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THE

Canadian Agriculturist,

OR

JOURNAL AND TRANSACTIONS OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. XIII. TORONTO, OCTOBER 1, 1861. No. 19.

e Sixteenth Annual Exhibition of the ovincial Association of Upper Canada.

It is not our intention to write a report of the nt exhibition, which will receive proper at-tion, in due course, in that portion of our rnal devoted to the Transactions of the Board Agriculture, with the official list of premiums,

In the meanwhile we have much pleasure ecording the universally admitted fact that Exhibition, either as a whole, or in any of departments, was a complete success. The her, fortunately, proved fine till the close of show, when it commenced raining, and the ber of entries and visitors was little, if any-g, short of the last memorable meetings of sociation in Toronto and Hamilton. As the greatest part of the animals and ma-s of the exhibition is made up from the cts surrounding it, the late show affords conclusive and pleasing evidence of the progress which the western counties have te years made, both in agriculture and the ic arts.

Exhibition Building is altogether different tyle and appearance from any of its pre-ors, and is a convenient and substantial re. The following description will be in-g to such of our readers as were unfor-enough not to be present at the Exhibi-

ground plan of the building is a regular its dimensions, from opposite angles, being 186 feet. The space afforded by the ground area is upward of 24,000 feet, while the galleries give an additional space of 4,000 feet more. The external wall is built of white brick, on a foundation of rubble masonry and concrete, and is 21 feet in height. The entrance to the building is through eight doorways, one at each angle, each eight feet wide and fourteen feet high. In the brick wall on each side of the octagons, and between doorways, are five spacious windows, making on the ground floor forty windows. The roof of this portion of the structure is covered with felting, gravel, &c. The arrangement of the doors afford ready ingress and egress to the building, besides securing a thorough draft for the purposes of ventilation. The second tier of the building, containing the gallery, rises to the height of thirty-two feet above the ground-line, and 114 feet in diameter from opposite angles, giving a wall accommodation of more than 300 lineal feet, lighted with 48 windows, every alternate one being hung on a pivot to admit of ventilation. The ascent and descent to the upper portion of the building are provided for by two stairways, one being intended for the entrance and the other for the exit of the public, and leading in opposite directions, so as to divide the ground. The third tier of the building is a continuation of the inside gallery wall, and runs to the height of forty feet above the ground line. This tier supports the cupola, and is covered with a shingle roof. The interior view is clear, and is not intercepted by any timbers to the height of eighty-seven feet. The full height of the building to the top of the flag-staff is 114 feet; the dimensions of the cupola, twenty feet diameter by thirty-one in height; the area of the ground floor and gallery, 28,000 feet, being about the same area as the Hamilton Exhibition Building, and 4,000 feet less than the Toronto Building. The sheeting of the roof is painted a blue color, the timbers

a drab. Provision is made for a band of music in a suitable situation. The building is designed and constructed with a view to the purposes for which it is erected, and also with a due regard to economy. The building is of the most permanent character, the best stone, brick, and lumber obtainable being used in its construction, while the entire workmanship is of a superior order. On the whole, it may be said that the London Exhibition Building is alike creditable to the Association and the Province."

The ground on which this fine building is erected is situated most conveniently within the city limits, and consists of about thirty-six acres, including a pretty sheet of water on the northern and lower side. The subsoil being sand, and the surface gently sloping, the surface is comparatively dry, even in showery weather, and, taken altogether, with the roomy and substantial erections for stock of all descriptions, the London show-grounds and buildings are not surpassed by any of the other three places that have permanent erections; and they are certainly highly creditable to the citizens of the "Forest City," who met by far the greatest portion of the expense.

Several Americans of distinction were present; among them the Hon. Mr. Geddes, President of the New York State Agricultural Society; Mr. Harris, of the *Genesee Farmer*; Mr. Moore, of the *Rural New Yorker*, from which we copy the following extracts from an editorial in the last number:—

"The Annual Show of the Provincial Agricultural Association of Canada West, at London last week, was a grand affair—a great exhibition, large attendance, and altogether most creditable and successful. Though present only one day—the 24th—we had the good fortune to see, and were enable to take brief notes of, the display in most departments, and will endeavor to give a summary of our observings. As time was limited and notes taken while standing, our report is necessarily rough and imperfect—yet, though far from doing justice to the Exhibition, we trust it will convey some idea of the progress of the Farmers, Horticulturists, and Artisans of the Province, and the credit to which they are entitled for such well-directed and successful efforts to advance Improvement as were manifest on the occasion.

* * * * *

The show of stock is always the leading feature at the Provincial Fairs, but was this year much larger than usual, in most departments. Indeed, the display so far exceeded expectation, that many stalls and pens were obliged to be hastily prepared, in addition to the large number completed before the opening of the Exhibition.

* * * * *

Sheep.—As usual at Provincial Fairs, the show of sheep, especially of Long and Middle Wool or Mutton breeds, was large and magnificent. There were over 750 entries. The Leicesters, Cotswolds, Cheviots, and other breeds and crosses, made a fine display.

* * * * *

Swine.—The most popular breeds of the genus *Sus* were represented by excellent specimens the show being the largest, and of the best average quality, we have seen for years, if ever. The entries in this class (about 250) indicated considerable competition, and the hundreds of sleek and handsome big and little pigs received a share of attention from spectators. Both large and small breeds were shown in considerable numbers—the Yorkshires, Suffolks, Essex, Berkshires, &c., &c., and their crosses, being numerous and noteworthy.

Poultry.—The display of Poultry was largest and one of the finest we have seen anywhere for years—since the height of the "chicken fever." The Show embraced the usual variety of fowls, Turkeys, Geese, Ducks, Pigeons, &c., and was worthy of a more extended examination and notice than we are able to bestow.

GRAIN, ROOTS, AND VEGETABLES.

Grain and Seeds were exhibited on a large scale, compared with our New York display, though Canadians assured us the show was fully equal to that of last year in either quantity or quality. Wheat (both spring and winter) barley, oats, peas, rye, and Indian corn, were shown in abundance, and there were many samples of superior quality. We had only time, however, to give a glance at the fine display, and hence will not particularize. Of the smaller seeds—such as timothy, clover, millet, Hungarian grass, &c., there was an excellent variety much larger and better than we ever saw at any of our State Fairs. Would that our New York farmers might emulate their Canada brethren in this department, and for once show what they can excel in!

Roots and Vegetables were shown extensively and we thought of a quality highly creditable, though this is a branch in which our transatlantic friends are wont to excel. Potatos, turnips, beets, parsnips, and carrots, were all displayed in profusion—while the the show of cabbages, squashes, tomatoes, and garden vegetables generally, was large and fine.

DAIRY PRODUCTS, HONEY, &c.

Dairy products were shown in considerable quantity, and apparently of good quality. The display of both butter and cheese far exceeded our anticipations, in all respects. Two cheeses, weighing about 1,200 lbs. each, made and exhibited by Hiram Ranney and Jas. Harris, of Oxford, attracted marked attention and in

The manufacturers propose to send the larger one (which is 4 feet 5 inches in diameter, and 19 inches thick,) to the World's Fair, and may send both. They are worthy of the honor. Mr. Rooney also exhibited fine samples of Pine Apple and Stilton cheese.

* * * * *

Various other departments of the Exhibition were noted, but space forbids our giving particulars. The display of Domestic Manufactures, Fine Arts, Fancy Work, &c., far exceeded our expectations, not only in extent but quality, and was said to be an improvement upon former exhibitions. The "Palace" was full of useful and curious products and articles, and alone comprized a splendid display, aside from the grand show on the outside—an exhibition decidedly commendable, and most creditable to the industry, skill, enterprise, and artistic taste of the People of the Province.

—Though pleased with the Exhibition, we are constrained to add that greater pleasure was expected in meeting the farmers, horticulturists, and other producers in attendance. To many exhibitors and officers—and especially Messrs. Denison and Thomson of Toronto, and D W. Freeman, Esq., of Simcoe—we are indebted for courtesies and attentions which will be long remembered. Indeed, our brief view of the Provincial Fair of 1861 was most pleasant, gratifying, and instructive.

The Great Exhibition at London, England, 1862.

The subjoined memorial was recently addressed to the Executive Government, by the Boards of Agriculture and Boards of Arts and Manufactures of Upper and Lower Canada, jointly:

To His Excellency the Right Honourable Sir Edmund Walker Head, Baronet, K.C.B., Governor General of British North America, &c., &c., &c

The petition of the Board of Agriculture for Upper Canada, the Board of Arts and Manufactures for Upper Canada, the Board of Agriculture for Lower Canada, and the Board of Arts and Manufactures for Lower Canada.

RESPECTFULLY SHEWETH,—

That during the last session of the Provincial Parliament, your petitioners severally addressed His Excellency and the other Branches of Parliament, praying that commissioners might be appointed, with the necessary powers to secure a proper representation of the industrial resources of the Provinces in the Great Exhibition to be held in London under the authority of a Royal Commission, in the year 1862, and that the necessary funds should be placed at the disposal of such Commissioners for that purpose.

That this prayer of your petitioners was not then granted. Yet so heartily convinced are your petitioners both of the desirability of securing such a representation of Canada on that occasion, and of the almost unanimous desire of the people of this Province that the necessary steps should be taken to that end, that they venture again humbly to approach your Excellency and solicit Executive action to that behalf.

That as the result of the position taken by Canada in the Great Exhibition held in London in 1851, and in Paris in 1855, a knowledge of the vastness of the resources of the country has been spread throughout Europe, and large investments of capital have been made here tending to the rapid developement of those resources. That this is evidenced alike by the high credit which the Provincial securities have always since enjoyed, by the vast sums embarked in our railways, and by the multiplication of agencies for the loaning to Canadians of transatlantic capital for the improvement of real estate. It has also been evidenced by the establishment in this country of foreign consulates, and the developement of its foreign trade as well as by the efforts made (in France more especially) through those consulates, further to develope and extend our commercial relations with other countries. It is also evidenced by the success of recent Postal conventions with foreign Goverments, which previously to 1851, would not have conceived of Canada as a country with sufficient resources to establish and maintain separate transatlantic postal communications.

That since the year 1855 new and important discoveries of mineral wealth have been made—the rich copper ores of Lower Canada and the mineral oils of Upper Canada being especially noteworthy—new and important branches of industry have arisen; and it is fitting that these should be brought under the attention of European capitalists and men of enterprise with due prominence.

That a new census of the Province has just been taken, and some of its most prominent results ought to be compiled and laid before the European public; and this can in no way be so effectively done as through the agency of a Commissioner, appointed to represent Canada in this the third Great International Industrial Congress.

That all important foreign countries, even the United States, (not adequately represented on previous occasions, and now suffering the ordeal of civil war) have announced their intention of competing on this occasion, and have appointed Commissioners. All other British Colonies (including the Acadian Provinces, before unrepresented) almost without exception have done likewise; and therefore for Canada to absent herself were to make a confession that she has, as compared with her sister colonies, retrograded, or

remained stationary, which must prove prejudicial to her interests. Intending emigrants cannot fail to be influenced in a greater or less degree by the position which the several colonies take in these Exhibitions, though not possibly to the extent originally anticipated, and nothing can be of greater importance to Canada than a healthy immigration to her untilled fields and her unworked mines.

That by the 6th rule or order of the Royal Commission, no party desirous to send articles to the Exhibition can do so, or communicate with that Commission, except through Commissioners appointed as the organ of communication by the Government of his own country, and a barrier is thus placed in the way of individual efforts to exhibit Canadian products. Besides, such individual efforts must fail to produce the desired effect which a more complete and united representation of the country's resources would do.

That it is necessary that steps should be immediately taken to secure space in the Exhibition building, since the Royal Commissioners have advertised that the allotment will be made a few weeks hence.

That if a Committee were forthwith appointed and space secured, it might through the instrumentality of the Geological Survey and the Agricultural Societies, and by an appeal to individuals to exert themselves in this behalf, secure a large representation of the products of the soil and mines, almost for the mere cost of transport.

That if your Excellency were advised to lay before Parliament, should it be called together before or in the month of February next, a moderate estimate for the expenses of the commission, preparations could be forthwith made by individual exhibitors, and articles made for submission for selection to the Commissioners in March, to be shipped during that month to Britain.

That the cost to the Province of its part in the Paris Exhibition of 1855 was, as your petitioners are informed, altogether $60,000.

That many expenses were then incurred which might now be unnecessary, the voyage being shorter, and one transhipment being avoided. Your petitioners are convinced that out of a similar, or perhaps less grant, the half might be returned to the Provincial Treasury on this occasion, if due economy were exercised in its arrangement.

Wherefore your petitioners humbly pray that your Excellency will be pleased to appoint a commission invested with the necessary powers, to secure the representation of the industrial products and resources of the Province in the Exhibition to be held in London during next year, and with such assurances with respect to the grant to be recommended to Parliament as your Excellency may be advised it is possible to make.

And your petitioners, as in duty bound will ever pray.

In reference to which the following notice has appeared in the *Canada Gazette*:

SECRETARY'S OFFICE.

Quebec, 28th September, 1861.

HIS EXCELLENCY THE GOVERNOR GENERAL has been pleased to appoint:—

Sir WILLIAM LOGAN, Provincial Geologist, Hon. LOUIS VICTOR SIROTTE, President of the Board of Agriculture, L. C., EDWARD WILLIAM THOMSON, Esquire, President of the Board of Agriculture, L. C., JOHN BEATTY, Junior, Esq., M. D., President of the Board of Arts and Manufactures, U. C., JEAN CHARLES TACHE, Esq, M. D., and BROWN CHAMBERLIN, Esq., Secretary of the Board of Arts and Manufactures, L. C., to be Commissioners through whom Canadians can obtain exhibition of such articles as they desire to transmit to the International Exhibition of 1862 to be held in London.

We are informed that the Commissioners have already met in Montreal, and have taken preliminary steps towards securing the proper representation of Canada at the great Exhibition Government has not yet however granted any pecuniary aid to the object.

Importation of Stock.

[We have sincere pleasure in transferring the following letter of a correspondent of *the Globe* to our columns, heartily endorsing the sentiments which it contains. It is a pleasing and encouraging thought that men like Mr. Miller benefit both themselves and the country in which they live.—ED.]

