryness, formed the ordinary superphosphate of lime. Dissolved, either by art or by nature, the material must be, or else the phosphoric acid cannot be got at by the plant. Now one of the main advantages derived from the use of the dissolved or superphosphate is that the food is ready for the plant as soon as the plant wants it; and, consequently, the young turnip plant, for it was mostly used for that crop, was rapidly pushed into rough leaf, and escaping the ravages of the *fly*, went on its way rejoicing.

In examining the effects of the raw phosphates, we must see, first, what agents exist in the soil capable of dissolving them: they are the vegetable acids, such as the oxalic, citric, &c., together with their salts, as oxalates, &c. In an experiment conducted by Mr. Hughes, an analytical chemist of repute, he took ground Cambridge coprolite, and after boiling it in a solution of oxalate of ammonia for half an hour, he found that only one fifth of the phosphate had yielded itself to the solution; and the conclusion he arrived at was, that *at most*, only 20 o/o of the total amount of the phosphates employed as manure can be expected to be available during the first year of their service. Further, that the whole of the manure is hardly likely to be dissolved in less than five or six years at the earliest, and in most cases a much longer period. We must not forget that the phosphate here tried was the softest of all; whereas our apatite is the hardest. Superphosphate, too, besides the 26 o/o of soluble phosphate, contains from 35 o/o to 50 o/o of hydrated *sulphate* of lime, which must not be left out of the calculation, particularly in this country, where plaster, as we vulgarly call it, is of so much use.

The Aberdeenshire experiments, an account of which may be seen at p. 165, vol. 1, and pp. 87, 119, vol. 2. of Journal, have been carried on continuously, but, as far as one can gather, the condition of the land, or something else, has caused the crop to be so very varied in yield, that they are utterly untrustworthy: as for instance; at the Aboyne station, the precipitated phosphate in one plot gave 3 tons per acre, and the duplicate plot, with just the same treatment, 7 tons, 6 cwt. At Clany, and it must be observed that in both of these experiments the number of turnips, as well as the size of the plot, was the same, one plot gave 2 tons, 6 cwt. per acre, and its duplicate 4 tons, 9 cwt! Nay, in more than one place, the unmanured plot gave a greater yield than the manured plot.

At the Easter Ross, Scotland, experimental station, no satisfactory reports of the trials made of the raw phosphates alone are given; but the most successful crop was from dissolved phosphate and sulphate of ammonia (1).

Dr Voelcker, analyst to the Royal Ag. So. of England, thinks it "a retrograde movement to use raw phosphates instead of dissolved."

Lawson, in his report of experiments on turnip growing which won the prize offered by the Highland Society of Scotland, shows the usual uncertainty in the yield of crop; but he says, as I fancy most people who make a fair trial will have to say: "on the 1st of August, that is 9 weeks after the seed was put in, the raw phosphate plots were about equal with the no-manure plot;" and again: "ground mineral (phos.) does increase the weight of the crop, but owing to the sluggish start which it gives the plant, it exposes it to the ravages of all the parasites which prey on its leaves." There is no doubt that plants can take up insoluble phosphates. Such, grew seed on sand placed upon a polished slab of apatite, and found, by the rough grooves on the surface, that the roots had dissolved the phosphate; but a turnip or

(1) Hydrogen and Nitrogen form ammonia.

beet-crop that had to depend on such a source for its supply of phosphate would make but a poor fight against the fly. Observe, however the difference in the crop between phosphates, both soluble and insoluble, when used alone, and the same when used with nitrogen:

| | tons. | cwt. | |
|---|---|---|---|
| Mean of 5 plots with soluble and insoluble phosphates, ..... ..... | 15 | 3 | root and top |
| Mean of 5 plots with sol. and ins. phosphates and nitrogen, ..... | 22 | 13 | " " |
| Showing a balance in favour of the added nitrogen of ..... ..... | 7 | 10 | per acre (1) |

And, after all, it is nothing that one has learned from these (2) experiments, as far as practical farming goes: in the same set, one may see turnips grown by 20 tons of dung, producing no larger a crop than turnips grown with a small amount of insoluble phosphate and ammonia; while 20 tons of dung added to the phosphate give no larger crop than the phosphate and one cwt. of potash; so it is clear that the larger portion of the crop was grown by materials already in the ground, and was utterly unconnected with the added manures. Turnips had been grown once before when large quantity of town- and farm-yard dung had been used, and it is evident that the land was in a condition to bear a large crop of roots without much help.

