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AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

Lower Canada Agricultural Society.

VOL. 2. MONTREAL, OCTOBER, 1850. NO. 10.

We very willingly give insertion to a letter of Mr. Wm. Boa, and in reply to his enquiry beg to state, that in our Treatise on Agriculture, published under the heading, "Agricultural weights and measures," in 1835, we gave the various Land Measures, by which land is measured in England, Ireland, and Scotland, and in Lower Canada; and also, the various "Corn Measures," known in all these countries, and the proportions they bear to each other. We have at various times since that period, endeavoured to draw attention to the great inconvenience of having different weights and measures in this Province for selling grain of all kinds. Our measure differs from Upper Canada, and both differ from the Standard measure of England, the Imperial bushel. But to proceed to reply to Mr. Boa. The English foot is 12 English inches. The French or Canadian foot is $12\frac{78}{100}$ English inches, 100 English feet is equal to $93\frac{9}{10}$ French or Canadian feet. The English acre is 4840 square yards. The French or Canadian arpent is 3600 square yards, French or Canadian measure, equal to about five-sixth of an English acre, or 100 English acres, make about 119 arpents, Canadian. This is as near the proportion as necessary.

As regards "corn measure," 25 minots Canadian, make 28 Winchester bushels all but 3 quarts, and about 27 Imperial bushels. Consequently, if one arpent produces 25 minots, an English acre should produce $29\frac{1}{8}$ minots, and hence one arpent producing 25 minots is equal to one English acre producing about 33 Winchester bushels, or about 32 Imperial bushels. This calculation is as nearly correct as is necessary to give an idea of the proportions of each measure of land and grain. 300 minots of potatoes off an arpent, is equal to 400 bushels off an English acre in Upper Canada or the United States. This difference is a very material one in the produce of a 100 acres of grain in Upper Canada and the United States, and 100 arpents in Lower Canada. The land is nearly a fifth short of English measure in Lower Canada, while the grain measure is nearly a eighth more in quantity than the grain measure of Upper Canada or the United States. This difference is seldom duly considered in speaking of the produce of land in these countries, and when the difference is not understood, it gives an idea that is unfavourable to Lower Canada, compared with other countries. There are many other matters connected with Lower Canada that are not properly understood, and if they were, the country would be much more favourably appreciated.

To the Editor of the Agricultural Journal.

SIR,—In a late number of the Journal, you have given a statement of the difference of the capacity of the minot and the Imperial and Winchester bushels. Now that we farmers and our farms in Eastern Canada may appear in a true light in the eyes of our neighbours at the approaching Exhibition that is to take place in Montreal, will you in the October number of the Journal show the difference of the extent of the French and English acre. There are many amongst us that do not know that there is any difference either in the acre or bushel that is in use amongst our neighbours and that in use amongst ourselves; this ignorance of ours causes us to think too much of our neighbours, and lit-

tle of ourselves. Just be so good as to answer the following question, and you will oblige your humble servant and in some sense render justice to Lower Canada. If a French acre produce 25 minots, how many Imperial and how many Winchester bushels will one English acre produce.

Wm. Bea.

Virtue, Roadhead, September 27, 1850.

STATISTICS OF ENGLISH GARDENS AND PARKS.

NO. I.

At the request of several subscribers, we intend to give, occasionally, notices of some of the best gardens and parks in both England and Ireland. The Statistics of Scotch Gardens, &c., will be also continued as heretofore.