SIR,—The *Agriculturist*, of the 16th ult. publishes extracts of letters from F. W. Stone, Esq., Moreton Lodge, Guelph, showing that he had been making fresh additions to his already large and valuable farm stock. It must be gratifying to the ambitious men of the West to find that they have resident among them a gentleman of such enterprise. Long may he live and thrive in the good work he is engaged in. So much as Mr. Stone deserves credit for his enterprise, I desire to bring under the notice of the public a person no less deserving of credit for his enterprise—George Miller, of Riggfoot Markham, long and favourably known as the largest importer of thorough bred animals, and one of the most successful breeders in the Province. Mr. Miller was absent last winter some 8 months on a visit to Great Britain. In the course of his tour he inspected the stocks of the most celebrated breeders in England and Scotland, and on his return brought out 49 sheep, Galloway heifers, 1 Ayrshire cow and calf, 1 Jer-

and five pigs. The sheep comprise Leicester, Cotswold, Shropshire Downs and Cheviots. In Leicesters and Cotswolds Mr. Miller stands unrivalled. He has, I believe, the largest flock, comprising the largest carcase, and longest wooled sheep, of any breeder in Canada, and I suppose I am safe in saying, has carried off the most prizes of any exhibiter at our local and Provincial Fairs. At Hamilton, last year, he carried off the Gold Medal for the best bull shown. I had lately the pleasure of going over the farm and was shown the new breed of sheep—Shropshire Downs—lately introduced by Mr. Miller. They are pure bred, and to the uninitiated appear to be every thing desired in size, shape, and wool, and in Mr. Miller's opinion a decided improvement on South Downs, as being larger in the body, longer in the wool, and in every way better adapted to the country. Of Cheviots, Mr. Miller has also introduced a sample. For some localities these may be better adapted. Time, however, will test this. The six Galloway heifers, pure bred and of fine appearance, make quite an addition to his stock. The Ayrshire cow and calf are also pure bred, and considered by many to be a decided advantage to the dairyman. The sow and pigs are of the Yorkshire and Cumberland improved breed, and are really fine animals. Mr. Miller has, I think, the best herd of Short Horns in the County of York, and when I say that I may as well stump the Province. His bull, Prince of Wales, is a noble animal, and although only three years old, has taken eleven prizes—three at New York State Fair, two Provincial, and six local—And no less than four medals. I do not think the same can be said of any other animal in Canada.

It is worth a day's ride to visit the Laird of Riggfoot. You will find a large farm, well and profitably managed, with by far the largest flock of sheep from imported stock in the Province, and his stock of cattle surpasses anything of the kind in the country. It would well repay you, Mr. Editor, to pay Mr. Miller a visit, and as a friend of the Laird of Riggfoot I extend to you a cordial invitation, and will ensure you a hospitable treatment and a friendly welcome.

Yours truly,

JAMES.

Toronto, Sept. 13, 1861.

Flax Culture in Canada.

[The importance of this question is so great that we insert below two letters published in the *Leader*, from gentlemen professing ample opportunities of forming a sound judgment upon it. ED.]

WESTON, Sept. 19, 1861.

To the Editor of the *Leader*.

DEAR SIR,—I have just returned from Europe, where I have been on a mission of some months, principally in the northern counties of Ireland and in Scotland with a view of promoting emigration to Canada and it may be interesting to some of your readers to know that from nine to ten thousand emigrants have reached our shores this season in excess of the numbers up to this period last year. This, I can safely say, is mainly owing to the active measures taken by the Canadian Government, in circulating, through the hands of agents, a large amount of valuable printed information in pamphlet form, with maps of both Provinces. I also feel quite warranted in stating that the foundation is laid for a large increase next and following years. My attention has been particularly directed to small farmers of Ulster and other places with more or less means. Many have expressed their desire at once to leave for Canada, but have frankly acknowledged their inability to do so on a few months notice, and numbers have their minds made up to be prepared next spring. Although the population of Ireland has materially decreased during the last few years, yet the large landowners are most anxious to have their farms enlarged and in fewer hands. The tenants, too, are most anxious to better their position, and to be relieved of the heavy rents and still heavier taxes; and of necessity they are driven to seek a home in Canada, or some other country, for themselves and families.

The present disruption in the United States will also serve to swell the tide of emigration to Canada for many years to come, as at present every vessel leaving New York, Philadelphia and other seaports is taking large numbers back to Europe, and many are coming direct to this country.

On my arrival in Belfast, I found a strong desire on the part of the linen manufacturers and spinners to encourage largely the growth of Flax. The present supply not being anything like equal to the demand, agents were being sent to India and other places, at great expense to give instructions in the cultivation of the plant. The question at once presented itself to my mind why could it not be grown in Canada. I feel confident that it could be done to great advantage. If the farmers would only give it a fair trial, they would be convinced that it is a more profitable crop than wheat, especially in many of the front townships, where the average is not more than 16 to 18 bushels to the acre. Many farmers in the North of Ireland sold their flax on foot this season for £20 sterling per acre, and prices vary from £50 to £100 per ton; and for fair qualities often £150 a ton is obtained. The want of machinery for dressing it I am aware, has been a drawback up to the present time, as Scutching Mills have been expensive and require skilled labour at high rates to enable the farmer to get it prepared for market. But a Flax Scutching machine is now manufactured by Messrs. Rouan & Co., Belfast,

at the low rate of £24 sterling, which is capable of doing an amount of work equal to any other machine, and can be attended by a boy or any labourer with a few hours instruction. It was exhibited at the late Agricultural Show at Belfast, and highly approved of. I have in my possession a number of statistics and works on the cultivation of flax, all of which I will be happy to furnish to the Board of Agriculture. I also place in your hands for publication, a letter from Robert McCrea, Esq., Grange House, near Strabane, a gentleman who farms largely and grows large quantities of flax, and from whom I received my information, in his house. He had on his farm this year the growth of two barrels of seed, sent him by his brother in Guelph, which I believe was obtained from a Mr. Perine, in the County of Waterloo, and which looked as well as any I saw in the country. I am told there are several thousand acres under cultivation in that district this year, and if this crop is profitable in Waterloo I see no reason why it should not be profitable in other parts of the Province.

Your obedient servant,

J. A. DONALDSON.

To John A. Donaldson, Esq., Canadian Emigration Agent, Londonderry.

DEAR SIR,—The interest you have taken in my attempts to bring the capability of Canada as a flax producing country before the public, leads me to think that a few hints on the preparation of the soil, steeping and after management of the crop, might be useful on your return to that country.

My trip in 1859 gave me ample opportunities of judging, and I have no doubt there is much land in Canada West capable of growing good flax, as I saw in company with my brother, several fields grown by Messrs. Perine, of Waterloo County, and it only remains to be seen whether the climate and water are suitable for its preparation for the linen manufacturers of Belfast and Lurgan, &c.

The land best suited for the growth of Flax has a clay subsoil, and should have a portion of it mixed with the active soil by deep plowing, ior trenching; at the same time care should be taken that too much of it is not brought up in one season, as it would override, or neutralize the action.

But whilst a clay soil produces both the heaviest crop, and the finest quality, many other descriptions of soil give good crops, under proper treatment.

In Canada there is a long period of fine weather after harvest which will afford an opportunity of cleaning the land intended for Flax, of root-weeds; this is best done by scarifying, harrowing, rolling and raking just deep enough to bring the root-weeds to the surface, when they should be removed, or burnt, and the ashes spread. If this be done early an interval of a few weeks may be allowed to elapse before plowing, to let the small seeds vegetate. The land should then be plowed as deep as possible, (if stiff and difficult, with three or four horses, or oxen, and allowed to remain open and exposed to the action of the frost during the winter, which greatly facilitates the working of it *in spring*.

As soon as the frost and snow are gone, and the ground partially dry, or sufficiently so to admit of harrowing, and rolling, it should be subjected to a thorough working of these implements, following each other till the top is as fine as an onion bed, and the bottom so solid as to exclude the drought, which in any climate is injurious to the Flax, but in Canada would destroy it.

When the proper season for sowing arrives, (and this differs in different climates) the land should be marked into ridges of 10 or 12 feet wide, to facilitate the sowing and pulling; and the seed at the rate of about 28 or 30 gallons to the Cuningham acre, or 2¼ to the English statute acre, sown and harrowed with light clever barrows, and rolled. If the land be in good condition, this is an excellent preparation for clover, and it is often sown with Flax, and the pulling of this latter crop is understood to be favourable to the growth of clover, by moulding it, and leaving it to the free action of the atmosphere.

In pulling, great care should be taken to keep the ends even, as the value of the crop is more influenced by this operation being well executed than most people are aware of, and if not attended to in the pulling it can never be effectually remedied afterwards. If rushes can be procured for bands it will save a considerable quantity of the Flax, and be much more convenient for tying it; the sheaves should be small to facilitate the steeping and spreading, and if it can be correctly *struck* in the water the shorter time it remains on the grass the better; the ponds for steeping should be about 3½ or 4 feet deep, care being taken to avoid *iron*, or other *mineral* springs, which would prevent it from bleaching white; the best water being soft running water, and the warmer it is the shorter time will it require to remain in it; I have known it to water in *five* days, and to take *twenty-one*, but generally in this climate ten.

If the sheaves be packed neatly on their root end, standing nearly straight, or but slightly leaning towards the end of the pond at which the filling has commenced, it will water more equally than if put in less regularly, and will be more easily taken out and less subject to be straggled, or torn. When the pond is full the flax should be covered with straw or grass to protect it from the sun, when it rises above the water, which it will do no matter how deep, when the fermentation takes place; it should always have a quantity of flat stones, or pieces of timber laid at short intervals over it, to keep it under water, and be trampled twice a day, or

as often as it rises up, during the first few days; but it will sink after the fermentation, and should then be carefully watched, to ascertain when it is ready for removal. This is one of the most *critical* stages, and on it a considerable part of the profit, or loss, may turn, and if there be in the neighborhood any good judge, he should be consulted. In the absence of such, a sheaf should be taken out, washed, and dried in the sun, and tried whether it will clean freely. If part of the shoves, or wood part adhere to the fibre, it must remain a little longer in the steep, but experience alone can teach, and no directions can be given that would be understood by persons unacquainted with the matter, but I am certain there must be in every district of Canada many Irish and Belgians, fully up to the subject, and that little difficulty need be anticipated in procuring the services of such. In spreading, care should be taken to shake it well and spread it evenly and thin, but if want of room should necessitate the spreading of it thicker, the rows should be at such a distance from each other as to admit of the flax being turned, then a *day* or *two* on the grass, in order to give an equal exposure and bleaching on both sides. If it has been properly watered, it need not remain more than two or three days on the grass. When lifted it is to be tied up in sheaves, and pu under cover of a house or shed, till it is convenient to remove it to the scutch mill.

While on this head, I may mention that the desideratum so long wished for by Flax growers in Ireland, viz, a machine for cleaning without the necessity of employing so-called *skilled* hands has been recently patented, and brought out by the Messrs. Rowan of Belfast. (This is a piece of information which may be of great service to our friends in Canada, but which you are quite as well acquainted with as I am, having witnessed its operations with me). I believe it comes nearer to the requirements of the Flax growers both in this country and Canada, than any thing yet invented, and the fact that I, who never attempted to clean Flax in the old mills, found no difficulty in doing it in Rowan's, is, I think, proof positive of its adaptation to unskilled labor. This machine, like most new inventions, has met with some opposition; it is objected to on the ground that it gives less cleaned Flax than the old mills, but as this comes from *mill owners*, an interesting party, it should be received with caution, and was not borne out by our experience.

That some modification of the *speed* or *rate* of driving the machine may be necessary, to adopt it to the harder or softer quality of Flax, I do not doubt. This only requires a larger or smaller pulley on the scale, which costs little to effect.

The present seems a very favorable time for introducing the growth and preparation of Flax into Canada. The demand for it in Belfast, Lurgan, Dundee, &c., is greater than can be supplied. The emigration from this province since the breaking out of the war in the United States, (aided by the information you have diffused here respecting Canada), has resulted I understand, in at least nine thousand more than in any former year. Many of these emigrants are from Ulster, the Flax growing portions of Ireland, and from Belgium where it is equally well understood. The weekly intercourse between the St. Lawrence and the Foyle, and Mersey, by steam, affords an opportunity of forwarding the article at once to the best markets in the world, and of procuring such machinery for its preparation as may be required.

I have said nothing as to which seed should be preferred. Different soils and climates may require different kinds of seed, and few experiments, by intelligent growers, may be necessary to decide which is best suited to Canada. Riga is generally preferred here, on account of its growing longer than Dutch or American; but these latter were in more favor some years ago, when the spinning was done in a small wheel, in every farm house and cabin in Ulster, and was then thought to produce a *finer* article: but since machinery has take the place of the domestic manfacture, the Riga is more generally sown.

You are aware that I had this year a barrel of Canadian seed, sown in the same field with five of Riga, as an experiment. The Canadian came up some days earlier than the Riga, and grew much more freely, up to the middle of June; it blossomed fully ten days earlier, and had fully three times the quantity of seed, but is of an average three inches *shorter* than the Riga. I am unable to say which will be the best quality, or the comparative quantities each will produce, not having got it cleaned out, but I hope to be able to give you an account of them next week; I cannot doubt, however, that the Canadian grower of Flax would find his advantage in changing his seed either from Riga, or Holland, at least every second year, as like every other crop it has a tendency to degenerate when grown in the same locality, especially if that be not its native, and this is evinced by the immense quantity of seed borne by the Canadian here.

I sent two barrels of Riga Flax seed last year to the Messrs. Peile, but it was delayed at Liverpool and Portland, and did not reach them in time for that year's sowing; I suppose, however, they will have tried it this year, and if carefully kept, it may do pretty well, but can scarcely be considered a fair trial, compared with new. You can, however, hear from them on the subject when you return to Canada, and if you or any of your friends should desire it, I will have great pleasure in forwarding any quantity you may require, on the arrival of this year's growth.

From what I have written, as well as from your own observations during Spring and Summer, it is plain that Flax growing and prepara-

tion, is both troublesome and expensive, but the question which has to be answered is, "Will it pay, and leave a greater profit than any other crop?" If this question can, on a fair trial, be answered in the affirmative, the trouble and expense will be disregarded by industrious farmers in Canada as well as here.

Some objections may be made to the steeping, on the ground of its tainting the water and the air and possibly those acquainted with it may think that the smell, which is disagreeable, may be also unwholesome, but it has never been been found so either in France, Belgium, or Ireland, and no healthier women can be seen than those who are employed during the whole flax season in pulling, spreading, and lifting it.

The objection as regards the water applies in an especial manner, or rather it is confined to the *owners* of Fisheries; but I do not know whether the Fisheries in Canada are owned by individuals, or are common property, and on that would turn the validity of the objection, if made.

In estimating the profit of Flax cultivation some allowance should be made for the employment it gives, and the increased or additional crop it introduces into the rotation, by which variety the land is enabled to yield more in a given number of years than by confining it to the growth of any class of crops exclusively. Employment too, in working a succession of crops as Flax, Hay, Wheat, Oats, &c., is more continuous and certain.

You have seen what the Linen manufacture of Ulster, which has its root in the growth and preparation of the raw material, has done, in raising it to its present state of wealth and comfort, as compared with the other provinces so much more favored by nature, in soil and climate, and which has made Belfast the manufacturing and commercial metropolis of Ireland; and, looking at the soil, the minerals, the lakes and rivers of Canada, with the origin of its population, its free government, and its educational establishments, I see enough to indicate a bright future for it too, if you but go to work with a fixed determination to succeed.

Wishing you a safe and pleasant voyage and happy reunion with your family.

I remain, dear Sir,

Very sincerely yours,

ROBERT MCCREA.

Grange House, }
Strabane, Aug. 29th, 1861. }

The Elodea Canadensis.

[The following letter from a Dutch correspondent recently appeared in the *Canadian News*, published in England. We had previously heard of the mischievous effects of this curious aquatic plant in British waters. Is it known in Canada? If so, can any of our readers give us some account of it?—EDS. C. A.]

Amsterdam, Sept. 1, 1861.