In another series of experiments in Aberdeenshire, we find a trial again of the soluble and insoluble phosphates with ammonia salts and nitrate of soda:

| | Insoluble phosphates with ammonia salts tons. | cwt. | Nitrate of soda tons. | cwt. |
|---|---|---|---|---|
| Roots per acre..... | 6 | 10 | 5 | 7 |
| | Soluble phosphates with ammonia salts tons. | cwt. | Nitrate of soda tons. | cwt. |
| Roots per acre..... | 9 | 2 | 8 | 17 |

These are the mean of ten experiments, in 1879, and the only conclusion we can draw is, that the soluble phosphates, with the addition of ammonia and nitrate of soda, gave a much better crop than the insoluble with the same manures, as we find the mean produce to be 9 tons per acre against 5 tons, 18 cwt. One of Dr Lawes' most valuable contributions to our study of this interesting question, is a comparison of the effect of minerals alone and minerals with nitrogen, as manures for turnips: "Instead of taking the results from the field where permanently roots are grown, I take them from a field under an ordinary four-course rotation. There is nothing to distinguish the experiments in this field from ordinary practice, except that one part receives minerals, and the other minerals and nitrogen. The roots are all fed on the land, and the corn and straw of the other crops are carried off. Taking the average of three good crops, I find the following results with swedes:

| | Roots per acre tons. | cwt. |
|---|---|---|
| Minerals ..... ..... ..... ..... | 9 | 16 |
| Minerals and nitrogen ..... | 17 | 6 |
| Increase by Nitrogen ..... ..... | 7 | 10 " |

It is true, that the dry matter in the mineral grown swedes was greater by 1.18 o/o than in mineral and nitrogen-grown swedes, but as Dr Lawes observes, "the unmanured turnips which rarely exceed a ton per acre on our continuously unmanured plots contain the largest per centage of all of dry matter"—where you have a plant full of water and life you must have plenty of water—whether this water contains no other substance is one of those questions which I am impertinent enough to think chemists have to answer: see Journal for December 1880, p. 123, vol. 2.—Try a swede that as been mildewed before it is fully grown, and another that has escaped the disease—try first with a knife, and then with your teeth! your own observation will tell you that the badly grown one holds a much larger per centage of dry matter than the well grown one, but for all that you would not choose it for your own eating.

The experimental mangold crop, at Rothamsted, manured with minerals only gave 5½ tons containing 16 o/o of dry matter. Nitrogen added to the minerals gave 27 tons containing 12 o/o! Balance of dry matter in favour of mineral and nitrogen in round numbers per acre 2412 pounds, besides a much more agreeable food for the animals who were destined to eat it.

A large amount of minerals and a paucity of nitrogen in the soil produces early maturity and small pale-green leaves, which soon turn yellow. When nitrogen is abundant as well as minerals the leaves are large and of a deep green colour; the life of the plant is lengthened, and when growth ceases it is not from a deficiency of food, but because the weather becomes too cold to allow it to continue.

Mr. Jamieson, the chemist in charge of the Aberdeenshire experiments, criticises Dr Lawes' statement severely, but he proves nothing to the purpose, and as his whole argument tends to show that the most single-minded benefactor to the agricultural community is a humbug, I think his criticism is hardly worthy of notice.

One farmer, he does not give his name, is the next whose observations meet us. He states that on one occasion, (no date given) he grew 12 tons more yellow turnips per acre with one poundsworth of insoluble phosphate than without it: *valeat quantum.*

Another, who signs "S." to his letter (why are so many people ashamed of their names?), has a very pertinent remark: "Has not this important subject as to the value of turnips grown with minerals, and with minerals and nitrogen, been looked upon from a too purely chemical point of view? A farmer grows a field of roots principally with minerals, yield 9 tons, 16 cwt, per acre; and another with minerals and nitrogen, yield 17 tons, 6 cwt. He has them for sale to be fed off on the land. If he were to tell a purchaser that they had been analysed by a chemist and that the additional weight of the one field consisted mainly of water, would not the purchaser laugh at him for his pains? It does look as if Mr. Jamieson had mounted the hobby of the undissolved phosphate theory; and I am much mistaken, if it were ridden to death to-morrow, whether the agriculturist would weep."