During a short tour recently made in the south of England, I had an opportunity of visiting the residence of Sir George Staunton, at Leigh Park, so justly celebrated for its selection of rare and valuable plants, and particularly for the perfection in which many of our rarest tropical fruits are cultivated. Nor should this celebrity be confined to that very important branch of horticultural skill, as everything grown appears to obtain an equal share of skilful attention, and to afford similarly satisfactory results. The residence itself does not form any very important feature, but it is delightfully situated in the midst of a thickly wooded and undulated country, about 10 ten miles distant from Portsmouth, enjoying a moderate share of elevation, it commands a considerable extent of view. The pleasure ground or demesne, in immediate connection with the house, consists of between 20 and 30 acres, and is most tastefully laid out in the gardenesque style—the irregularity of surface contributing largely to its beauty; not very distant from the mansion, there is point of sight from which a considerable portion of the ground is seen to great advantage. The eye of the beholder cannot fail being struck with the very handsome sheet of water which reposes in beautiful irregularity of outline below. The first conclusion the mind arrives at after drinking in the beauty of the prospect is, that it must be natural: but much to our surprise we were informed that it is all artificial, and, if we mistake not, has been made within the last few years. Be this it may, it is truly a most happy combination of Nature and Art—nay, rather it is Art so beautifully allied to Nature, that she has immediately claimed its work as her own. This sheet of water is of considerable extent, and is much enlivened by two neatly rigged vessels riding at anchor on its peaceful surface. In addition to this feature, the contrast between the dark foliage of the shrubberies, and the rich light green of the velvety sod sloping to the very water's edge, has a charming effect when viewed from the elevated position alluded to.

Proceeding round the lake, I noticed a very pretty oriental looking Turkish smoking saloon, in a retired spot, not very far from its margin; and in near proximity to this, an ornamental bridge of Chinese design, if I remember correctly. At no great distance from this, I was shown by Mr. Scott a small pond, rendered, at least to me, highly interesting, as it contained a nice collection of our rarer hardy aquatic plants, and among others the Anacharis Æsinastrum, a plant which, till within the last few years, was not known to exist in the old world, being confined altogether to North America, and what renders it more interesting, in this very pond it made its first appearance, without there being any possibility of tracing it satisfactorily to its trans-atlantic origin; indeed, the fact of its having been discovered since, in several widely distant localities, even as far north as Berwick-upon-Tweed, tends to strengthen the belief of its British originality. Returning to the house, on ascending the hill, we find a very handsome temple, dedicated as "sacred to parents and friends," as the inscription above the portico "sacrum parentibus et amicis" intimates. A glance at the interior was all my time would admit of, that being but sufficient to excite a wish to examine more minutely the many beautifully sculptured busts it contained. These objects we have here mentioned are but a few out of the many which are scattered through, and contribute largely to the beauty of the grounds. In connection with the mansion is a large conservatory, or it may be perhaps more appropriately termed an orangery, as it contains the finest and healthiest collection of Orange trees I have ever had the fortune to see. The structure is about 60 feet long, 40 feet wide, and about 14 high. The roof being on the ridge and furrow system, the plants are all in the most luxuriant state of health it is possible to imagine, loaded with their large and richly coloured fruit, and filling the atmosphere with the delicious fragrance of their flowers. When standing in the centre of such a house, there is really little left for the imagination to work out, in order to fancy yourself transporte to the Orange groves of Andulusia. Besides Oranges, we observed fine plants of the Shaddock, the Lemon, and the Lime, all laden with fruit. We also noticed large specimens of the Tea Tree, Thea viridis, and the Camphor, Larus Camphora. This conservatory is accessible from the dining-room, being separated by glass folding doors; and how delightful must it not be to cast the eye up such an avenue, whose sides are formed by richly laden Orange trees, the branches bending to the ground from the weight of their golden crop—and now and then to admit a few of those gentle zephyrs, which have been sporting amid such exquisite fragrance. Surrounding this structure is a neat little geometric flower garden, and though rather early in the season to be seen to much perfection, it looked remarkable gay,