SIR,—That singular aquatic plant, the *Elodea Canadensis*, brought by chance from the waters of North America to England, is well known to have increased in that country to an alarming extent. The phenomenon has now made its appearance in the rivers and canals of Utrecht and its neighborhood, and great and well founded fears are entertained that it will extend all over the kingdom. It appears that not more than two or three years ago a specimen of the plant was introduced here by way of experiment, and it has unfortunately succeeded but too well, as it has propagated itself with such extraordinary rapidity, forming at the bottom of the water an impenetrable tangle of grass of considerable thickness, that it greatly impedes the work of cleaning out the canals. It may now be termed quite an indigenous plant, possibly to the satisfaction of the botanists, but it is certainly an abominable plague for the Government of a country like Holland, intersected by canals in direction.

Mons. Miquel, Professor of Botany at the University of Utrecht and editor of the *Journal de Botanique Neerlandaise*, has expressed his opinion that this plant will in a short time overstep the frontiers of this kingdom and advance into Germany by creeping up the bed of the Rhine. With the exception of some particular varieties of the Lemna, it far exceeds all the aquatic plants of this country, not only in quickness of growth and gradual dissemination over large districts, but also for the wonderful extent and power of its reproducing faculties. The stem of the Elodea is very delicate and easily broken, so that by the natural motion of the waters minute branches and fibres become detached and are carried to a distance by the current, whilst others, coming in contact with the barges and boats, attach themselves to their sides and are carried away by them, which also partially explains the rapidity of their extension to distant parts.

It is quite clear that the astonishing power of reproductiveness of this little plant cannot be ascribed to the dissemination of its seed, for the flower contains no properly developed petals, as Professor Miquel satisfactorily ascertained from some specimens gathered last summer by Mr. Hartsen, Candidate of Philosophy at the above named university. As soon as the branches are broken off they make rapid shoots and thus produce fresh plants. On the approach of winter the brittleness of the Elodea increases so much that in simply lifting it out of the water it breaks to pieces in the hand, and as is generally the case with plants about to reproduce their species the detached fragments are found to contain

large quantity of a sticky substance, which leads to the belief that each minute portion of the plant becomes a new and independent exemplar. When one considers the great rise of the water in autumn and winter and the unavoidable inundations that take place in consequence, it is clear that all these different movements must greatly contribute to the spread of this aquatic plant over the whole country in a very short space of time. During the summer months, and especially under the influence of bright sunshine, oxygen gas is generated in the Elodea and rises in bubbles to the surface. Mr. Bisdom has analysed its component parts and given a description of the result, which is published in G. J. Mulder's "Chemical Reports and Transactions," vol. III., pp. 97—112.—I am your obedient servant.

[We presume the object of our correspondent is to ascertain if any and what means exist to check the spreading of this extraordinary aquatic plant, and perhaps some of our naturalist correspondents may be able to give a satisfactory answer. We are aware that a prolific water-creeper said to have come from America, succeeded in completely choking several of the natural drains in the neighborhood of Hull, entailing a heavy outlay in clearing them by manual labor; and that the same or a similar creeper had nearly filled up the canal in the neighborhood of Lincoln in the summer of 1860, and great fears were entertained of these waters ever becoming free again from this vegetable parasite. The extreme severity of the succeeding winter having, however, brought with it flocks of wild swans from across the North Sea, it was found on their leaving that they had completely cleared the canal of the obnoxious plant, so much so that no traces of it are now to be found. What says Professor Miquel to an importation of wild swans to clear out the Dutch canals?—Ed. C. N.]

Farm-Yard Manure.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The relation of vegetable and animal life is the theme of a very interesting lecture at the Central Farmers' Club, by Mr. J. G. Hobson, of Long Sutton.

It is hardly necessary for my readers to look beyond their own noble homesteads to discern the importance of such an inquiry. That both these great divisions of organic beings subsist upon each other, is evident to the most careless observer. The farmer is ever acting upon this knowledge, even in foreign countries, where the tiller of the soil is obliged by hard work to accomplish what science has long enabled the English farmer to perform with far greater facility. Thus the listless, idle Spaniard has a proverb that the sheep treads on the land with a golden foot. The hard-working Belgian, as he rests on his trenching-fork, tells you that "there is no manure without stock, no stock without green crops, no green food without manure;" and on these truths he bases his mode of cultivation. The Flemish farmer, therefore, devotes his attention to the preparation of his manure with the most untiring energy and success. He is not content with securing requisite bulk of manure, either liquid or solid; he well knows that the quality of his manure is of even greater importance. The Dutch farmers, therefore enrich their liquid-manure by fermenting, and by adding to it rape-cake and other fertilizing matters. They would be surprised to hear a quantity, of dirty—merely discoloured—water dignified by the name of liquid manure.

The skilful English farmer proceeds very commonly on a different road to the same end; he passes his oil-cake through the bodies of his live stock, and by thus enriching their excreta increases the fertilizing power of his farm-yard dung; and, as I have in another place had occasion to remark, the improvement of this staple fertilizer by feeding stock with cake has been so long and so increasingly practised, that, at length, the advanced price of the cake has rendered it almost necessary to abandon its use. Other oilcakes have been suggested as substitutes for linseed, in stock-feeding; and a still more simple mode has been again advocated, that of applying the cake itself as a manure, without its having previously passed though the body of an animal. An experiment with mangel-wurzel was in this way made by Mr. Corenwinder, in April, 1855 ("Quar. Jour. Ag." 1857, p. 668). Seven portions of a field which had borne a crop of oats were set apart for the experiment; each plot contained 8¾ poles, and was manured with 220lbs. of one or the other of the following substances. The result I give in a tabular form—

Cake.	Cost. s.	d.	Produce in lbs.
Arachis, or earth nut.....	9	6	3194
Sesasum (from Indian, &c.)...	12	2	3324
Toulocanna (Sennegambia)...	10	8	2904
Poppy.....	15	0	3487
Camelina.....	14	7	2917
Rape.....	14	3	2811
Hemp.....	14	3	2640

It can hardly fail to be used if, at this season of the year, we remember a few of the scientific facts which bear upon the improvement of the quality of our farm-compost.

The effect of food in varying the power of the excreta of animals is partially known to every one. The more concentrated the food, the more nitrogenous its composition, the richer is the dung of the animal. Take the case of the flesh-subsisting animals: mark the excreta of the fish-consuming wild-fowl of the islands of the Pacific Ocean; note how in their excreta, guano, we find the most powerful of our readily available manures. In this the chemist shows us an

abounding proportion of ammonia and uric acid, both the alkali and the acid containing a large and essential proportion of nitrogen. Uric acid probably exists in the urine of all animals that subsist even partially on animal matters. It has been found in that of man and of our domestic fowls; the urine of the boa-constrictor and several others of the serpent tribe is nearly pure uric acid.

It would be a natural conclusion, from these facts, that the more nitrogenous the food consumed by the animal, the more powerful would be the fertilizing effect of its urine. Some careful experiments made long since with the urine from a large dairy of cows in Scotland support this conclusion ("Quar. Jour. Ag.," vol. iv., p. 96.) Their urine, when fed on the white globe turnip, was found to be larger in quantity, but less effective as a fertilizer, than when they were consuming the yellow turnip or rutabaga, and much less so than when they were fed on brewers' or distillers' grains.

These observations all concur with those of the owners of cake-fed cattle or sheep; the manure is much increased in value, its effects more powerful, and yet more permanent. The policy of applying both liquid and solid inorganic manure in their recent or putrified state has long engaged the attention of the farmer and the chemist; the tendency of the latest researches rather leads to the conclusion that, in both cases, the manure is best applied in as fresh a state as possible. And to this opinion Professor Tanner inclines, in his recently-published prize essay. When speaking of the application of the manure of the farm to clay soils ("Jour. Roy. Ag. Soc.," vol. xx., p. 331) he remarks: We have other reasons which favour the application of dung to the fallows whilst the fermentation is in its earliest stage. In the fermentation of dung, we have important chemical changes taking place amongst the elements which enter into its composition. The great object in fermenting manure is to bring waste matter from the animal body and certain products of vegetable life in such a condition that they can again be useful for the support of vegetation. This fermentation of the dung may be carried out in two ways: the one will materially diminish its fertilizing powers; but by the other plan the change may be controlled so that the manurial properties may, in a great measure, be preserved, although some slight loss is inevitable I have estimated, from the analyses given by Dr. Voelcker as the results of an examination of farmyard manure in its fresh and also in a well-rotted condition, that the ingredients in very superior manure, calculated at their market value, are worth 1s. per ton more when the dung is in a fresh condition that when it has become thoroughly decayed. This loss is experienced when the manure has been carefully fermented for experimental purposes; but when the decomposition takes place under careless management—when, for instance, the drainage from the manure is not carefully preserved—the waste is far greater, so as materially to affect the finances of the farm. In the application of dung in the early stage of fermentation, we have this change taking place in the soil under circumstances which ensure us against loss; for we know enough of the power of these retentive soils to be assured that what is entrusted to their custody will be safely retained for promoting vegetable growth.

The laborious researches of Professor Voelcker, on the composition and changes of farmyard manure ("Jour. R. A. S.," vol. xvii., p. 191), tend to lead us to similar conclusions. Without attempting to follow the Professor through the detail of his ample precautions to attain a fair mixture of the dung (including the straw), made by the horse, the cow, and the pig, I can yet give, I hope, a useful digest of the chief of his laborious researches. Some of his results were —1, That a fresh dung, the proportion of soluble organic and mineral substances is small; 2, of insoluble, large; 3, of ammonia small; 4, of nitrogen, inconsiderable; 5, the organic soluble matters are by far the most valuable—they contain (in equal parts) more than three times as much nitrogen as the insoluable; 6, that dung contains all the constituents of cultivated plants; 7, that the same substances are found in both the soluble and insoluble portion; 8, the principal constituent of the soluble ash of dung is potash; 9, both the soluble and insoluble ash contain much soluble silica, combined either with potash or lime; 10, the prominent constituent of the soluble ash of fresh dung is silicate of potash; 11, of its insoluble ash, lime; 12 (let the reader mark this important fact), that of the soluble ash of fresh dung, 19¼ per cent. is phosphate of lime, in the insoluble ash only 9½. It has been found, in fact, that bone-dust, moistened with a little water, in a few days yields a considerable quantity of soluble phosphate of lime, and that this solubility rapidly increases with the putrefaction of the gelatine of the bones.

From the result of other trials, the Professor seems to lean to the opinion that the spreading of farmyard compost on the surface of the soil, for even a considerable period before it is ploughed in, is by no means so injurious a practice as we have hitherto been led to suppose ("Quar. Jour. Ag., 1857, p. 155). He says, that "on all soils with a moderate proportion of clay, no fear need be entertained of valuable fertilizing substances becoming wasted, if the manure cannot be ploughed in at once. Fresh, and even well-rotted dung contains very little free ammonia; and since active fermentation, and with it the further evolution of free ammonia, is stopped by spreading out the manure on the field, valuable manuring matters cannot escape into the air by adopting this plan."

If this is a reasonable conclusion, it goes far to remove our dread of losing, on such soils, the

better portions of farmyard manure by top-dressings. As the season will soon be here when these dressings are commonly applied to grass, it will be useful to remember this fact. The best time for applying the manure is held, by the great Cheshire farmers, to be in the end of September or the beginning of October, particularly in a showery period, as the grass soon covers it, and renders it less liable to be damaged by the sun or drying winds ("Jour. Roy Ag. Soc.," vol. xix.. p. 215). The most recently published report of trials upon the means best adapted to restore to the soil the ingredients removed by the grasses is that of the prize essay on "Top-dressing Pasture," by Mr. James Porter, of Moneymask, in Aberdeenshire (Trans. High. Soc.," 1861, p. 455). The conclusions to which the result of his experiments led him were, 1, that on strong soils, on lands under cultivation, guano, sulphate of ammonia, nitrate of soda, and soot are the best, and most remunerative if the season is not too dry; 2, that on light soils in alternate husbandry, composts of earth bone-dust, cattle urine, salt, sea-weed, and fish refuse are the most suitable; 3, for old grass on strong soils, powdered lime is the most effectual dressing; 4, for old grass on light gravelly soils, clayey compost, mixed with quicklime or bone-dust, makes a good dressing. It has been calculated, adds Mr Porter, that a milch cow carries off annually 30lbs. of bone-dust from the land; and if this waste is to be supplied, as it certainly ought, there can be no better way of doing it than by adding bones or other phosphatic manures to the land.

But if it be true that we need not fear impoverishing our dung by exposure to the winds and rain, there is another common source of loss of the soluble portion of our farm-yard manure by soakage in rain-water, of which the chemist has no doubt. When dung is exposed to heavy rains, on certain soils, what the rain-water dissolves and removes from the dung the land receives, its aluminous portion, absorbs and stores up those soluble matters for the service of future crops; but there is in most farm-yards no provision for the richer soluble portions of the dung, which either soaks away or drains some neighbouring ditch or equally unwholesome pond. It is this fact which renders the dung of sheltered animals so superior to that produced in the open air. It is one of many advantages which attend the use of covered homesteads, and would lead to the general introduction of the box system of feeding, if the animals thus fed were improved at the same rate as the dung over which they are confined.

The advantage of preparing manure as little exposed as possible to the weather has been illustrated by Mr C. Lawrence, of Cirencester (Jour. Roy. Ag. Soc.," vol. xviii., p. 368). He gives the following analysis, by Professor Way, of box and farm-yard manure. He remarks that, "Those who have not previously inspected this system of feeding, and have had an opportunity of seeing at one moment the boxes full of the accumulation of some three or four months' manure, invariably express their surprise at the sweetness of the range of buildings; and in a few minutes afterwards, on setting the forks to work to empty the boxes, still greater surprise at the almost instantaneous evolution of volatile gases on the admission of air to the dense compound below."

	Box.	Farmyard.
Water, per cent	71.40	71.00
100 parts dried at 75 to 80 deg. Fahr., gave of ammonia	2.37	1.70
Matters soluble in water, organic and inorganic	10.70	4.60
Which left on incineration a fixed residue of	4.28	2.78
This fixed residue consisted of—		
Silica	Not determined.	
Phosphoric acid	0.30	0.26
Alkalis, potash and soda	2.00	0.80

It is from such practical inquires that the farmer more and more clearly sees how dependent upon each other are the members of the vegetable and animal worlds, and how essential to the prosperity of the farm is the most anxious care that the food of neither is wasted. It is gratifying and encouraging to look back and note how much has been done in the last quarter of a century in thus economising the true riches of the farm. It is such reflections which will urge on the noble cultivators of our soils to other and still greater triumphs over the manifold and ever-varying difficulties which they have to encounter. Such conclusions will lead them to still more careful modes of preparing the manure of the farmyard. This will, sooner or later, cease to be impoverished by the rain; its drainage water will be systematically employed. That of our large towns no longer be worse than wasted. The farmer of a future day will, indeed, ask with some surprise how it happened in the year of grace 1861 that, while the drainage of Edinburgh, of Mansfield, of Croydon, and of other places rendered luxuriantly fertile so many of acres of valuable grass land, the drainage of millions of persons who dwell in our metropolis and other populous places should not only be utterly wasted, but that grave chemical persons should endeavour to show how useless it is as a liquid manure.—*Farmer's Magazine.*

Scientific Culture of the Strawberry.

[Concluded from page 550.]