Mr. Lawson meets us for the second time. He says that, "on several farms in Forfarshire ground phosphate has proved itself to be a more valuable and economical manure than superphosphate;" he instances only one farm, a peculiar soil, and he acknowledges that he expects no good from it on *heavy soils*, which, as that is my own idea, I think shows good judgment on his part! Last of all comes the evidence of Mr. Falconer King, analyst to the Chemical Agricultural Society of Scotland. He is engaged to analyse all samples of manures, feeding stuffs, &c., sent him by the members of the association. "It is a fact worth noting," says he;—"that, notwithstanding all that has been said in favour of undissolved mineral phosphate as a manure, only a single sample of that material has been sent for analysis. This, I think, may be taken as a pretty sure indication that farmers have not yet began to use phosphoric acid in this form to any extent. This evidence is corroborated by the result of some inquiries which I made when visiting some of my agricultural friends in the North, this year (Aberdeen is in the North). I found in a large district only one man who had used undissolved mine-

(1) Lawes' experiments, at Rothamsted.
(2) Viz the Aberdeenshire experiments.

ral phosphate. He had only used it for two seasons; the first year it seemed to do *pretty well*, but the second year it appeared to do *no good*, so he gave it up."

The conclusion I arrive at, after weighing all these opinions and statements, is this: we know very little more about the value of undissolved phosphates than we did two years ago. This, I think we have settled: if 4 cwt. of bones dissolved, whether by sulphuric acid or by turning them up with earth or ashes, will produce a crop of turnips on clay soils, and 7 cwt. of ground bones will not; *a fortiori*, 7 cwt. of undissolved phosphates will not. Again, as regards our dry climate in summer, we are much less advantageously situated than are the Scotch for the proper production of the effects of such a very refractory subject as our apatite. It is a serious thing to say that a confessedly raw material is to take the place of the manufactured one, which has been proved to be capable of performing its promises under all circumstances.

We must have experiments tried on our own soil, and under the supervision of some one who comprehends the aim of the trials. He must understand that it is a *competitive* examination he is superintending; he is not to try whether undissolved phosphates will produce a crop, but whether they will, *ceteris paribus*, produce a better crop than dissolved phosphates at the same cost. He must be fearfully honest, he must love truth for its own sake, and be entirely unbiassed one way or the other. He must be a chemist in theory, and a farmer in practice; and as his whole time must be devoted to his charge, his remuneration should be ample. Thousands of pounds have been wasted in experiments, and doubtless, thousands more will be wasted hereafter; but remembering, as I do, the time when farmyard dung was the only manure used in England (in Scotland bones had just been heard of when I was a boy); when bullocks fed on oil cake were supposed to be unfit food for a gentleman's table; I cannot believe but that sooner or later a change will come over the practice of farming in *this* country, as it has over the farming of England, and that we shall no longer see the apatite from our mines, the bones from our cattle, the sulphate of ammonia from our gas-works, all remorsely shipped off to England, "giving our sum of more, to those who had too much."

ARTHUR R. JENNER FUST.

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The following, from the Circencester, England, Agricultural College, I have only just received.—Messrs. Swanwick, Hulbert, and the rest, are real practical farmers, and worthy of all confidence. I find that the price of finely crushed apatite, at the Newell's Grinder Mills, is $24 per ton. Now, at the same place, bone-meal is only $1 a ton more; as it is manufactured from boiled bones, there will not be as much nitrogen as in recent bones; but still, there must be from 2 to 3 o/o, and if heated with moist earth, it is a very much more useful manure than any form of mineral phosphate.

"Dr. Prevost, professor of Chemistry at the Royal Agricultural College, read an elaborate paper on "Experiments in turnip cultivation with soluble and insoluble phosphates," giving as the result of a set of experiments, on which he reported in detail, that the best dressing for turnips was a mixture of super-phosphate and insoluble phosphate, the former to start the growth of the plant, and the latter to sustain its after life.—A practical and interesting discussion followed, in which Messrs. Swanwick, Hulbert, Parsons, Ruck, Snowsell, and others took part, *super-phosphate being generally regarded as the most beneficial dressing.*"

## AGRICULTURE.

*Paris, February* 12.