and gave goodly promise of a brilliant display in the autumn. A large number of the rarer Coniferæ are planted contiguous to the flower garden, and thriving exceedingly well—amongst them we observed a fine young plant of the new Chinese Cypress, Cupressus funebris, the largest specimen we have yet seen of it; also good plants of the Deodar, Cryptomeria, Cupressus torulosa, Taxodium, and indeed all the rarer Pinuses. The kitchen garden being on rather a limited scale, the most important feature we come to, is the principal range of hot houses, consisting of a large central house or Palm Stove about 60 feet by 50, and between 30 and 40 feet high; a wing from the north side is devoted to Orchideous plants, and on either side are Vineries, a Heathery and a peach house. The most observable feature of the Palm Stove, is that the plants appear to luxuriate in a state of nature, the only thing to be regretted, is the prospect of their becoming in a few years, impatient of the narrow limits which confine them. Indeed a noble specimen of the Sage Palm, Sagus saccharifera, whose leaves are as much as 30 feet long, and 8 feet wide, has already reached its utmost limits, and bids fairly, in the absence of other supports, to form a very substantial one in the centre of the house, that is, of course, provided its leaves do not think themselves above the task. We observed also a fine plant of Caryota urens, the Wine Palm, with leaves of a similar length, and in full flower—an excellent specimen of the Date, Phœnix dactylifera, the Oil Palm, Elœis guineensis, and Lantana borbonica, nearly 20 feet high. Among the tropical fruits, the Mango, Mangifera indica, may deservedly stand first on the list; it is a fine plant, completely loaded with fruit. On inquiry I found that upwards of 200 had "set" upon it, of which 50 were thinned out, the remaining number 150 being deemed as many as the plant was capable of bringing to perfection. Not very far from this, there stands a beautiful pyramidal specimen of the Clove, Caryophyllus aromaticus—it is about 23 feet high, and has the lower branches hanging over the edge of the tub. The Allspice Tree, Pimenta vulgaris, grows in a most luxuriant manner, and produces flowers and fruit in abundance, it is upwards of 30 feet in height; also the Nutmeg, Myristica moschata, and the Cinnamon, Cinnamomum verum, this latter is about 10 feet high. The Chocolate, Theobroma cacao, a fine specimen just coming into flower; others which we observed, were Nephelium Litchi, and Nephelium Longan, Mammea Americana, Anona Cherimolia, and the Star-apple, Jambosa vulgaris, covered with fruit, also the Jack fruit, and the Carica Papaya, the stem of the latter must be nearly a foot in diameter, and the Bambusa or Bamboo, with canes about 15 inches in circumference.

One of the most natural features in this house is the creepers; if the reader would just picture a plant of Allamanda cathartica, growing beautifully wild amongst the Palms, and along the roof, apparently unrestrained by the artistic and and order loving hand of man, covered with—I do not think I exaggerate when I say upwards of 1000 blooms, and that not for a day nor a week, but for months, he would be able to form some idea of its beauty and permanent excellence; other creepers are the Combretum purpureum and Quisqualis indica, the latter trained the whole length of the house, and flowering freely; another plant not to be passed over silently, is a fantastic and truly characteristic specimen of the Indian Rubber Tree, Ficus elastica, training itself up to the west end of the house, where it appears quite at home, sending out hundreds of gracefully hanging roots, many of which having gained the soil, were rendering considerable assistance to the old parent stem. We had almost omitted to notice the perfection in which the Musa or Banana is cultivated here. The two most fruitful varieties are Musa Cavendishii and M. maxima; the last year a bunch from the latter was exhibited at the Horticultural Society's rooms weighing no less than 133 lbs., some of the individual fruit being 11 oz. in weight, and 11 in. in length; The Collection of Orchids is both extensive and select; at the period of my visit there were several fine specimens of Calanthe veratrifolia in bloom; one had as many as 15 spikes of their pure white and delicate flowers just coming to perfection. The Peristeria elata or Dove plant was also sending up numerous spikes, and fine plants of Cattleya labiata, and C. mossiæ, in a condition which would warrant them no insignificant position on the richly decorated stages of metropolitan exhibitions. Various Oncidiums and Dendrobiums were also in bloom; and we observed a fine plant of the rare Ansellia africana, growing very luxuriantly, also large masses of Cyrtopodium, Maxillaria, &c.