It appears that a plain, uneducated market gardener, of the name of Abergust, removed some 46 years ago from Philadelphia to Cincinnatti, and went largely into the cultivation of the Strawberry, in which he marvellously surpassed

all his neighbors by means of a secret method of managing the culture, and which method he had most successfully practised at Philadelphia. So well did he keep his secret that for many years it was not even guessed at; and he supplied nine-tenths of all the strawberries consumed in Cincinnatti, making thereby a very handsome competency. To give Mr. Longworth's own words: "While I could, from one-fourth of an acre scarcely raise one bushel of strawberries, he (Abergust) would raise 40 bushels. His fruit was much larger than any other brought to market, and commanded from 25 cents [1s.) to 37½ cents (1s. 6d.) per quart. His secret he kept to himself, and my attention was first led to the subject by a casual remark of his son's to me one day in my garden—that I must get very little fruit, as my plants were all males. I then investigated the matter, and soon discovered that there were what he called male and female plants—a fact I communicated to our market gardeners. The result was that strawberries rapidly increased in our market, until as fine as Mr. Abergust's were sold at from 3 cents (1½d.) to 10 cents (5d) per quart.

There can be little doubt that this gardener, Abergust, obtained his knowledge, either directly or indirectly, from Mr. Keen, who had promulgated the information he had required some short time previously. Through Mr. Longworth, Keen's discovery and Abergust's secret was thoroughly ventilated in the United States, and is now universally known in that part of America, where strawberry growing is carried on to an extent little dreamed of in this country.

One individual grower (Mr. Culbertson, of Cincinnatti) sends to market sometimes 4,000 to 5,000 quarts a day, employing 60 persons to pick them Numerous cases are known of 5,000 quarts per acre being obtained in one season; and it is held as an undubitated fact that, by cultivating hermaphrodites (as we do in England), instead of pistillates, only from one tenth to one-third of a crop can be obtained.

By far the largest and most delicious strawberries in the world, to our knowledge, are those of Chili; and we think plants and seeds from that country might advantageously be brought and domesticated here. Certainly the finest strawberry plant we have ever seen is that of Mr. John Robertson, of Paisley, which is known under the name of "The Wizard of the North', (that is supposing the authorised coloured drawing of the plant, in full bearing, to be a true and faithful representation). Sundry apparently respectable and trustworthy persons testify by letter to having seen it with 78 fine large fruit at one time upon a single plant.

Having obtained a good pistillate, who would be apt to suppose that we had the utmost we could reasonably hope for; but in this we should err very greatly, indeed; for Mr. Charles Peabody, of Columbus, in Georgia, has clearly demonstrated that it is possible to obtain a succession of fruit from the same plants for many months in the year, instead of only one bearing. This most indefatigable gentleman has, in truth, reduced the culture of the strawberry to a perfect science. His is no small garden cultivation, but comprises many large fields, embracing a very considerable acreage, and justified by more than 15 years constant observation and experience. His plan deserves all possible attention and respect. He selects some good pistillate of an ever-bearing variety; and, to impregnate this, he also chooses a good, ever-bearing hermaphrodite, planting seven rows of pastillates, then one row of hermaphrodites, and so on throughout the field. For many years the varieties he employed were the Hovey's seedling pistillates, and the early scarlet hermaphrodites, both flowering regularly together, and both being ever-bearing. Recently he has widely disseminated a seedling of his own, and named after himself.

It is believed that all these valuable seedlings have been originally obtained by judicious crosses with the hardy, ever-bearing, or monthly wild strawberry, such as the monthly Alpine, or others of a similar type. Certainly it is, that not only Mr. Peabody, but numerous other persons throughout the States, obtained by simple *field culture a continuous bearing of fruit*, from early spring until the winter's frost sets in—a thing altogether unknown in this country, although quite as practicable here as there.

Mr. Peabody, in his statement, given in the "United States Agricultural Report," says:—

"*It is now well known throughout the Southern States* that for many years I have cultivated the strawberry extensively, and have had from my beds a constant succession of fruit six months, and frequently 10 months in the year. While I am now writing (Dec. 24) one of my beds (of an acre) is loaded with ripe fruit, specimens of which I have sent to New Orleans, Montgomery, Charleston, New York, &c. This bed has scarcely produced a runner the last season, the causes of which will be found in my method of culture. I prefer a sandy soil—that is, a sandy loam with a good mixture of vegetable matter, in which the plants stand 8 to 10 inches apart. In the fall of the year I go over the field with sharp hoes, cutting up all runners, and leaving them on the ground to decay. Somewhat later, I cover the whole field with partially decomposed leaves from the woods or swamps; the rains of winter beat down these leaves; the fruit germ finds its way through them, and the first mild weather of spring the blossoms appear. If I desired to obtain an abundance of leaves and strong runners all over my beds. I should employ animal manure; but as I want fruit, and no runners, I never use animal manure of any kind—nothing but leaf mould and an occasional sprinkle of wood ashes. The leaf mould keeps the ground cool and moist, and the fruit clean, and does not stimulate the root to make runners. Whatever runners are made,

cut off close; keep the ground clear of grass and weeds, and manure with leaf mould. Beds thus formed and cultivated will to my certain knowledge, continue productive for twelve years, and, I have every reason to believe, as much longer as this system of culture is continued. Strawberries so cultivated are remarkable for their lusciousness and aroma. A very continual watering, whilst bearing, is desirable—as the crop is wonderfully increased, both in quantity and quality, thereby."

Such is Mr. Peabody's mode of raising this delicious fruit; and although we have not the fine climate of Georgia, and may not expect fruit in an open field in December, yet we certainly can adopt the course of treatment that he so kindly points out to us. Our course, then, is to plant the best ever-bearing pistillate and hermaphrodite impregnator; to use no manure but leaf mould, or other suitable decayed vegetable matter, with an occasional sprinkling of wood ashes; to keep all runners off; and to water very frequently during the time of fruiting.

The best descriptions of strawberry for planting, generally, in England would be, in our opinion, "Hovey's Seedling," the "Early Scarlet," "Longworth's Prolific," "M'Avoy's Superior," and the "Extra Red" (all American varieties, the Prolific, Superior, and Extra Red being seedlings from Hovey's Seedling by one of our best English hermaphrodites), if we could obtain them in this country; but, unfortunately, there are none to be had, unless imported from the United States. The English varieties appear to be all hermaphrodites, from the seed of which famous pistillates may be obtained by any who will take the trouble to attempt it.

Those particularly celebrated at this moment are the Oscar (of Mr. Charles Turner, Royal Nurseries, Slough), the Wizard of the North (of Mr. J. Robertson, Linside Nursery, Paisley), the Empress Eugenie (of Mr. Myatt, of Deptford), and two or three well-known varieties. The Oscar is a particularly fine, well-flavoured, firm, and large-sized strawberry; and said to be a cross between the British Queen and Keen's Seedling. The Wizard is said to be between the Elton Pine and Keen's Seedling, producing a large handsome berry, and an abundant crop. The Empress Eugenie has been remarkably large this season, of a dark, blood-red colour, very juicy, rather soft and with a very strong perfume, somewhat similar to the musk melon. We believe this is also called the "Crimson Queen."

We cannot ourselves feel any confidence in an alleged cross between one hermaphrodite and another, unless we are perfectly certain that the pollen of one was applied to the bud of the other, previous to its opening; for almost simultaneously the pollen of its own stamens is matured, and the least motion causes it to fall upon the pistils, which they enclose, and self impregnation ensues at once. If, however, the pollen from one kind be applied to the bud of the other, just before it opens, the subtile influence descends to the pistils and impregnation is effected surely and certainly, before the flower has yet opened, or its own stamens have had time to burst and shed their pollen. This is the opinion of Mr. Peabody, verified by some 20 years' experience, and we fully adopt his views upon this point. As a matter of course, pistillates, being pure females, cannot impregnate themselves; their artificial impregnation is therefore, perfectly easy, and the cross resulting is beyond doubt.

In conclusion, we may remark that (more or less) all hermaphrodite strawberry plants appear to become more and more imperfect as they get older, until, in some cases, they will not bear a single perfect berry; and we believe that even the very best hermaphrodite (however perfect may appear when young) will, in a few years, exhibit this inherent tendency to infertility.

Templemoyle Agricultural School.

This Irish institution appears from a recent report to be in a prosperous condition, and the instruction is of a rich and useful character. The farm is leased of the London Grocers' Company, who have steadily supported the school from its commencement. The following extract from a speech of Mr. Thompson, an officer of the company, at the terminal examination of the scholars has something more than a local interest.

When he looked around the school, and perceived the advantages which the scholars possessed, not only receiving a sound, practical education in the particular professsion which they had chosen for themselves, but having also put into their hands the key to all the sciences, enabling them to examine into the noble works of God, to see His wisdom as displayed in the in the construction of man; and when they learned of the winds to think of Him who made the winds minister unto them that they ride upon the storms: finding also in the stones sermons, and books in the running brooks—in the light of these they are enabled to look from nature up to nature's God; and soberly and earnestly could he assure them that when he considered these advantages enjoyed here he could wish himself again a boy, standing at their side, surrrounded by those privileges, and learning with them. But, if they had privileges, let them remember that they had also great responsibilities—that in after life they would all go forth as missionaries in the world, whether for the prosperity of their native land, or as the pioneers of civilization in other lands. When thus situated they would never forget the advantage enjoyed here. He assured them that there was no such things as "lucky hits." By steady, earnest, truthful perse-

verance alone could they succeed. The course of agricultural instruction imparted at this seminary taught them this. They knew that if they were to expect a harvest they must sow the seed, looking for the rains and the genial sunshine to bring forth a crop. Thus let them go forth in their various walks in life, all of them endeavoring to discharge their duties to themselves and others. In one word, he would remind the teachers that they were sowing seeds for eternity, and this made their position solemnly responsible. And if the clergymen would permit him for a time to interfere with their functions, to all would he wish to say a word at parting—let them endeavor to spiritualize their operations. When they sowed the seed in the ground, let them remember there was still a nobler and a better seed to be sown; When they rooted out of the ground the weeds which choked the tender blade, let them remember that weeds of a more noxious tendency required to be removed from their own hearts; when they used the sickle, let them remember that there is a Reaper before whom they all must bow; and when they brought home their sheaves rejoicing, let them remember that there is a harvest home where the attendants are the angels of God and the redeemed; and he prayed God to grant that every one of them might be found in that blessed company.

Weeds.

Somebody wrote a book upon our wild flowers, pretty, graceful, bright-coloured creatures, giving life to our pastures and our hedgerows. Beautiful, indeed, they are, in their proper place; but in the wheat field or garden ruinous. Our weeds are ripening now faster than our corn. The rain will not kill them nor will cloudy, ungenial skies check their vitality. A man who knew nothing of the primeval curse would fancy that weeds were designed for the support of man, they are so unboundedly prolific. And they are for the benefit of man in some sort. for they make labor a necessity; and yet that labor might be more profitably expended on fruitful plants, which the weeds choke and strangle. He is the true farmer's friend who teaches the peasant to extirpate these devourers. Placing them in a heap amidst manure is of no avail. Though the plant be pulled up the sap will flow upward, the flower will blossom, and the seeds ripen, to be scattered next year with precious seed. There is no killing them. They will live three feet under ground for years, for when the land is deeply trenched, up will spring a thick crop of weeds, never observed in the soil before. Few have any idea of their prolific nature. We see the coltsfoot, with its golden stars, in cold, black March, without a leaf, to shelter it; but the flower droops and the green calyx is a roof to defend the seeds within. Every flower head produces its 150 seeds; and these are each shrouded with cotton down, in which the wind fastens and bears it away to other ground. Why is it that this plant has not only its floating seeds, but creeping roots working under ground, here and there shooting to the surface; and there producing its hosts of seeds? A single coltsfoot produces from 3,000 to 22,500 seeds! It is now every peasant who knows that wild mustard produces from a plant 8,000 seeds; the chamomile 40,000; the may weed, 45,000; the burdock 24,500; the red poppy, 50,000; the groundsel 6,500; and wild parsley, 6,000. Every one has seen the gossamar parachute which bears aloft the thistle seed like a tiny car. From a single plant ten thousand seeds have floated away on downy wings There are weeds whose seed-pods burst open with violence, so as to scatter the seeds to a distance, where they will not lessen the nutriment of the parent plant. Other plants have seeds equipped with delicate hooks to fasten in the soil; others, again, propagate slyly under the earth, as the crow Gaelic, which produces 700 offshoots in the year. The eye rests gladly, no doubt, upon the nodding poppy or the cockle plant in the corn field; but these weeds have lessened the crop by, at least, a tenth part of its value. The weeds of Ireland cost us nearly six millions a year.

In the *Quarterly Review* for Oct., 1859, there is given in a tabular form, the quantity of weed seeds found in the bushel of crop seeds. Farmers foolishly desire to procure cheap seeds, and there are seedsmen willing to oblige them. Seeds are thus mixed often for purposes of fraud oftener perhaps, from carelessness. In a bushel of "rye-grass" there were detected no less than *204,800 weed seeds. In a bushel of clover seed* 312,000; of linseed, 304,640; this is quite irrespective of dirt and particles of stone, which make cheap seed by far the dearest that can be purchased. Fraud. in this case, is difficult of detection. A farmer cannot carry a microscope in his pocket, like the Leeds cloth buyers, to detect adulteration. His only security is to purchase from a house of character, and to pay a fair price for the article he requires.

But our fields will bear weeds as long as the road sides are neglected, and the uprooted weeds are merely thrown upon the manure heap. The moment the crop is cut the weeds should be collected and burned. They ought not to be left upon the land to ripen, as they will, and to commit their progeny to the winds. The loss to the agriculturist in the choking of his crop, its insufficient nourishment, the exhaustion of the ground, and the amount of labour eventually required, is something absolutely incalculable.—*Irish Times.*

Agricultural Intelligence.

County and Township Shows.

Hay Township Society, at Rodgerville, Oct. 5
South Wellington and Guelph Townships, Guelph, October 10.

In the Counties of Lanark and Renfrew, at Ferguson's Falls, third Tuesday in October.
Carlton Place, first Tuesday in November.
Clayton, second Wednesday in November.
Packenham, second Thursday in October.
Almonte, last Thursday in October.
Ross, fourth Tuesday in October.
Pembroke, third Wednesday in October.
Norwich Township, Norwichville, Thursday, t. 10.
North and South Wentworth and City of amilton, United Show at Hamilton, October and 10
West York and York Township, at Yorkville, tober 22 and 23.
East York and Markham Township, at Union-le, Markham, Oct. 9.
City of Toronto Elec. Div. Society, and Tor-to Mechanics' Institure, Union Exhibition, mmencing Oct. 7, and to continue for two eks.
North Oxford and Ingersoll, at Ingersoll, Oc-ber 9.
Erin Township, Erin Village, Wednesday t. 6.
Bayham Township, at Staffordville, Saturday, t. 15.
West Gwillimbury, at Middleton, Thursday, t. 10.
Northumberland West, at Cobourg, Wednes-y, Oct. 16.
King Township, at Bowmanville, Oct. 11
Whitby Township; at Oshawa, Thursday, tober 17th.
Carrick Township, at Balaklava, October 15.
Stormont, at Carnwall, Oct. 9 and 10.
Walsingham, Port Rowan, Oct 17.
West Middlesex, at Strathroy, Oct. 15.
Niagara Elec. Div., at Niagara, Oct. 9 and 10.

[Secretaries of Agricultural Societies will ige us by informing us of the days on which ir shows are to take place.—EDS.]

Horticultural.

Fruit Tree Vending.