M. Henzé has raised a practical question respecting the value of maize as a forage plant; he maintains that it ought not to be given to cows when a rich and abundant supply of milk is desired, because he finds a maize dietary diminishes both of these ends (1). The matter is to be authoritatively looked into. Scientists continue to wage war respecting a standard for the determination of the nitrogenous value of a food. Professor Muller draws attention to a point, which is not without importance, and that admits of no questioning, viz the richness of root crops in nitrogenous matters not albuminous. Potatoes and beet contain, in addition to albuminous substances rich in nitrogen, other azote compounds, not differing notably from the former, either under the heads of chemical composition or nutritive value. Dr. Kellner last year made known, that all vegetables, in a green state, contained very notable quantities of non-albuminous, but nitrogenous matters, and that the manures employed, influenced the richness of such. Professor Muller has analysed beet, carrots and turnips, grown on calcareous and clay soils in Prussia, and has clearly shown, that swedish and ordinary turnips, but above all carrots, approach potatoes. Jerusalem artichokes and beet, in containing a large per centage of their nitrogen under a form non-albuminous.

The complaints so general of the non-success of red clover, has drawn attention to lucern, as a substitute; in fact the latter now exists in localities where it was unknown thirty years ago. The draw back to the successful culture of lucern is, the frost killing the young plants during the first year, and more to be dreaded, as northern latitudes are approached. As Brunswick is noted for its successful cultivation of the plant, the mode in which it is there raised, is as follows: It is a bad plan to sow lucern either with spring or winter wheat, because the plants come up too sickly; a soil of good quality, having produced a root crop which had been well-manured, receives after the roots, are removed, a tilling during the winter, to the depth of 10 or 12 inches, and an irrigation of liquid manure: in spring the harrow and roller are employed, and if the land be poor in lime, a small dose is to be added. Before sowing, the harrow is again employed: 36 lbs. of lucern with 4 lbs. of red clover, is sufficient seed for an acre, lightly brushed into the soil, and rolled; the second fortnight of May is the best period for sowing; a first cutting, of about two tons per acre, will be yielded in September; the aftermath must not be cut, but left to protect the young plants during winter. Under no circumtances must it be fed down. The first winter, no liquid manure is to be applied to the tender plants, the acids would be too strong, but a slight stroke of the harrow in autumn and spring, will be advantageous. Thus followed, an excellent and *permanent* field of lucern can be secured, and that will amply repay the cereal crop sacrificed during the first year.

Rape cake is commonly adulterated with mustard seed, and to this cause general belief attributes cows slipping their calves. A farmer addressed some adulterated cake to Dr. Hoffmeister, and demanded his opinion generally on the subject. He replies, that 2 per cent of mustard in the cake, for from producing abortion, aids favorably digestion. Professor Richter, of Konigsberg, gave from one, to one and a half ounce of mustard daily to heifers and cows in calf, without producing any objectionable results. However, stronger and continued doses, by provoking intestinal irritation, could bring about abortion. In Holland, Denmark, Sweden, and Germany, hemp cake is employed in the feeding of oxen: in France it is chiefly employed as a manure for flax and tobacco. Hemp cake contains nothing deleterious, and the quantity of nitrogen

(1) Precisely what I have said time after time.—A. R. J. F.

found in it varies from 4 to 5½ per cent. Some experiments have been tried with the cake in the north of France, for feeding black cattle, horses and sheep, and with success, save in the case of the latter, when it ought to be given sparingly, as it is a ration of rather an astringent nature.

The battle between wool and mutton growers is far it seems from being at its Waterloo. A M. Leroy recently asserted, that there cannot be found a flock of precocious merinos that is not a loss to the owner. A very practical reply comes from Poland. Let it be observed *en passant*, that Polish agriculture is undergoing a successful evolution, by the adoption of two French processes: trench preserving of green maize, and the crossing of native breeds of sheep, by the precocious variety of merinos peculiar to Edrolles, in the department of the Aisne. M. Laszczynsky states, ordinary Polish sheep are adult towards five years weigh 88 lbs and yield a 3½ lbs. fleece; from a first crossing with Edrolles rams, the resulting progeny gave, at one year old the following results: ewes, weight 114 lbs. and for the rams, 154 lbs.; average weight of fleece 5½ lbs. Further, while the native breeds at the age of four years only sold for fr. 15 to 18 the ameliorated stock at twelve months, were disposed of at fr 38 to 40 Another variety of the precocious merino is, the Soissonnais; one flock of this breed, containing 200 rams, contains an animal aged 16 months, which weighs 220 lbs. with a fleece estimated at 24 lbs.