The Vineries and Peach houses, by their excellent condition, gave good evidence that in the attention bestowed on the rarer tropical fruits, they were by no means forgotten. We passed through a beautiful house of Muscats, remarkable for the great regularity in size of the bunches, and the berries being far above the average standard; besides those in this range, there are two houses devoted to early forcing, which, if I mistake not, were at one period heated by polmaise—a circumstance I quite neglected to inquire into. In proceeding to the new tropical house, we passed among three ranges of span-roofed Pine pits each 60 feet by 15, and all heated by hot water in connection with one boiler. The Pines here are cultivated both on the planting out system and in pots; and under all circumstances, from the youngest to the oldest, they present a most healthy and vigorous appearance. There were numbers of very fine fruit just in admirable order for the decoration of

the desert table. A portion of one of these is fitted up as a house for the culture of Melons, of which there was a very fair crop; among other varieties nice fruit of Mr. Fleming's new hybrid. Proceeding onward we arrive at the last structure which we have to notice. This is a span-roofed house, 27 feet by 24, and 12 feet high; it was built a few years ago with a view of growing to perfection, and if possible fruiting the Bread fruit, Artocarpus incisa. This plant, as is generally known, requires a great amount of heat; it appears to suffer much if the thermometer is allowed to fall even as low as 60° in the depth of winter; so with this in view, the command of heat both terrestial and atmospheric is very great, and for so far the first of the two objects aimed at has been fully attained, as on entering, the eye is met by two noble specimens of the Bread fruit about 17 feet high, and fully 30 in circumference, branching and growing most vigourously, and judging from appearances, many years will not elapse before the production of fruit may take its place as one of the highest among the many achievements which horticultural skill has accomplished within the last few years. Besides these trees, we observed a fine young plant of the Cocoa-nut, Cocos nucifera, about 11 feet high, also the Mangostien garcinia mangostana, well branched from the ground, and as much as 12 or 14 feet in height; it was when we saw it, rather bare of foliage, but was just bursting into a very luxuriant growth. In a small and very neat glass case we noticed several pitcher plants, including Nepenthes Rafflesiano, also a new imported plant of the true Durio gibethinus— a tropical fruit of great variety in this country. From one of the supports, the Hoya imperialis was rambling as if quite at home, producing many of its large umbels of flowers, and on the back wall the Granadilla passiflora quadrangularis was fruiting freely.

Such is a brief and very imperfect sketch of this most interesting place. I much regretted that my time was so limited when I called, as I fear there are many important features that may have escaped my notice.

SIXTEENTH REPORT OF THE COMMISSIONERS OF NATIONAL EDUCATION.

The sixteenth report of the Commissioners of National Education in Ireland (for the year 1849,) presented to both houses of parliament, has been forwarded to this office, and has been lying on our table for some time; but, owing to press of business, we have not been able to give it that notice which it deserves. We now present our readers with those sections in the report which bear more directly on the model agricultural schools:—

"We have reason to be satisfied with the management of our model farm, at Glasnevin, during the past year. In our report for 1848, we referred to the enlargement of the farm, which now comprises 128 statute acres. The additional land we have recently taken rendered it necessary that the existing farm-buildings should be considerably enlarged, and that provision should be made for the accommodation of a much greater number of agricultural pupils. Upon an examination of the premises, with a view to extensive changes and improvements, it was found that, without incurring great expense; they could not be adapted to the growing wants of the establishment. We decided, therefore, after full consideration, to erect a new range of farm-buildings, upon the most modern construction, and of sufficient extent to accommodate about 100 agricultural pupils. Suitable plans and specifications have been prepared, and we have entered into a contract with an experienced builder for the erection of the buildings, which will be commenced during the summer. The estimated cost, £5,615. The existing buildings will be made available for various purposes connected with the farm.