TO THE EDITOR OF THE AGRICULTURIST —I was y much pleased with your remarks in your t number respecting the Apple Tree Ven-rs, but I fear your advice came too late to as a caution. There has been a perambula-g Yankee Nursery Agent canvassing this ownship, representing himself as agent for oor & Brothers, proprietors of Clover Street ursery, Rochester. He succeeded in getting ders to the amount of over twelve hundred llars worth of trees, in this Township to be livered on the 11th inst. I feel satisfied t it is a perfect sell, from his mode of proced-e. The agent has a sample book with all the ious kinds of fruit painted most charmingly to take the eye, and then procures some well known person in the neighbourhood to go with him to introduce him to the patients. The agent leaves with the parties who order trees, a copy of his memorandum or order which says, in printed letters. "If any varieties named cannot be supplied *others equally desirable may be substituted.*"

HORTI.

Walsingham, Oct. 4th, 1861.

Garden Botany—The Fuchsia.

The fuchsia, next to the geranium, is one of the most generally known and popular of garden flowers, and we think deservedly so, and will afford, therefore, one of the best subjects for a lesson on garden botany. And before going further, we may define botany as the science which names plants, attaches a name to the different parts of plants, or, as they are called, organs; investigates the offices performed by these organs, their use in the economy of nature. This science, which half a century ago was thought to be only useful to the physician, or to occupy a place among the "unprofitable knowledge" of the curious or the learned, has now obtained a place in the curriculum of the industrial school; and the government (art and science department) have wisely given it a place in their educational programme. Botany, or the department of it called vegetable physiology, in connection with chemistry, forms the science of agriculture and gardening.

If we examine a plant with a view to discover its structure, the name and position of its organs, our investigation receives the name of structural botany; but if we examine with a view to discover those organs in action, and the offices they perform, or, as the naturalist calls it, their "functions," we are then in the province of vegetable physiology. But as it is necessary we should first be acquainted with the names and relative positions of the organs, just as a child must first know the letters of the alphabet before it can read or spell, so we commence our first lesson on garden botany by enumerating a few of the principal terms used in the science, and illustrating them as applied to some of the organs of the fuchsia.

Let us take up a branch bearing flowers of any fuchsia, and we at once perceive that the flowers are attached to the branch by slender stalks which spring from the axils of leaves. Those stalks are called *peduncles* or flower stalks. The Peduncle, though very general, is not universally developed in plants, there being many cases where flowers are born immediately on the stem or branch, without any peduncle; the latter are said to be *sessile*, while the former are *pedunculate*. At the extremity of the peduncle we may observe a considerable swelling of an oblong, roundish figure, and green colour, which gradually grows larger. This, which might seem to be a part of the peduncle, or at least

the base upon which the flower was constructed, is not so, but an essential part of the flower, as we shall see hereafter. Let us now suppose that we hold the flower of a fuchsia erect, that is, the reverse to the way it generally hangs on the plant; we find the ovary—for such is the organ we have just alluded to as terminating the peduncle—surmounted by a tube which terminates in four lobes. This is the calyx, and most external part of the flower. In the fuchsia it ise generally red or white or some variety of flesh color, in this particular differing from most other flowers, in which the calyx is mostly green. Passing inward, that is, towards the centre of the flower, we find four colored leaves attached to the side of the tubular part of the calyx, and alternate to its lobes. In the variety of fuchsia we are examining (Venus de Medici) they are of a beautiful purple; these are the petals, and taken collectively are called the corolla. Such a corolla is called polypetalous in contradis inction to monopetalous, where the petals cohere and become united, so as to form one piece, as in the bell-flower; the calyx and corolla together are often spoken of as the floral envelopes. Proceeding still to the centre of the flower, we find eight thread-like organs, like the petals, inserted into the tube of the calyx, and terminated with little two-celled cases. The thread like body is called the *filament*, and the little case the *anther*, which together are called the *stamen*. The anther contains a dust-like or powdery matter called the *pollen*, which is of great importance in the economy of vegetation. A stamen, then, consists of the filament, the anther, and the pollen; but plants are to be met with whose stamens are without filaments, in which case the anther is said to be sessile. We now arrive at the central organ of the flower, namely, the *pistil*. In order to examine it properly, let us remove the calyx, that is, cut it off at the place where it is attached to the ovary, and in doing so not to cut through, but preserve the pistil untouched. Having removed the calyx and with it the corolla and stamens, we have now remaining the pistil. It consists of three parts, viz., the german or ovary, the style, and the stigma. The name of german or ovary is given to the lower portion, which, when arrived at maturity, is the fruit. By cutting it through we will perceive that it consists of four compartments, which are filled with embryo seeds. The long thread-like portion of the ovary is called style, and the swelling at the summit, which, like the ovary, indicates four divisions, is the stigma.

We have now examined the flower of the fuchsia, and found it to consist of a calyx and corolla, stamens and pistil, which organs are, with few exceptions, found in the flowers of what are considered the highest or most perfectly organized plants; but as we descend in the vegetable scale we find one or more of those organs wanting, and cases are to be met with where a single stamen or a single pistil constitutes a flower, and as we descend still lower, all traces of a flower disappear, or at least of such a flower as we have indicated as characterizing the great division of the vegetable kingdom known as the class of phenogamous or flowering plants.—*Irish Farmer's Gazette.*

Planting Chestnut for Timber.

Young, second growth chestnut trees, make excellent fencing and other timber—and if, in addition, it be cut in summer, (whether with or without regard to the age of the moon, no matter which,) it will last a long time. John Johnston of Geneva, finds second growth chestnut best for his fence posts—old trees he regards as of little value.

Chestnut trees, on light soil, grow very rapidly. Any farmer who has a few acres to spare, may make a very valuable investment by planting a chestnut orchard. The best way to do it is to take a field that is suitable for some cultivated crop, corn for example. Plow two or three furrows together into a ridge twelve feet apart, over the whole field, either late in autumn so as to admit of early planting, or else early in the spring. Plant the chestnuts along this ridge three or four in a hill, about the same distance as hills of corn. They are difficult to transplant with success, or without check in growth and therefore this mode secures vigorous young plants at once, thinning out all but one in each hill the following year. Plow the spaces between, and plant with corn or potatoes, and cultivate and keep clean the young trees with the rest of the field. If care is taken by using stakes, each hill of chestnuts may be made to stand in a row with the hills of corn, so as to cultivate whole field both ways. Or, if the corn is planted with a drill, it will not be necessary to take any care in this respect, as the cultivator will run one way only. This cultivation kept up for a few years, with crops of corn, beans, potatoes, carrots, &c., or with plowed stripes near the trees, and sowed grain between, which is not so good, will give a very rapid start to the young trees; and if they are thinned out in some years as they crowd, thus giving good stakes, they will, by twenty years, form a very valuable plantation—this being the age found most profitable to cut down the young timber for renewal. A great advantage of this plan is the wagon used for drawing off the timber may be driven between the rows in a straight, smooth road, and not as in common irregular woods with constant twists and turns to avoid hitting trees, stumps or roots.

Many fail in raising the chestnut from seed because they allow the shell of the nut to become dry. Take fresh chestnuts in autumn, and mix them with slightly moist leaf mould, and leave them exposed, out of the reach of mice all winter—they are best if in contact with the

st ground. Then, as soon as they begin to t in spring, plant them two inches deep. Locust trees may be planted in the same way corn, but nee not be planted before the corn f, as they will not sprout without scalding; for reason they are more easily managed. They e admirable timber, when not injured by the ts.—*Country Gentleman.*

The Apiary.

Bee Culture in Canada.

TORONTO, Sept. 26th, 1861.

the Editor of the Canadian Agriculturist.

SIR,—Having recently arrived in Canada from land, where I took considerable practical est in the improved management of the ey Bee, I should be greatly obliged, if any adian beekeepers would favour me, through columns, with the result of their experie in Canada;—stating the system they found profitable, the average yield of honey, the time to stock an apiary, cost of stocks, or s, and any other particulars which might seful.

By kindly inserting this letter in the next ber of your useful journal you will confer a our on

Yours, truly,

APIARIAN.

Bees are not generally kept by farmers in da, although we have been assured by ex enced persons in that line, that they might e profitably. Clover, buckwheat, &c., are able substitutes for the heather and field of the old country, from which bees ex the best materials in secreting honey. We ved a jar of very fine honey at the Provin Exhibition, at London, the other day, be ging to Mr. G. Miller, of Markham. We be happy to hear from any of our readers, are beekeepers, in reference to the informa requested by our correspondent.—ED.]

Transactions.

AY ON THOROUGH DRAINAGE.

BY MR. GEORGE SMART, OF BOWMANVILLE.

before the West Durham County Agricultural Society.

the President, Vice President, and Directors of the Agricultural Society of the West Riding of the County of Durham:

NTLEMEN.—I have had many aplications for information on the subject of farm drainage, from several of the enterprising agriculturists of this section of the country, who, no doubt, thought that as I was interested in the manufacture of drain tiles, I ought also to be able to give such information in reference to the principles of farm drainage as would enable them to estimate, nearly, what amount of drainage they would require to put their farms in a proper state of cultivation, and rid them of that. I may say greatest of all nuisances in connection with the farm, viz.,—a superabundance of surface water.

But, however willing I might be to do so, I have found it impossible, in course of conversation, to give any adequate idea of what would be required, or to give anything like reliable information, as there is such a variety of causes and effects, so intimately connected with and bearing upon the subject, which require a good deal of consideration and reflection in order to arrive at anything like a correct estimate of what actually would be necessary under various circumstances, and in a variety of soils.

But having no desire to withold any information of which I am possessed, or can obtain in the perusal of standard works in connection with the subject, I am willing to impart it to others, if by so doing I should be the means of forwarding the cause of Agriculture in this section of the country, in which I have for many years past taken a deep interest.

It has been suggested to me, that in order to treat this subject fully, I would not only be required to be thoroughly conversant with its principles, but also to be something of a geologist, and well acquainted with the scientific terms made use of by persons writing on the subject. This, certainly, is a difficulty; but, as I make no pretensions to a great amount of scientific research, I merely intend to state as clearly as possible, and in plain terms—such information as I have been able to gather, and quote occasionally from the writings of scientific men, such matter as I think will be useful and instructive, in order that the lack of information in regard to the principles of farm drainage as applied to this portion of the country, may be at least partially overcome.

Farm drainage is a subject which is becoming of more importance to this country every year, and I believe that farming, on

cleared land, I mean land free from stumps, which has been cultivated for a number of years, (particularly clay soils,) cannot be made to pay a full profit without under draining: and that all such farms (and there are many of them) in this section of the country, would be greatly improved, even if they were drained to that extent which the limited means in the hands of our farmers would allow. This, in my mind, is no longer a question of doubt; and it has also been proved satisfactorily by a number of persons who have given it a fair trial. And I would merely say to those who are still skeptical, either as regards the advantage or profit of underdraining land:—make a fair trial of a small piece of drain, on any land which has has hitherto been good for nothing on your own farms, and if the drain does not pay for itself, if properly constructed, during the first four years the land is in crop, it will be the first case of the kind which has come under my observation; and I feel satisfied that farmers who have the means, cannot find a more safe or profitable investment for their money than by improving their farms in this manner. The experience of some of the best farmers in Britain. in the absence of all other proof, would be sufficient to show that capital may be more safely invested in this than in any other way. For after very large expenditures have been made by farmers in Britain, amounting to millions of pounds, it has been clearly proved that the increased profit from what is termed partial draining is sufficient in a few years to pay the expense, even of thorough draining, thus leaving their farms permanently increased in value, to the amount of the total cost, while the income is augmented in a still greater ratio. And an eminent writer on this subject says: "It is quite doubtful whether Britain could now sustain her population, were it not for her system of thorough drainage."

It has been a source of gratification to me to observe, that prominent agriculturists in this country are becoming alive to the advantages to be derived from draining, and I have also been much interested and edified by the perusal of several well written articles, which have appeared during the past year or two in the publications of this province from the pens of gentlemen of high standing, who would wish to arouse and stimulate farmers to take action in this matter.

It is a new subject, comparatively speaking, in this Province, and which is not well understood; and I may say there are but few capable of teaching its theory and practice yet many farmers are awake to its importance, and are eagerly seeking information in reference to it. Many are already endeavouring to drain their land, conscious of their want of the requisite knowledge to enable them to do so in a proper manner, but who are, nevertheless, willing to run all risk rather than plow and sow portions of their land year after year without even reaping enough to pay for the seed. I have often thought a treatise on this subject much wanted, one which would contain an elementary and thorough exposition of the principles upon which Canadian farmers ought to drain their lands, as compared with some of the system adopted in other countries, one which would tell the man who never saw a drain tile, what thorough drainage means, and which would convey to those who have studied the subject from British authors only, the difference in the climate and soils, in the price of drain tiles, labor, &c.; which must modify our operations in this country to a certain extent compared with England, Scotland, and Ireland. And although, as I have previously stated, I do not pretend to be possessed of any great amount of ability to treat this subject fully, still, I think I may be able to bring before you a few comparisons and suggestions, which, in the present lack of information, may not be altogether useless.

In the first place, then, let us trace the progress of farm drainage from the days of old, and review some of the principal systems which have been adopted, for that purpose in modern times in Britain, and partially in America. So far as I can learn, the ancient Romans were not what might be termed far-famed agriculturists, although, no doubt, there were many eminent men among them. You are no doubt aware that they were famed for sculpture, and for ingenuity in various branches of mechanics. They were also great manufacturers of pottery, earthenware, and amongst the rest of their articles they were in the habit of manufacturing from their mother earth, I observe that they made pipes, not tobacco pipes I presume, because they were used for the purpose, as is said, of conveying water from place to place, that is, as aqueducts. I cannot find anything which would lead me to sup-

- that they used them as a means of drain- - although they are said to have drained r land. Some of the old Roman writers e given minute directions for forming -s of various m-terials, such as stone, &c., bundles of brush, straw, &c. So you perceive that even at that time draining considered worthy of attention by emi- men; and no doubt was carried on ex- ively, and profitably, in those days, as as now, although not to the same state perfection.

Nothing is mentioned by British authors anything having been done in reference land drainage in England, Ireland, or land until the year 1650, when a gentle- n named Capt. Walter Bligh published ork setting forth the great advantages of ining as applied by him to water meadows swamps, and as being applicable to all st lands. Nothing is mentioned by him drain tile having been used for that pur- . But subsequently, however, in a note of hens' on draining and irrigation, we find following statement and opinion. "In ining the park at Grimsthorpe, Lincoln- re, some tiles were found 8 feet under the face of the ground, and were similar to e now used for the purpose of drainage, although they must have been in the und over one hundred years, they were in a ect state of preservation." I cite this note e particularly to show and convince those o are sceptical as to the durability of tiles, t they have been found to stand that e and that there need be no fear in pting them as the means of drainage.

The first account we have of anything a system of drainage, is what is known as Elkington system. It appears that in year 1795, at the request of the Board Agriculture, the British Parliament voted Joseph Elkington, an English farmer, the m of £1,000 for his valuable discover- in the art of draining land, the details of ich were brought before the world at that e by Mr. John Johnston. Mr. Elking- 's fame as a practical drainer is said to e quickly and widely extended and was very generally employed throughout gland for many years afterwards, particu- y in the Midland counties, of which he ained thousands of acres successfully, and ough much of the land was previously of value, it is said to have become the most luable land in that section of the country, producing the most valuable kinds of grain, and affording the richest pasture for stock.