The scheme for transplanting Rio de la Plata horses into France, has not quite succeeded: but there is nothing to prevent the success if certain conditions be observed. The Argentine horses, taken suddenly from the free life of the field or the pampas, and transferred to the stable, became ill.

The transition ought to be less abrupt; before being embarked they ought to be habituated to an enclosure, and fed some time on hay. It is an error in South America not to employ mares, like the horses, for the saddle and draught, and for which their greater docility so well fits them. Instead, they are allowed to live in a wild state, and naturally the fillies take after them; were the mothers trained, their progeny could be subjected to the same more easily. The Arabs, who are the first horsemen in the world, know these truths so well, that while they sell their stallions, they never part with their mares In La Plata then, mares are only utilized for breeding and the slaughter house; were they cared for and trained, they would become a valuable export industry for military Europe. Even when used, the "noble animal" in La Plata is shot away like so much rubbish. In France when a horse has reached the age of 20 or 30, it is destined for a chemical factory; it is first relieved of its hair, which serves to stuff cushions and saddles: then it is slaughtered and skinned; the hoofs serve to make combs. Next the carcass is placed in a cylinder, and cooked by steam and a pressure of three atmospheres; a cock is opened, which allows the grease to be run off; then the remains are cut up: the leg bones are sold to make knife handles etc., and the coarser or ribs, the head etc., are converted into animal black and glue. The first are calcined in cylinders, and the vapors when condensed, form the chief source of carbonate of ammonia, which constitutes the base of nearly all ammonical salts. There is an animal oil yielded, which makes a capital insecticide and a vermifuge. To make glue, the bones are dissolved in muriatic acid, which takes away the phosphate of lime: the soft residue, retaining the shape of the bone is dissolved in boiling water, cast into squares, and dried on nets The phosphate of lime acted upon by sulphuric acid and calcined with carbon, produces phosphorus for lucifer matches. The remaining flesh is distilled to obtain the carbonate of ammonia, the resulting mass is pounded up with potash, then mixed with old nails and old iron of every description. the whole is calcined, and yields magnificent yellow crystals—prussiate of potash, with which tissues are dyed a Prussian blue, and iron transferred into steel; it also forms the basis of cyanide of potassium and prussic acid—the two most terrible poisons known in chemistry.

In some of the central departments of France, where skim milk cheeses are prepared, but only for local consumption, dairy maids have the habit, when the curd is drained and shaped, to dredge it with animaloules, or mites, specially kept in stock. Entomologists give this insect the generic title of *tyroglyph*, or cheese sculptor, and it is a revolting agglomeration of hairs, humps, pans, nails, and gelatinous sacs. The insect propagates so rapidly, that a single pair will produce in a cheese, 20,000 in a month. They give a false idea of maturity, a ripened crust, to the cheese, while the inside remains white, and devoid of that sharp flavor so desired in cheese. But if the latter contains an opening, the army of besiegers will rush in and devour it voraciously. These mites are in no way related to the infusoria, or cryptogams, which are derived from the air, and spontaneously settle on the curd, to produce the fermentation of the caseine.

Nothing in the way of a victory over the phylloxera; the battle for their extirpation goes on hopefully. Reports as to winter; some crops not bad, the snow came in due season and afforded protection; at present we have the rains.

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## Vennor.

Mr. Vennor will not be quiet. He has evidently never read Lord Macaulay on the *Puff collusive* (1). He reminds me of the men in the ring of my younger days, who were always challenging others of a stone heavier to fight, in order to *keep their names before the public*. He wrote to the *Star*, Montreal, on Thursday, March 3rd, the weather then being mildness itself, as follows:

### Mr. Vennor Again Heard From—Another Storm Period.

"Mr. Vennor writes us as follows:—'There will be rapid "moderation on the 4th or 5th to warmth, but the tempera- "ture will again fall on Sunday night or Monday, and a "week of extremely cold and stormy weather is likely to "ensue with some very heavy snow falls. The 17th and 18th "days (possibly the 16th) come within another downward "curve of the weather line, as do also the 24th and 25th. "Montreal has yet to experience the heaviest snow-falls of "the winter. Saturday next is likely to be slushy.'"