"We are happy to state that there is an increasing desire, on the part of patrons of schools and many of the landed proprietors, to obtain admission for pupils into the Glasnevin model farm. In the year 1849, 34 pupils and agricultural teachers were admitted, and 43 remain up to the present time. A list of the total number trained since the 1st of November, 1847, to the 31st of March, 1850, and of those now under training, is given in the appendix. The pupils of the Glasnevin establishment receive literary as well as agricultural instruction. Their evenings are devoted to mental improvement, under the care of a first-class teacher, and they have access, at their leisure hours, to a select library of agricultural works. All the male teachers received into our training establishment are required to attend the daily lectures of the agriculturist, and to visit the model farm one day in each week for the purpose of seeing its practical operations.

"Our agricultural class-book, which we published in 1847, for the use of the advanced pupils attending the national schools, has had a considerable sale in Great Britain and Ireland, and has been found exceedingly valuable, especially in schools in which agricultural is combined with literary instruction. We continue to distribute amongst our teachers cheap and useful works on agricultural subjects. It is our intention to provide each of our district model schools that have farms attached to them with a collection of such publications. A "farm account-book" has been compiled by our direction, which has been introduced into our agricultural schools, and has been approved of by many eminent practical agriculturists.

"The following model agricultural schools, thirteen in number, are in full operation, and each of them is connected with an elementary national school:—Lame, country of Antrim;

Markethill, Armagh; Holywood, Down; Carrick, Fermanagh; Loughash, Tyrone; Sallybank and Belvoir, Clare; Rahan, King's County; Loughrea and Ballanikill, Galway; Kyle Park, Tipperary; Bailieborough, Cavan; and Dunmanway, Cork. The three last are under our exclusive management, and the land is vested in us. Two of them are district model schools.

Besides these model agricultural schools we have made building grants towards the erection of ten others.

"In some of these cases leases of the land have been executed, and the buildings are either in progress or about to be commenced. With regard to the others, steps have been taken towards the preparation of the leases; and in some, the plans of the farm premises have not yet been finally adopted. The following is a list of these schools:—Dunlewy, Donegal; Bath, Monaghan; Mount Trenchard and Tervoe, Limerick; Ardfinnan and Derrycastle, Tipperary; Woodstock, Kilkenny; Leitrim, Leitrim; Glandore and Farraghy, Cork.

"There are several other cases to which we had promised assistance. Our correspondence with the local parties regarding them is not closed; and it is not yet certain whether they will be in a position to avail themselves of our aid upon the conditions we now require. Several grants were cancelled, during the year, owing to the inability of the applicants to raise the requisite amount of local contributions, and from other causes.

"The following table shows the provinces in which the model agricultural schools are situated:—

Provinces.	Model agricultural schools.		
	In operation.	To be erected, or in partial operation.	Total.
Ulster	6	2	8
Munster	4	6	10
Leinster	1	1	2
Connaught	2	1	3
Total	11	10	23

"The number of our ordinary agricultural schools, to which only two or three acres of land are annexed, has increased during the past year. At the present date, there are 34 in operation, and several new applications have yet to be disposed of. The only aid they receive from us is an addition of £5 per annum to the master's salary. He pays the manager a moderate rent for the farm, and receives the amount of the produce sold. These schools are, in general, working successfully, and have furnished satisfactory proof, that literary and agricultural instruction can be practically united without counteracting or encroaching upon each other. Our inspector of agricultural schools, Dr. Kirkpatrick, has been active in the discharge of his important duties. All the existing agricultural schools have been visited by him once during the year, the majority of them twice, and several more frequently. He has also reported upon all new applications received during the year. In his general report, he observes:—"I feel gratified in expressing my strong conviction, that it is perfectly practicable, and eminently useful, to combine with the ordinary branches of a sound English education, as taught in our national schools, such an elementary course of agricultural instruction as shall prepare youths for the higher branches of agricultural science, should the opportunity of acquiring such knowledge be presented to them; and, what is still of greater moment, shall teach them to avoid those grossly defective methods of farming hitherto practised, and still in too general use throughout the greater part of Ireland."