James Smith of Deanston, Stirlingshire, Scotland, next after Elkington, in point of time, was the prominent leader in drainage operations in great Britain. His peculiar views came into general notice about the year 1832, and in 1844 he published the seventh edition of his remarks on thorough drainage. He is said to have been the first advocate of any system worthy of that name, because instead of the few deep drains cut with reference to particular springs or sources of wetness adopted by Elkington, Smith practised a systematic operation over the whole field, at regular distances, and at shallow depths of about three feet, according to the level. He considered that much more injury arose from the retention of rain water in the soil than from springs, while Elkington's attention seems more particularly to have been directed to springs as the source of the evil. Both theories, however, may have been correct, as suited to the general character of the soil on which they were adopted. Smith's system may be given in a few words. He says the drains should be made parallel with each other, and at regular distances apart, and should be carried throughout the whole field without regard to the wet or dry appearance of the soil—the principles of this system being, the providing of more frequent opportunities for the water rising from below, or falling upon the surface, to pass completely off, with greater facility, through the numerous drains, which he says may be constructed with various materials where tiles cannot be obtained conveniently, such as brush, or faggots, tied together in bundles, stones, timber, &c.; but he further adds that where drain tiles can be got, they are decidedly superior to any other material now in use, as they are not only found to answer the purpose better, but are more durable, and not so liable to get choked up, or get out of order, as the drains are which are laid with the other materials mentioned. This system of Smith's has been adopted to a considerable extent. Throughout England and Scotland it has been found to be very efficient, and beneficial in its effects, more particularly in heavy and wet clay soils, which obtain to a very great extent in many places both in England and Scotland, and by which millions of acres of such have been reclaimed from almost a state

of worthlessness, to be the most valuable land for agricultural purposes.

Some years subsequently, however, we find Mr. Josiah Parks before the agricultural world as the author of several essays on the philosophy and art of drainage, and of many papers on the subject which were published in the Journal of the Royal Agricultural Society, in which he held a high position. His views differ in some respects from those of Smith—first, in as far as he advocates a less frequent system of drains, at intervals varying from 21 to 60 feet, with preference for wide intervals, and deeper drains at a minimum depth of 4 feet, designed with the two fold object of not only freeing the active soil from stagnant water, but of converting the water falling upon the surface into an agent for fertilizing the soil; and he deemed no system efficient that did not both drain off the water falling upon the surface, and keep down the subterranean water to a depth exceeding the power of capilary attraction to raise it too near the surface. He coincides with Smith in regard to running the drains parallel with each other, but claims that the advantage of increased depth compensates for the increase in width between the drains. He also gives it as his opinion that pipes, or tiles, are the best known materials for the purpose of agricultural drains. The most material difference between the systems adopted by these two leaders of what has been termed rival systems, are, while Smith advocates drains of 2 or 3 feet in depth, at from 10 to 24 feet apart, Parks contends for a depth of not less than four feet, with a width between of from 20 to 60 feet, the depth compensating for the increased width. Mr. Parkes at first advocated the use of pipes of only the inch bore, and also that land could be drained by his system at an average cost of about fifteen dollars per acre, but subsequently he is said to have modified his ideas, both in regard to the size of the tiles and as to the cost of drainage per acre, which he afterwards fixes in his estimates as ranging from fifteen to thirty dollars, according to the nature of the soil and other local circumstances.

No doubt, both of these systems are worthy of our consideration, as they have been extensively practised in Britain, and from any information I can obtain in reference to them, I find that both have their advocates, and are the systems generally adopted where thorough drainage is carried on extensively. I am inclined to think either of the would answer the purpose, and migh adopted according to the nature of the gro to be drained, or the depth from the sur at which the water bed is found, whic this part of Canada is generally between is termed the subsoil and the hardened and is formed by a strata of sand, or mixed with limestone gravel, varying thickness from half an inch to four or six inches. But on many farms, more ticularly upon what are termed old farm this country, is to be found in many another description of waterbed, which is result of a bad system of cultivation. I reference to the hard formation frequent be found at the bottom of the plow-fu in clay soils, which is very injurious to c as through it water can scarcely penet and therefore has to lie at the bottom, at roots of plants, until it is dried up by eva ation, the effectual cure for which thorough application of the subsoil p But this is not the real water-bed to whi wish to call your attention, but merel hard formation of clay of about 1 or 2 in thick, made by the frequent action of plow sole at the same depth for a numb years in succession.

The real water-bed is generally abo to 4 feet below the surface, and throug the water percolates, and on drained soils it its way into the drains, which should be structed a little lower than the water-be that they may draw the water from both s But on underdrained soils it has to fin way to some lower level, where it oozes upon the surface, it may be on the fa some distant slope, in the form of spring it may accumulate at certain seasons of year in the hollows or low places, whe becomes stagnant, not only destroying vegetation of any crop which may have sown in such places while comparatively before heavy rains, but in consequenc which, after the water has been remove evaporation, a lot of noxious weeds sp up, the seeds of which are carried and near by birds, and even by the w and deposited on alluvial soils, where spring up and become a source of great noyance to the agriculturist.

But to proceed. Another system calle Keythrope system has been adopted in cases in England, the peculiarities of w consist in this, viz., that the parallel dr

not equidistant, and that they cross the of greatest descent; the usual depth is feet and a half, but some are as deep re and even six feet. The depth width are determined by digging trial in order to ascertain not only the depth hich the bottom water is reached, but the st to which it will rise in the holes, and distance at which a drain would lay the dry. It is claimed for this system by ocates that it is far cheaper than any because its drains are only laid in the s where by careful examination before they are found to be actually necessary, that it is a great saving of expense compared with the system of laying drains at equal distances throughout the

think in reference to this system that it improvement on its predecessors,—first, se it is now generally acknowledged ctical drainers, that the drains should with the greatest line of descent, and cross it, as recommended in this system, en, again, I think, according to the h specified, that it would cost as much t more to drain by this system, which ot be called a system of thorough drain- than it would cost to thorough drain at rage depth of 3 feet.

here is yet another system to which I will e. It is termed the Wharncliffe system, is a combined system of deep and shallow ge, the principles of which are as fol- viz.:—

e says that in order to secure the full of thorough drainage in clay soils, it is sary that there should not only be well conduits for the water which reaches but also subsidiary passages opened gh the substance of the close subsoil by of atmospheric heat, and the contrac- which ensues from it, the cracks and fis- which result from this action, are reck- upon as a certain and essential part of process. And to give efficiency to a sys- of deep drains beneath a stiff clay soil natural channels are required. To ce them, there must be a combined n of heat and evaporation. He further on to say that if we drain off effectually constantly the bottom water from beneath clay, and from its surface as far as it s of percolation, and by some other s provide a vent for the upper water, h requires nothing more than facility to run freely, there seems good reason to suppose that the object may be completely attained, and that we shall remove the moisture from both portions as effectually as its quantity and the substance will permit.

Acting upon this view then, after due consideration, he says, "I determined to combine with the fundamental four feet drains, auxiliary ones of much less depth, which would do their work above, and contribute their share to the wholesome discharge, while their more subterranean neighbours should also be steadily performing their more difficult duty." He then goes on to state that he accomplishes this by placing his four feet drains at a distance of fifteen to twenty yards apart, and then leading others across at a depth of two feet from the surface, at a distance of eight or ten yards apart, and at an acute angle with the main drains, at the junctions with which the two feet drains were either to be sloped down so as to run into the main drains at the same level, or if not so sloped down that the water should be made to descend from the high to the lower drains, through a few loose stones placed perpendicularly from the one to the other.

I believe that this system might work well in Britain, but I do not think it would answer in this country, for two reasons, first, because the two feet drains would be liable to be frozen up solid every winter—and, secondly, because the subsoil plow, which is coming more into general use every year, by our best farmers, runs to so great a depth as to be liable to destroy the two-feet drains at the first application. And even if the plow was not run to a greater depth than 15 or 18 inches at an average, any person who has held a subsoil plow must know from experience that it is an implement somewhat unmanageable, and liable to plunge deeper into soft places, such as the covering of drains, so that I am of the opinion that no skill or care could prevent it from injuring two feet drains.

By these systems, however, a great deal of good has been done in England, Ireland, and Scotland, during the past thirty years. Each has had its supporters, and I have no doubt that different soils, having various strata, and lying, as regards inclination, in numberless positions, require different systems of drainage, and no doubt the great incentive in getting up these various systems has been the object of securing the best system at the least possible expense.

Having brought to your notice some of the systems adopted in Britain, let us glance for a little at what has been done in America in regard to this important work, and, to commence at the beginning of its history, I will have to draw your attention to it, at its first introduction in connection with agriculture in the United States. I presume, from any information I can obtain in regard to the matter, that the first person who began drain ng operations, with tiles, which I consider as the beginning of draining operations in any country where practised systematically, was Mr. John Johnstone, of Seneca County, in the State of New York, a Scotchman by birth, who comm nced operations about the year 1835. He is said at first to have got drain tiles made by hand, and set the example of using them on his own farm, the effects produced by which were so evident to every one who had an opportunity of witnessing the way in which they operated, both upon the soil as regards cultivation, and the increase of produce, &c., that many intelligent and industrious farmers commenced operations also. The demand soon became so great for tiles, that a gentleman in the same county who held a high position in agricultural matters, imported a machine for the purpose of manufacturing them, at less expense than they could be made by hand, and of various sizes, which were then seen to be necessary, according to the amount of water r quiring to be carried off. Since then, draining operations have been carried on very extensively in that section of the country, and several interesting publications, containing statements of many successful operations, and giving much useful statistical inf rmation in reference to the subject of farm drainage, have been published from time to time by Mr. Johnstone, and several other gentlemen of experience and ability, showing forth the principles upon which they have drained their farms, and the success which has attended their efforts from time to time in so doing. In fact, it is from this source that much of what is known in this country in regard to drainage has been obtained. Tile yards have since been established in many different places throughout the States, which have been manufacturing hundreds of thousands, even millions, annually, of both horse shoe and pipe tiles; the horse shoe tiles were at first most extensively used, but of late years the pipe or sole tiles are preferred.—Other materials have also been used with varied success throughout the States, such stones, and wood of different kinds, put in various ways; but it is generally acknowledged that where drain tiles can be got veniently, and at moderate prices, they after all, the best and most economical m of drainage yet discovered. It is true d age has not been carried on to anything the extent, or efficiency, in the States, r it has attained in Great Britain but suffi has been done to show, that farmers a also are becoming aware of the great a tages to be derived from a cheap and effi means of drainage, and they are now for themselves into joint stock companies for purpose of manufacturing drain tiles for own use, in sections where it would be di to get a person to invest his money in e lishing a tile manufactory, and run the ri being able to make it pay, without havin farmers in the surrounding country dir interested in its support. Such, in my opi is the way in which tile making establishr ought to be got up in new countries, an farmers in connection with the work then be able to get what tiles they req at first cost. And on the other hand th maker would be in a better position, - either case, whether hired by the day, m year, or by the thousand, they could c with some certainty upon making a li whereas in the position in which many of have found themselves, after having spen principal part of their money in getting establishment, they could not find sal one-fourth part of the tiles they could m facture. And to enable them to live have had to add a living profit to the c those they have been able to sell. I me this particularly, because it affects the int both of the farmer who wishes to drai land, but cannot afford to do so in conseq of the high price of tiles, and of the manufacturer, because with the present mand, even at the high prices, he can sca make both ends meet.

I feel satisfied that tiles could be re in price from 25 to 50 per cent from th sent rates, were farmers to go about it right way. They could do it either as I stated by joint stock companies, or, whe works have been established, by a num farmers making up their minds in spring amount of tiles they would require duri summer, and deputing one of their num make arrangements for getting them m

Or it may be done through the Town-
gricultural Society, in the same manner
h subscribers sometimes obtain plaster
r land at a cheap rate, or are enabled
r cases to procure seeds of various
A fund might be subscribed for the pur-
procuring drain tiles, in the same way
h it has been done frequently for the
mentioned purposes—until some action
n by the Legislature of this province,
to that which has been taken in Eng-
laring for its object, the encouragement
ıage.

erely mention this matter here because
that the Americans have used the vari-
ans I have described, to assist them in
ating some of the difficulties against
they have had to contend in their oper
in drainage and in consequence of
they have been enabled, to progress
he work more rapidly than they could
ise have done, under the high rates of
and tiles, against which they formerly
contend.

me now draw your attention for a few
ts, to what has been done in Canada in
ce to this important work. And in or
do so we have to look back some twenty
ars, previous to which very little had
one in regard to drainage in connexion
the farm. About that time however,
our farmers having friends in England,
ther countries where the beneficial ef-
drainage were becoming better under-
—frequently received publications from
which the subject was treated ably,
which the opinions of scientific men
iven, setting forth the advantages to be
from it.

his way therefore, and by conversation
ities who had an opportunity of seeing
vation in other countries, many were
d to make a trial of small pieces of
in some of the low wet places or runs,
ir farms, the advantages of which soon
apparent to those who had constructed
and also in a great measure to sceptical
ours, who when the drains were being
ected were of opinion that it was only
money thrown away, but who were
instances through force of example
to try the operation on their own
after which they were no longer sceptic-
ber in regard to the utility, or profit, of
e, as applied to such places. Very
progress was made however for some
years afterwards, or until about fifteen years ago, when several prominent agriculturists through the province commenced operations on a large scale—but not even then, on anything like a system of thorough drainage.

Very little more has yet been done, particularly in this section of the country, than to relieve some of the fields by running drains in low places or cutting off water flowing from springs, &c.

But this may be accounted for in various ways; first, because it is, comparatively speaking, a new settlement, as compared with some of the first, and more wealthy settlements in the province, and has not until a few years past been sufficiently cleared to admit of draining operations to any great extent. Secondly, because the greater part of those who had their farms sufficiently cleared to admit of drainage previous to the crisis of 1857 and 1858 seemed to be more actuated by a spirit of acquiring more land, even at very high prices, than of improving that of which they were already possessed. This I am aware has been the case to a considerable extent, the consequences of which have in many cases been almost ruinous to the parties themselves. And to this in a great measure, I attribute the general depression which has prevailed in all descriptions of agricultural improvement for some time past, in this part of the country.

Still there are some cautious enterprising farmers, who have been steadily improving their farms by draining, as well as others who have found it to their interest to do so, and from past experience have become convinced, that before they can count with any degree of certainty upon good returns for seed and labour, they must first get rid of the surface water on their farms, and put them in such a position that they can get to work, as early as possible in spring, and not have either to sow their grain in pools of water, thereby losing both seed and labour, as too many are in the habit of doing, year after year, or else wait till the land dries by evaporation, which very frequently does not take place for weeks after the seed should have been sown, and in consequence of the cold, and wet state of the soil, the crops are retarded in growth, and when the drouth of summer comes upon them they become yellow, and are more subject to blight and other evils to which early crops on well drained soils are not exposed. And I am satisfied, were the

principles of land drainage and its effects better understood, by the majority of our farmers, greater exertions would be made by them, to put their farms in a better position, in regard to this most important work in connexion with agriculture.