And again, on the following day, Friday, March 4th:

### A Storm To-morrow.

Friday, 11 o'clock a. m.

"*To the Editor of* The Star:

"Sir,—The prospects are a shade brighter for the "snow- "shoers" to-morrow afternoon—that is if a snow storm "will answer their purposes as well. The abrupt rise in tem- "perature having occurred on the 3rd instead of the "4th "or 5th," the storm and "dip" is (sic) likely to come on "immediately.

Yours truly,
H. G. Vennor."

Mr. Vennor evidently reads the papers. Our weather report of yesterday gave us precisely the same information as the above. If Mr. Vennor is wrong this time he *can blame it on* (sic) the signal officer.—[Ed. Star].

"Our weather report" means the telegram from the Toronto Observatory, which is always to be seen at the Montreal Post-Office, a little after 10 a.m.

I append an extract from my own journal, describing the real state of the weather during the time included in Mr. Vennor's prophecies for March.

(1) v. Essay on Robert Montgomery's poems.

March 4th, Mild; a little snow.
" 5th, " " "
" 6th, " ; a little colder towards night—lovely night.
" 7th, " ; lovely spring day—lovely night.
" 8th, " ; a divine, bright day — heard a crow — lovely night.
" 9th, " and cloudy.
" 10th, " " light, fine snow; splashy.
" 11th, Mild, but an awful drift and snow (4 inches); at night, 18° F.
" 12th, Mild, and pleasant; 21° F.
" 13th, Very fine, mild morning; soft thaw; a little snow at night.
" 14th, Lovely, bright morning — springlike — colder towards night, 20° F.
" 15th, A charming day all through.
" 16th, Dull, mild, sloppy; a drip of rain and a little snow.
" 17th, Dull, foggy, mild morning; sun at 11 a. m. but soon retired; rain, and a little snow after sunset.
" 18th, Nasty morning; thaw; dull all day.
" 19th, Very soft and mild; rain at night, with snow (2½ inches).
" 20th, Dull; damp; slight snow.
" 21st, " " showers; but brighter p. m. — springlike air.
" 22nd, Morning frost; dull; very fine snow a. m.; very fine afternoon.
" 23rd, Colder last night; lovely morning; dull p. m.
" 24th, Coldish morning with a film of snow; dull—sun broke out at noon; finish p. m., but chilly all day.
" 25th, Fair, blustering morning; cold, with fine snow; very bright at 2.30 p. m. 22° F.
" 26th, Rain; chilly day; wind and drift, but very little snow. 20° F.
" 27th, A wretched day—wind, and snow, and drift—perhaps an inch or two of snow have fallen during the last two days.

From the first to the 28th of March, I reckon about eight inches of snow. At Chicago a terrible snow blockade; and Mr. Vennor takes credit for having predicted it! But then that charlatan, Murphy (1), when taunted with the failure of his weather-prophecies, in 1838, informed the *Times*, that the weather in the south of Ireland, where he had written his almanac, had turned out exactly as predicted, although, in London, it happened to be exactly the reverse. Seriously, have we not had enough of this nonsense?

A. R. J. F.

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### D. M. Ferry & Co's Seed Annual, 1881.

We have just received, from Detroit Michigan, the seed annual of Messrs. D. M. Ferry & Co. Amateur gardeners will find it a very useful work. We are happy to say that the seeds sent us by this firm have always turned satisfactorily. The Seed Annual can be had from the publishers at Detroit by sending a postal cart with the address of the person desiring a copy.

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" The *Quebec Journal of Agriculture* for March contains an illustrated article on birds; part of an excellent article on the horse's foot, by McEachran, and a description of the cultivation of tobacco. In view of its effects in Virginia, we cannot understand why anyone should advise its culture in Canada. But Mr. Jenner Fust thinks it was the neglect of manuring that did the mischief, and not the growing of tobacco."

Orillia packet.

The Virginians persisted in planting tobacco on their finest soils. They never manured them, but when one piece was worn out they followed suit with another. The soil chosen was generally sandy, and, when once exhausted, was left to nature to recover, if it could. I do not suppose we, in the province of Quebec, are going to be so ungrateful; and we could not be, even if we would, as our soil would not produce any crop worth speaking of, if we were to plant tobacco without a good dressing of dung.