"We give, in the subjoined table, the number of ordinary agricultural schools in each province:—

Ordinary agricultural schools.

Provinces.	No.
Ulster	12
Munster	5
Leinster	11
Connaught	6
Total	34

"We have inserted in the appendix the report of our agricultural inspector on the model and ordinary agricultural schools at present in operation. It will be seen that the system is gradually taking root, and likely to produce good fruit. Special reports have been furnished by the teachers on the agricultural schools of Loughash, Market-hill, Larne, Belvoir, Rahan, and Dunmanway. These reports, which will be found in the appendix, contain a statement of the farm accounts, of the mode of cultivation adopted, and of general results, so far as they could be ascertained.

"We have received, during the past year, a considerable number of new applications, from all parts of Ireland, for grants towards the erection of model agricultural schools. We have found it necessary to postpone our decision upon twenty of the applications, and to reconsider the conditions upon which we formerly promised grants to schools of this description.

Before stating our reasons for adopting this course, we consider it desirable to republish some of the statements contained in our former reports on the subject of agricultural instruction in our national schools.

"Our grant towards the building of a model agricultural school, upon the plan we originally proposed, did not exceed £200. The remaining proportion required for building and furnishing was required to be raised by local contribution. The expense of providing implements of husbandry, stock, and seeds, was defrayed by the local parties by whom the model schools were to be managed. We paid neither rent nor taxes for the land The only portion vested in us was the site upon which the farm-buildings have been erected.

"From information subsequently obtained, through our district inspectors and other sources, we deemed it expedient to enlarge our scheme, and came to the following conclusions, which we announced in our report for 1847:—

"'That we ought to increase our grant towards the building of model agricultural schools, with a teacher's residence, and the necessary farm-buildings attached to each, from £200 to £300, upon a local expenditure of, at least, £150. We propose that from six to eight acres of land shall be annexed to each of these schools, and the premises vested in us in our corporate capacity, for a term of at least three lives and thirty-one years. To the teachers of the model agricultural schools we propose to give a salary of, at least, £30 a year, besides a suitable residence, and accommodation for a limited number of agricultural pupils. We propose, also, that a portion of the grant shall be applied to assist in the purchase of stock, and the necessary farm implements. It is intended that the advanced boys attending model agricultural schools shall receive instruction, during school hours, in the theory of agriculture, by means of the series of books to be provided, and be required to assist, before or after school-hours, in the labour of the farm.'

"In our report for the same year it was stated that, 'although we may become instrumental in promoting the cause of agricultural education in Ireland, we feel bound to state, that we can accomplish little, unless our efforts be cordially sustained by the co-operation of the landed proprietors of the country. The agricultural schools must, in almost all cases, be erected by them, and conducted under their directions. It will be necessary for them to expend much money, and bestow constant care upon them. The salaries, training, and inspection, furnished by the state, are indispensable; but they will be unavailing if local expenditure and exertions do not supply the groundwork upon which the assistance of government is to be brought into operation."

"Referring again to the subject of model agricultural schools, in our last report, we observed, that the result of our limited experience has convinced us, that the establishment of model agricultural schools will be attended with far greater expense than was at first anticipated, either by ourselves or by local applicants. We are at present engaged in making inquiries upon this important subject, and we have submitted plans for building this description of schools to persons of practical knowledge and experience.