It is now about 16 years since the first drain tiles were made in this part of the country; they were made by hand at the Bowmanville pottery, and were used by John Smart, Esq., on his farm at Port Darlington, and after a fair trial, he found them to be the best, although not the cheapest material for that purpose at that time. And although he had previously drained with cedar to a considerable extent, still by taking into account the difference in the durability, he adopted the tiles in preference to the cedar, and continued to use them for a number of years, until he changed the nature of his farm from that of a wet cold clay, which he could never begin to labour in spring until it was almost too late to sow, and in consequence of which the crops were very often rusted and almost worthless, to that of a rich mellow clay, which can scarcely be equaled in this section of the country for producing any kind of crops. In regard to the cedar drains which I have stated Mr. Smart had constructed fifteen or twenty years ago, they now cave more or less every year, and will soon be useless altogether.

I am aware that some persons will scarcely think it possible, but it is nevertheless true, that I have examined the drains and found the cedar in many places completely decayed, by what is termed dry rot, not by wet rot, as it would be almost natural to suppose, and in many places nothing now remains to uphold the soil, and the drains are frequently being broken through even by animals passing over them. So much then for cedar drains.

The next gentleman who commenced draining operations after Mr. Smart was the Hon. S. Simpson, a gentleman of high standing and of considerable energy and ability, who having become possessed of a nicely situated farm in the vicinity of Bowmanville, determined to make it second to none in this country, either as to its general appearance, or capability of producing crops. But finding many portions of it cold and wet, in consequence of which it would not produce good crops, he determined to commence draining; and in order to obtain drain tiles at a cheaper rate, than they could be made for, by hand, he was the means of importing the first machine for making tiles into this part of the country since which, he has spared no means necessary to put his farm (comparatively speaking) into a good state of cultivation in regard to drainage. Mathew Joness, Esq., another eminent agriculturist in this section, has done much to improve his farm in this respect.

There are many others whom I might mention who have not hesitated to follow the good example in regard to this important work. But suffice it, to say, that through the example of those gentlemen whom I have mentioned, many have been induced to improve their farms by what is termed partial drainage.

The gentlemen mentioned were at that time considered high farmers, and it was supposed by many, that they had more money than they knew how to make a good use of, and that it was, as it were, throwing money away, but this supposition however has proved erroneous, even by the small amount of draining they have done, compared with that which it will yet pay them to construct, they have established the fact, not only in their own minds but also in the minds of many farmers around them, that it will pay to drain, and that land drained partially, the farmer can commence operations a week earlier in spring than on undrained soils. This is of itself a great advantage when we consider the shortness of our seasons, even were crops on drained land not more sure than on undrained land, of which there is not the least doubt, and that the produce is frequently from five to ten bushels per acre more in consequence of even partial draining. These facts, as I have already stated, have been established in the minds of many, but I cannot say in that of a majority of our farmers, many of whom, although possessed of means to enable them to drain, because they cannot see that the money laid out in that way would yield them interest equal to what they are very frequently promised for the use of their spare funds will not even give it a trial. Many farmers also I, have no doubt, are ignorant of the fact that a great change takes place in the soil after it is cleared of stumps, and that the chemical properties formerly existing in the vegetable matter become exhausted. It is a well established fact, that the soil becomes more retentive in its nature and more compact, consequently it requires more care and attention, both as regards manurement, drainage, subsoiling and many

es, which are not requisite while the veg- mould is upon it in order to produce a crop. And many who consider them- good farmers may be ignorant also as cause of deterioration in the produce of farms compared with what they formerly d, or the cause of winter killing in their the cause of blight, the cause of the and late frosts, which have for some past affected our crops to a considerable in this and in many other sections of the y. And no doubt they would remain so if kind friend did not draw their attention fact, that these evils arise in a great e from the amount of surface water ey allow to accumulate on their fields, that this system can be alleviated by a ous system of drainage which would not have the effect of drying the soil, but raising the temperature of the surround- tmosphere, the benefits of which must be evident to any thinking mind. But there other matters in connection with, and g directly upon this subject, which I attempt to bring before you in such a r as to enable you to understand them: e first is the fertilizing substances con- in rain water.

water is the source of surplus moisture, at is generally termed surface water, a ority of which is the principal of the evils, which we contend in land requiring ge, but it is said to be a great source ility, not only because it affords the ne y moisture to dissolve the chemical in- ents of the soil, but because it contains valuable fertilizing substances.

n article by Mr. Caird, in the Cyclopœdia griculture, on th erotation of crops, he the surprising effects of a fallow, even d by manure, has received some expla- by the recent discovery of Mr. Barrell,

rain water contains within itself, and ys into the soil fertilizing substances of most importance, equivalent, in a fall of 24 inches per annum, to the quantity monia contained in 200lbs of guano, with of nitrogenous matter besides, all suit- the nutrition of our crops.

being the case then, and taking even average fall of 34 inches of rain per as a criterion, how careful ought farm- heavy clay soils, to be in having them sufficiently porous to enable it to per- through them, instead of running off them, so that these nutritious substances may be extracted from it, by the soil through which it would have to pass to the water bed underneath.

Rain water is also said to contain in solution, air and carbonic acid, with ammonia. The first two ingredients are amongst the most powerful disintegrators of a soil, or in other words they contain the properties required to dissolve the chemical ingredients contained in all soils which, when dissolved, become fertilizers also. By this then we are led to see that the rains bring us not only water for the use of man and beast but also food for our plants. And what I wish to impress most forcibly upon your minds in connection with this matter is, first, that while you should remove by proper drainage, the surplus moisture from your land, you should also take care to conduct it through the soil far enough to extract from it the fertilizing substances it contains. And secondly, see that it is removed to such a depth that it will not prove injurious to the roots of plants, as they require warmth as well at the roots as on the surface in order to enable them to grow with vigor; in short that which constitutes the science of draining, is to have a knowledge of the depth to which drains ought to be laid in order to drain off such water from the water-bed, and not allow it to remain to keep the soil cold.

Evaporation is another great agent which we ought not to lose sight of, in connection with this subject, as it is a most powerful one in connection with drainage, and to it we are indebted for the beneficial effects produced on all soils, but more particularly are its effects remarkable upon soils which are drained, both tending to increase the temperature of the soil during summer, and in consequence to increase the growth of crops, so that they come to maturity earlier and are thereby not so liable to be injured by many of the evils to which late crops are subject. Of the value of these considerations then, let the farmer who has lost more or less of his crops every year make his own estimate. Perhaps he may come to the conclusion that there is more truth in the theory and practice of drainage than he at first imagined and that even in the effects produced by evaporation, he may find a subject of much importance, well worthy of consideration.

Evaporation takes place at any point of temperature from 30° , or even lower, up to 212° , at which water boils. It is increased

by heat, but not caused by it at all times, as an apparently cool wind will very often cause more evaporation than takes place in many instances under a higher temperature of the atmosphere. When the weather is warm and genial, and as I have already said, that the temperature of the soil when drained is higher than it was previously, it must follw that the power of evaporation is also greater, in proportion to the difference in the temperature caused by drainage, by which then you will perceive that evaporation is enabled to perform the work of preparing the soil for the seed, making it dry and mellow with greater rapidity on drained, than on undrained soils, and both working together have a very beautiful effect upon the soil.

Having directed your attention to a few of the systems of drainage as practised to so great an extent in Britain, and also in the United States to a considerable degree—together with a sort of digest of what has been done in this section of our country, and having attempted to show the effects of rain, drainage, and evaporation upon the soil, I will now proceed to show you that although draining has been carried on to such an extent in Britain, it is not because the land requires it more there, owing to a greater amount of moisture or rain than we have to contend against in this country, but, on the contrary, it has been clearly proved by scientific observations that there is a greater quantity of rain during the year in America than in Britain. It is computed that the average annual fall of rain in England is as follows, viz. In the eastern portion it is estimated at 20 inches, midland, 22 inches, and western 35 inches, whereas in this country and in the northern and Eastern States the average annual fall amounts to about 40 inches. The rain also falls more moderately in England than it does in this country. They seldom have such deluges of rain as we have here, flooding the land to the depth of several inches, and, on undrained lands, frequently lying in small lakes for days afterwards. By this you will perceive that this country, compared with England in regard to the amount of rain, should in reality require more drainage to keep the soil in a proper state than is required in England; because, as already stated, the rain falls more regularly there and never in such quantities in a single day, and also because, there, the soil is open the most of the winter, so that it can be worked almost every day with the plow. While in this country for ral months our fields are completely l up in frost, in consequence of which our in spring has to be done in a few days- often very superficially on account of th state of the land. But I would remar though speaking in general terms of this try requiring more drainage than Eng still I do not wish you to understand r say that all lands even in this country re drainage. On the contrary, I am fully vinced that there is a great deal of land ir as well as in other countries, which doe require artificial drainage; it having natr porous subsoil through which the su water may find a free passage. And fa ought to obtain a tolerably correct idea principles of drainage, so that they m able to discern between soils which do n quire drainage, and those that do. I wish before leaving this part of our su to impress upon your minds this impo consideration, that we should underdr the land we cultivate, which has natural drainage in itself. For you ma pend upon it, that so long as this is not so long will we be troubled with winter- rust, midge, blight, and all the other e which late crops are exposed.

But the main point to be considered i it pay to drain land in this country. W under certain circumstances it will re a moderate outlay, but we must bear in that whatever outlay we make it ought considered as a permanent improvement lar to the putting up of buildings on a which pay for themselves ultimately, b ing grain, and waste in stacking, althou in one or two years. Still, in my opin moderate outlay on draining will pay e as well as buildings for saving grain will return good interest for the money i ed, besides enhancing the value of th permanently, to more than the amount pended. By way of illustration let u out this idea,—say for instance th of you has a piece of land, say 10 worth $80 per acre, and that it pay now in the way you work it a yearly profit of 6 per cent on the v Now suppose it costs one third more t it, the one-third of $80 is $26 66, w sufficient to thorough drain it, with dr 40 feet apart throughout the field, w many instances would not be neces drains at 66 feet apart, or four

ld be sufficient in most cases, in this part the country, and would only cost 30 cents rod, about $18 per acre. But for sake of ration we will take the figure at 26 66½ see how much more each acre would have produce in addition to what it formerly uced, to pay interest at 6 er cent. on mount expended, which would be $16 56 y on 10 acres or $1 55½ per acre and in to show the result clearly we will take year's rotation for example:—1st year ces at 1s 3d per bushel about 6 bushels,

year wheat at 5s, per bush.	1½	"
r oats, at 1s 3d "	C	"
year barley, 3s. "	2⅝	"

year hay, 40s. per ton, 350 lbs.
year pasture, increase of which will pay.
ar oats, 1s. 3d. per bush., 6 bushels.
e not the slighest doubt this increase be obtained, even were the figures half as again. I think that those of you who had experience in the benefits to be d from a system of thorough drainage gree with me in thinking that it is not ated.

, on the other hand, we will see whether draining will pay. Taking again for e a field of 10 acres, in which there a water run or runs to the extent of in length, and 4 rods in width, which frequently the case; that is, supposing ds on each side of the drain to be wet ngy, in consequence of which it has produced more than half a crop, and n worse to work than any other acre field; and the average yield on which, say, of wheat, for sake of calculation, n about ten bushels, which, at $1, be $10. Now we will take the cost of

—cutting, laying, and filling, ents per rod..... $6 00
tile, or 650, at $10 per 1,000 6 50

$12 50

e will take an average crop from the ter being drained, 20 bushels, and the in yield by drainging, 10 bushels, at ; which would pay within $2 50 of of draining during the first year. r this estimate not over drawn, and if those who have drained such places pt an account of the cost, and the in- yield, they would, in most cases, bear n this calculation.

then, that has been delayed, year after year, by the wetness of his land in getting his spring work done, or has had the troubles incident to cold wet seasons, will not see the necessity of draining every acre of his land by artificial drainage, which has not a natural drainage of itself.

Taking it for granted that it will pay to drain land, let me bring to your notice a few important considerations in connection with some of the modes of drainage, and first in regard to some of the leading features of the old open ditch and water furrow system, which I may say prevailed to a great extent at one time in Britain and even now in this country. No doubt, open ditches are often required in connection with the most approved methods of thorough draining, as receivers or outlets to tile or other covered drains. But taking them in connection with the water-furrow system, they have been found very objectionable in many ways. First, they are too expensive; the first cost of construction is much more than that of a covered drain, owing to the great depth to which they require to be dug before they will withstand the action of the frost and weather.—Secondly, they require too much attention to keep them clean, and in good order, as they generally require to be cleaned out at least once every year, and very often twice, in consequence of the accumulation of various substances carried into them, which, if not removed, would choke them up and render them useless—Thirdly, they occupy too much land, and are an obstruction to good husbandry: no doubt this is the case, because if open ditches were opened at every wet place or water run in our fields, they would be found a great source of trouble and annoyance in the cultivation of the other portions of land, and would prove a harbour for weeds.—Fourthly, they, in connection with the high ridge and deep water furrow system, have the effect of impoverishing the soil, because the great quantities of rain or snow annually falling upon the soil must either be carried off by evaporation, filtration, or run off upon the surface; and by being carried off by the deep water furrows, the consequence is, that a large amount of the manure and finer portions of the soil is carried off also, and washed into the open ditches. These then, gentlemen, are some of the principal objections to open drains, and the water furrow system, which has been given up altogether in Britain for some years past.

It is acknowledged by all writers on this

subject, and also by practical drainers, that the drainage of land can be most cheaply and effectually done by means of covered drains, which, as I have previously stated, may be constructed with various kinds of materials. Stones, wood, brush, tiles, &c, have all been used for this purpose—of which, however none have been found so effectual, durable, or so cheap at last, as tiles. But I would by no means discourage parties from using the other materials, if they cannot procure tiles at a reasonable price, or convenient distance.

Let us now turn our attention to a few particulars in connection with the practical operation of laying drains, as this is a point upon which a great deal of ignorance is displayed in many cases. This, as well as every other work in connection with the farm, requires to be done systematically and with whatever materials are used. In the first place persons unacquainted with draining operations ought to consider what they require to do, and in the next place how they ought to do it; and a few suggestions may be useful on this point.

I would beg to observe, that in commencing to drain a piece of land, in the first place, it would be necessary to find the depth of the water-bed, after which find out where you are likely to find the best out-let for your main drains. Then in what direction to run them in order to carry off the water most effectually from the minor or branch drains, and see that sufficient fall can be obtained to do so. Then form a plan upon which to construct your minor or branch drains—which ought to depend altogether on the lay of the land; and if possible run the minor drains, with or against the line of fall, and not across it, either straight or angling, which at one time was considered the best method, but which has of late years been proved to be a fallacy, because on slopes, it is a well known fact that the different strata of soils crop out toward the surface in many cases. Where the drains are run across the slope, or at an angle along the face of the slope, they frequently, although put down to the water-bed, have been known to lose more water than they conveyed. And the water thus lost would ooze out upon the surface where the hard strata under the water-bed cropt out a short distance lower down the slope, or a few yards below the drain, where that hard strata came in contact with the surface soil.

We will now suppose that the engineering or laying out of the drains has been d with due attention to system, fall, levels & and that every main, sub-main, and mi drain, has been carefully staked out, and fall in each correctly ascertained. This in cases ought to be done previous to any co mencement in digging, and if done prope will save a great deal of trouble from drains choking, or flooding, for want of fa

Now in regard to the work of excavati it is now an established rule, that to be properly it must be at the outlet, so t whatever water may be met with can p readily away, and the outlet should be kept enough for that purpose. If there is much it might be best not to take the main dr out the full depth at first, because altho they ought to be the first opened, they m be the last in which the pipes are laid, may cave in to a certain extent.