The same argument which the *Packet* uses would forbid the growth of hops, a much more exhausting crop than tobacco, as it ripens its seeds. Tobacco, the green leaves of which are the only part which is sent off the farm, only occupies the land, at most, twelve weeks, and if properly treated, the stems burned, and the ashes restored to the soil, cannot do it much injury. Besides, the gross returns are very large, and it is not too much to say will lead, almost necessarily, to an improved system of cultivation. In my opinion, the absence of hard cash passing through their hands, is one principal cause of the want of enterprise among the French-Canadian farmers. They don't see, or feel, the profits they do make, and so they despair of any alteration in their methods of treating their land doing them any good. But once let them handle two hundred or three hundred dollars coming from the sale of the produce of an acre or two, and we should, I firmly believe, soon see a great change come over the whole province.

A. R. J. F.

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Mr. Foucher, Joliette, consulted me last week as to the best manner of cultivating tobacco, and beets for sugar. His intention is to plant on his farm, at Berthier en haut, 50 acres of beets, and 50 acres of tobacco, besides keeping 50 cows for a cheese factory he is establishing there. As the farm contains only 150 acres, I do not envy him his undertakings. Where on earth are 2000 loads of dung to come from?

A. R. J. F.

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## CORRESPONDENCE.

*My dear Sir.*—Please do not consider me as wanting the "last word," in our "amicable dispute," for I am ever ready to admit myself in error, when convinced.

I think you have taken too extreme views of some of my assertions, and I only ask to be set right. You say, "of course I am utterly impenitent, as I feel sure, upon scientific principles, that no barn that was ever built can exclude air."

I am equally impenitent, and I am also equally sure, upon scientific principles, that no barn that was ever built can exclude air, for we know that the air, or atmosphere, pervades *everything*.

If I had said, it is a *free circulation* of air that plays mischief, instead of, "it is the air that plays the mischief," you would not have had the opportunity to "draw it so fine"—I said "if we could store our hay in air tight buildings," (and you will bear it in mind that if is a big word, for one of two letters), it would be on the same principle as Ensilage, or the storing of green fodder in pits.

What I mean by a *tight* barn, is a well built double boarded barn, and *not* full of cracks, as some of our ancestors thought they must be, or the hay would mould, and by keeping it "well closed up" I mean keep the doors shut when not in use, and prevent as much as possible a circulation of air. Let me illustrate, so that I may not be misunderstood; take two lots of hay made equally dry; put one in a loft over a horse barn, and close doors and windows; when it heats, the hot, dry air in the loft absorbs the moisture, for if it heats it throws off vapour does it not? Let us put the other lot in an ordinary mow, and leave the doors open for the air to circulate freely over it; when it heats, and throws off vapour, instead of being absorbed by the hot, dry, and confined air of the closed up loft, it is condensed, by the circulating air, and falls back on the

(1) v. Journal for February, 1881, p. 151.
——mutato nomine, de te
Fabula narratur.

hay in the form of water. Can you knock the bottom out of that philosophy?

I tried to condemn the practice of some farmers leaving their barn doors open to *dry their hay*, after it was stored, and am sorry, I left my meaning so obscure, as to be accused of trying to build an air-tight barn.

You will recollect, that our dispute on stacking grew out of Mr. Barnard's telling you, that he carried his hay greener, for the stacks he built at Varennes, than he could have put it in the barn; so that the question is in reality here. in Canada, and not in the old country, though I fail to see the difference, as I call a stack, a stack, whatever local-name it may go by. I have helped stack several hundred tons on the Pacific Coast, in stacks 24 × 120 ft long, and the same principle is carried out there viz: it must be drier to stack, than to put in the barn.

Can you not, some time before next hay season, favor us with an article on hay making? I, for one, am anxious to learn, all there is to be learned and I will promise beforehand, to pick no flaws, but at the same time you will recollect, that it is "through these disagreements, that the truth is elicited."

A few words about feeding, and I am done. I should infer, from the tone of your correspondent J. Mc'C very interesting letter, that he was feeding for beef. I had reference more particularly to feeding Dairy stock, as dairying is our principal business in this section. I have never fed for beef, except an occasional animal, but when I do, I only feed twice each day, i. e. hay, and their grain after their last feed of hay is eaten up.

Now my dear sir, I presume I have been just as prejudiced against the "twice a day" system, as your correspondent J Mc, having been taught, by precept and example, to feed cattle three times a day. — I said in my article in the Oct. No, that a young animal was supposed to want to eat oftener than an older one and I have tried, *in vain*, to make calves drink milk three times a day, in the flush of the season. Now, if a calf is well enough on two feeds a day, why does an older one want three? Your correspondent, J. Mc. says: "if they had but two feeds a day, it would be so long between meals, they would get hungry, and very uneasy, and would throw off before the next feed more flesh than they put on by the last one." Has J. Mc. ever tried it? Theories are all very well, in their way, but it is practice that tells the story — I have tried it, for years, and say they are not uneasy, but lie chewing their cud, as I like to have them. and pray tell me, what better sign of good health and contentment can you see in a herd?— Mine are not always done chewing their cud at 4 o'clock P. M which is my feeding hour for the night. Again he says, "they would throw off before the next meal more than they put on by the last one. — That, certainly, means that they are growing *poor* every day—yes twice a day.—Now, that is *theory*; let us see about the *practice*. We often have cows,—deep milkers especially, come to the barn thin in flesh, and according to that ratio, we should have their hides long before spring, but we *don't*; for instead of being skinned, they gain all winter, and plenty of cows can be picked from the herds of those that practice feeding twice a day, that are good beef at this writing.

I am not alone in advocating this method, — it is practiced by some of the best Dairymen in this section, as well as across the border, in Franklin Co.

Mr. McEachran thinks that twice a day feeding is a fruitful source of disease, and I plead *not proven*.

Physicians tell us that, if we take food before our last meal is digested, that the process of digestion is arrested, and that eating too often is a fruitful source of Dyspepsia. Does not the same rule apply to quadrupeds, as well as bipeds? And is not the process of digestion in a ruminating animal a very slow one? If, as Mr. McEachran says, it is very unhealthy for animals to eat but twice a day, then I must say that mine endure it well, for I have only lost one animal in the course of my experience, and that from some unknown disease — I am never troubled with garget, and very seldom have any trouble with cows not "doing well" in coming in.

I have not exhausted the subject, by any means, but I fear I have made my letter too long already, but then my dear Sir, if you do not wish to be bothered, you should not be an editor.

Frelighsburg. Yours sincerely, C. A. Deming.

---

*Dear Sir*,—Will you through the "Journal of Agriculture," give the varieties of trees best adapted for forest planting in this climate.

Would seed of the white maple from the Western States be better, or give more rapid growth for forest cultivation, than seed of the same variety grown here?

Our timber is fast disappearing, and unless we resort to forest culture, the next generation will suffer with a fuel famine.

In passing over the Massawippi valley road a few days ago, I was forcibly impressed with the destruction or disappearance of the forests; for, where a quarter of a century ago were miles of forest growth, now it is fast disappearing, and with this denudation, a change in our seasons is very apparent.

Verily he who is foremost in the enterprise of forest culture, will be looked upon shortly as a philanthropist and benefactor.

George Bachelder.

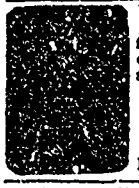
Stanstead, P Q., March 2nd.

# TABLE OF CONTENTS.

## ENGRAVINGS.



## Collaborators, Correspondents, &c.



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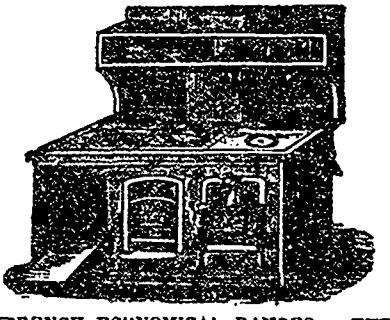

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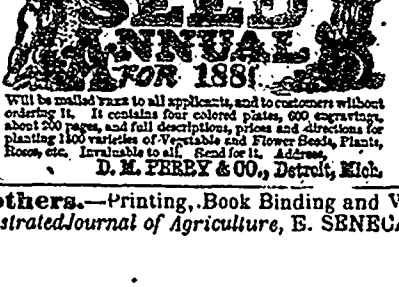


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