In opening drains the plow is freque used for turning out the two first furr deep, with good advantage, provided it is d with a good steady team by a good plow who can guide the plow straight. If it not be done straight it would be the caus a good deal of trouble, both in taking out remaining portion of the soil and in laying tiles, but there is no doubt that it is a con erable saving if properly done. A ditching machine would be a great acquis if such a thing could be got up, but there been none got up that has been found to swer a good purpose on hard clay, or gravely soils, and I presume we will s ill to use the drain spades for some tim come, but I have no doubt that a mac for that purpose will eventually be consti ed so as to do the work properly. I frequently seen people in digging drains themselves a great deal of useless wor digging them too wide, or at a width of 2 ches at the top and a foot at the bottom stead of a foot at the top, and from 4 inches at the bottom, so that a person just be able to stand in them to lay the with one foot before the other, by which would save half the amount of excav This can easily be done if the proper tools are used, which can now be got at of the hardware shops, and will pay for selves in a very short time where much ing is required to be done.

After the main and minor drains have opened, commence to lay the tiles in the branch or minor drain. By doing so you w

to finish the work as you proceed, and will able to make your junctions properly with main drains. There is another consider- which requires much calculation, that is reference to the various sizes of tiles you require in draining a field, according to amount of water which requires to be re- ed by the various drains, and it is wisdom er to put in tiles too large than too small. When you commence to lay the tiles, e a flat stone or a piece of brick irst the upper end so as to prevent soil from entering the bore. And in r to facilitate the operation of laying the have them placed in a row, end to end, the side of the ditch on which there is earth, making use of none but sound ones, prevent them from shifting about, and keep the joints straight, a narrow spading, width of the sole of the tile, is frequently n out, of the centre of the bottom of drain, about the depth of the tile, and in cases the sides and top of the tile are ed with gravel, sods, straw, and in some small brush. I do not consider this lly necessary, because, if the tiles are properly, nothing can get in at the but water, and it percolates so slowly nothing can be carried in with it. n the drains are filled in and complet- be sure not to allow water to run in a furrow on top of them, but rather if ble have the drain top the highest land vicinity, so that the water will find its from each side rather than straight down, has a bad effect upon the drains. would be found very useful if a plan kept of the position or situation of all on the fields, as a reference in after when by the appearance of the surface had lost track of their position, and re- d to find them in order to remedy any age which might occur, and the cause of it would be difficult to find out were not done.

cannot close my remarks on this sub- without adverting to the universal interest confidence of the people of great Britain, operation of land drainage. This is ested by the Acts of Parliament which been passed, having for their object the ement and encouragement of drainage, ishing means at a low rate of interest, term of years, so that landlord or ten- may take advantage of it, to bring lands into a proper state of cultivation. The outly in many instances has paid both both principal and interest twice over, during the period for which the money was borrowed at first. And I have no doubt that were our government in this country to take similar action and provide a fund, at low interest, taking security on the property to be drained, it would be a great boon to the Canadian farmer, which many would take advantage of, and profit by, because every cleared acre would then be a producing acre; whereas under the present circumstances, a very large amount of cleared land is producing nothing.

Miscellaneous.

The Farmers' Best Friends.

BY A. HOLLOWAY, MOUNT BRYDGES, CANADA WEST.

Destroy not the birds;
They're the farmers' best friends;
For the little they spoil
They make ample amends.

Some fruit they will eat:
But grudge it them not;
For the good that they do
Should not be forgot.

They keep down the insects,
Whose rapid increase
Would injure our harvests,
Till harvests would cease.

With their songs they amuse
Our wearisome hours,
And their presence enlivens
The shadiest bowers.

Then forgive their slight faults;
They make ample amends;
And do not forget
They're the farmers' best friends.

LOOKING FOR COAL IN EGYPT.—After a ride of two hours we arrived at our destination, about thirteen miles from Cairo. On descending the pit, I found it had been sunk in a very recent calcareous formation, intersected with beds of blue marl, to a depth of 266 yards, which had been ascertained to be about 100 feet below the bed of the Nile; and that there was just as much probability of finding coal on the top of the Pyramids as there. Hastening my return, I found the Viceroy at Shubra, in the evening, playing cards with three comfortable-looking grey-bearded Turks, all of whom, with the exception of his Highness, wore large diamond decorations. When I entered, the playing ceased, and the Viceroy eagerly inquired if I had been down the pit. Answering in the affirmative, and that I

did not consider that there was the remotest chance of discovering coal in such a locality, he inquired the exact depth of the pit, and if in England coal existed at greater depths. On my replying that certainly coal had been found and worked deeper than the shafts at Tourrs, he struck the table such a blow with his fist, that the shock sent the cards flying up, exclaiming, while fire darted from his eyes: "Then I'll sink a thousand yards!" I made my salaam; and rising, left the old Turus nearly in the same state as the trees in the petrified forests.—*Egypt, the Soudan, and Central Africa. By John Petherick, F.R.G.S.*

Light in the Sea.—A paper on the nature of the Deep Sea Bed, by Dr. Willich, was read at a recent meeting of the Royal Institution of Great Britain. The following passage occurred in it: "Light, or rather the absence of it, can hardly be said to determine, in any important degree, the distribution and limitation of the lower forms of animal life. Light is not essential even in the case of some of the higher orders. A large class of creatures, both terrestial and marine, possess no true organs of visions, although there is good reason for believing that they do possess some special sensory apparatus susceptible to the influence of light; whilst certain creatures, whose habitation is in subterranean caves or lakes, as in the Magdalena caves near Adelsburg, and the Great Mammoth caves in Kentucky, either porsess no organs of vision, or possess them in so rudimentary a state, as to prove clearly that the absence or imperfect development of the sense may be compensated for by the higher development of other senses. It is impossible at present to say to what depth light penetrates in the sea. The photographic art will, no doubt, one day solve the problem. But it is almost certain that a limit is attained, and that, moreover, long before the deep recesses guaged by the sounding machines are reached, where the light giving portion of the ray cannot penetrate even in its most attenuated condition; and yet, as shall hereafter be shown, creatures have been found down in those profound and dark abysses whose coloring is as delicate and varied as if they had passed their existence under the bright influence of a summer sun."

A Microscopic Age.—If I were to point out what is the most striking characteristic of the present century, I do not think that I should dwell upon it as a scientific age, or as a commercial age, or as a mechanical age, or as literary age, or as a missionary age, (by all which epithets it has been described,) but as a microscopic age. Nothing appears to be so wonderful as the change which has occurred in the common doctrine of magnitudes. Little things have become great, and great things have become small. As the modern science of chemistry could not spring into existence until an accurate balance was invented, so the modern science of physiology and the whole theory of mortal life, as we now comprehend it, has grown out of the microscope. This is a literal fact, and it is symbolic of a much wider one,—that all modern research has become microscopic. Painting has become microscopic and gives us details of mosses and lichens, which half a century ago would be laughed at as a useless waste of time. History has become microscopic, and enlivens the descriptions of courts and senates with a minute account of carpets and cakes, dresses, dinners, and other trivialities. Poetry has become microscopic, dwells even on morbidness on the blue fly singing i' th' pane, and tells us that the meanest flower that blows can give to the hard thoughts that do lie too deep for tears.—*St. James's Magazine.*

A Woman of Good Taste.—The following very happy and equally true sketch is from the *London Quarterly Review*. "You see this lady turning a cold eye to the assurances of shopmen and the recommendation of milliners. She cares not how original a pattern may be, if it be ugly, or how recent a shape, if it be awkward. However laws fashion dictates, she follows a law of her own, and is never behind it. She wears very beautiful things, which people generally suppose to be fetched from Paris, or, at least, made by a French Milliner, but which are often bought in the nearest town, and made by her own maid. Not that her costume is either rich or new; on the contrary; she wears many a cheap dress, but it is always pretty, and many an old one, but it is always good. She deals in no gaudy confusion of colors, nor does she affect a studied sobriety, but she either refreshes you with a spirited contrast, or composes you with a judicious harmony. Not a scrap of tinsel or trumpery appears upon her. She puts no faith in velvet bands, or in buttons, or twisted cording. She is quite aware, however, that the garnish is as important as the dress; all her inner borders and beadings are delicate and fresh; and should anything peep out which is not intended to be seen, it is quite as much so as that which is. After all, there is a great art either in her fashions or her materials. The secret simply consists in her knowing the three grand unities of dress—her own position, her own age, and her own points. And no woman can dress well who does not. After all, we need not say that whoever is attracted by the costume will not be disappointed in the wearer. She may not be handsome nor accomplished, but we will answer for her being even tempered, well informed, thoroughly sensible, and a complete lady."

Artificial Manure from Newfoundland.—Manure, which may now be considered a staple article of Newfoundland trade, is manufactured on Massacre Island, at St. Pierre's, in the following manner:—Old herring bait, at a cost

no francs per barrel, is salted with foreign salt, then boiled in a furnace, containing 250 gallons, for three hours; when cold, put into thick, round mats, made for the purpose, about two feet in diameter, then placed under a screw, about twelve of them at a time, for twenty hours, by which process the water and oil are pressed out; these run by means of a shallow trough and conducting spouts to casks outside the building, after which the oil floats, and is taken off yielding about five per cent; the mats containing the herrings are put out, after pressing, to dry for two days; it is then taken from the mats, put into flour barrels, and closely packed, by treading upon it; some is put into boxes containing 224 lbs. each; the barrel contains about the same weight. Caplin are made into manure as above, but do not produce oil. Cods' heads are also well dried on a beach, for five days or a week, without any salt. They are then packed into flour barrels, screwed in and sent to France, where they are ground up for manure. All these manures are said to do better than guano, and fifty per cent. higher in price. Mussels, oysters, bones, kelp—I saw specimens of all these manures, ground to a powder, said to be equally as good as any other kinds.—*Chemical News.*

The *Linnæa Borealis*, a beautiful creeping plant, named by the naturalist Linnæus after himself, and adopted as part of the great botanist's crest, is very plentiful in the woods in the neighbourhood of Riviere du Loup and Cacouna. It is used by the young lady visitors to these places, in the summer months, to twine round their hats, to which it makes a pretty ornament. It bears a small white bell-shaped flower, tinted with pink on the inside, and very fragrant, on a thin short stem, and is most abundant under the shelter of evergreens in half-cleared woods.—Thompson, the author of "Life in Russia," remarking on the love shown to this little flower by the Swedes, says:—"To have produced one man whose reputation has become the property of the universe is their boast and pride to this day, and, as if to prove what the force of example of one great mind can effect, the love of botany is among the Swedes a ruling passion. The *Linnæa borealis*, a little creeping plant of delicious fragrance, growing wild in the woods, and first discovered by Linnæus, and with which they crowned his bust, is perfectly venerated. In one of my rambles in the country some school boys, who were following the same path, came running to me, stranger as I was, exclaiming, 'See sir, we have found some of the *Linnæa Borealis!*'" It will not detract from the admiration which the Canadian ladies show for this lovely creeper to learn its name and association, and how it is honoured in another country.—*Advertiser.*

Flax—Land intended for flax demands particular attention now. The land should have been deeply ploughed last autumn, and should, as soon as sufficiently dry, be well harrowed, rolled, grubbed, and well cleaned of all root weeds, such as scutch, crowfoot, &c. The best soil for flax is a deep, strong loam; and rich stubble land, after wheat, oats, or barley, produces the best sample, particularly if the grain crops have succeeded lea; the seed may be sown by the end of the month, and well harrowed with a short tined harrow, first one way, and then across, or diagonally, so as to distribute the seeds equally; finish with the roller. The proportion of seed generally sown to the Irish acre is three and a half to four bushels; but it is much safer to show too thick than to thin. Good crops are taken after potatoes, mangels, carrots, and parsnips; but of late there is a decided opinion setting in the north of Ireland against growing flax after turnips. Professor Hodges, of the Queen's College, Belfast, recommended the following special manure for the flax crop for the last three years; but we have as yet no reports as to its efficacy from those who may have tried it. It is said that recent chemical investigations show that the flax crop has taken from the soil those matters which the professor proposes to supply. The quantities are for a statute acre:—

		s.	d.
Muriate of potash, 30lb.....	cost	2	6
Chloride of sodium (common salt) 28lb	"	0	3
Burned gypsum, powdered, 34lb.	"	0	6
Bone dust, 54lb.....	"	3	3
Sulphate of Magnesia (Epsom salts) 56lb	"	4	0
		10	6

This is also recommended to be applied to the land when flax is sown after turnips, from the results of an expiment made by Mr. James Dickson is growing flax after carrots, potatoes, and turnips

Editorial Notices, &c.

Veterinary Science.—We have much pleasure in calling the attention of our readers to an advertisement in this number, of Mr. Andrew Smith, who has commenced his profession as a Veterinary Surgeon, in this city. We stated in our last that Mr. Smith had arrived, and that he brings with him unquestionable testimonials of high professional talent and moral character. Persons at a distance, having valuable stock requiring professional aid, may communicate with Mr. Smith by letter; and he will hold himself in readiness, in cases of urgent necessity, to pay, if required, a personal visit. With regard to the giving of Veterinary Instruction, contemplated by the Board of Agriculture in their arrangements with Mr. Smith, full particulars will be announced in this journal, as soon as they are finally decided.

We regret that owing to the unavoidable absence of the editors, at the time of our last number going to press, a considerable number of typographical errors escaped correction. As however, the meaning in most cases was sufficiently obvious, we do not think it necessary to append a list of the Errata.

AYRSHIRE BULL FOR SALE.

MR. Denison, of Dover Court, offers for Sale a thorough bred Ayrshire Bull, bred by the celebrated Ayrshire breeder, John Dodd, Esq., of Montreal. The bull is 3 years old, and can be delivered at or after the Show at London, in September.

Toronto, Aug., 1861.

FOR SALE.

A LOT of thorough bred improved Berkshire Pigs of various ages.

R. L. DENISON,
Dover Court.

Toronto, Aug., 1861.

TO LANDED PROPRIETORS

AN experienced English Agriculturist, for several years practically acquainted with the Canadian Farming, wishes to undertake the management of a Farm, either on shares, or as Bailiff to the owner.

Satisfactory references and testimonials given by addressing AGRICULTURIST, *Post Office Paris, C. W.*

Paris, C. W. June, 1861 3t.

BOARD OF AGRICULTURE.

THE Office of the Board of Agriculture is at the corner of Simcoe and King streets, Toronto, adjoining the GovernmentHouse. Agriculturists and any others who may be so disposed are invited to call and examine the Library, &c., when convenient.

HUGH C. THOMSON,
Toronto, 1861. *Secretary.*

VETERINARY SURGEON.

ANDREW SMITH, LICENTIATE of the Edinburgh Veterinary College, and, by appointment, Veterinary Surgeon to the Board of Agriculture of Upper Canada, respectfully announces, that he has commenced his profession in Toronto, and for the present, may be consulted either personally or by letter, on diseases of Horses, Cattle, &c., at the office of the Board of Agriculture, corner of King and Simcoe Streets; or at Mr. Bond's Livery Stables Shepherd Street.

Toronto, Octoner 3, 1861.

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