"We have thought it necessary to transcribe these passages from former reports, respecting model agricultural schools, in order that your excellency may be enabled to form a correct opinion of the difficulties with which we have had to contend in carrying our plan into effect, and of the reasons which have induced us, after mature deliberation, to make the important changes which it is now our duty to explain. Having made inquiry as to the description of farm buildings, suitable for farms varying in extent from eight to thirty acres, and uniting the essential requisites of economy with sufficient accommodation, we obtained various plans and specifications, which we submitted to the inspection of several persons qualified to judge of such matters. We have ascertained that the erection of farm buildings, with a literary school for 100 children, and a residence for the teacher, agriculturist, and pupil teachers, will cost from £800 to £1,000, according to the size of the farm. In this sum we do not include the cost of furniture, farm implements, and stock.

"Assuming the expense to be on an average at least £900, the largest sum that could be obtained from the applicant locality would be the half of that sum, £450. As the farm, as well as the building, will henceforth be vested in us, we shall become thereby reponsible in each case for the annual repairs, for the furniture, the rent, and taxes, the expense of maintaining the resident pupils, and for the salaries of the teachers during the continuance of the lease. The question which we had to decide upon was, whether, under these circumstances, we ought to undertake the direct management of these schools, or leave it, including as it does the appointment of teachers, the selection of apprentice pupils, and the general arrangement of all the details of school management, to the applicants themselves, as has hitherto been the case. We have resolved, after the fullest consideration, to undertake the management ourselves. Hitherto the original outlay on agricultural schools was comparatively small, and the land was not vested in our corporation. If the school did not succeed, the loss to the public was inconsiderable. We accordingly felt that we were not incurring too great a risk, and that we saved ourselves from much expense and trouble, in leaving the management of the school to the public spirit, and private interest, of the persons locally connected with it. But

now the sum that must be contributed by the board is large, and all the future cost of maintaining the buildings and carrying on the whole establishment, must devolve upon us. In consequence too, of the farm being vested in our board, the local parties, if the management were confided to them, might at any time, after suffering all things to fall into disorder, cast upon us the whole expense and responsibility of repairing the mischief. Furthermore, the school having become, from the expense incurred, and the extent of accommodation supplied, of so important a character, a mere general veto possessed by us on the appointment of the teacher would not be sufficient. It becomes necessary not only to guard against the appointment of an incompetent master, but to appoint the best that can be selected. So with regard to the choice of the apprentice pupils to be boarded in the school, if the nomination were left to the local manager, he might indeed choose fit persons, but would, perhaps, select them from his own estate exclusively, and thus entirely deprive the school district at large from partaking fairly of the benefit intended for it. Should the proprietors wish such schools to be established on their estates, and to have the direction of them, they must undertake the chief expense in erecting and carrying them on. The state will have done all that can be fairly expected from it, by placing, at considerable cost and risk, in various parts of the country the best examples it could furnish to the gentry, of the mode in which agricultural and literary instruction may be effectually combined in a country circumstanced like Ireland.

"For the purpose of carrying into effect the above views, we have adopted the following conditions upon which grants are now made to schools of this description:—

"1. The commissioners will take land, from eight to thirty acres, for the purposes of model farms, at a moderate rent, on a lease of at least three lives, or thirty-one years.

"2 The lease must contain a clause of surrender every fourth year.

"The commissioners will not commence rent, nor enter upon the land, except the portion on which the buildings are to be erected, until the 25th of March or 29th September next ensuing after the completion of the works.

"4. The commissioners will grant towards the building a sum not exceeding £400, unless in cases where they may deem it desirable to provide two school-rooms. The remaining portion of the expenditure must be locally subscribed, and the amount of local contribution must be lodged in the Bank of Ireland to the credit of the commissioners before the works are commenced.

"5. The buildings will be put up to tender; they are to be erected under the supervision of the architect to our board, or of the clerks of works; and the grants will be paid by instalments on their reports.

"6. The commissioners will furnish the dormitories and school-house.

"7. The commissioners will supply (in the first instance) the necessary stock, farm implements, seed, &c., &c.

"8. The commissioners will contribute £7 10s. towards the maintenance of each of two resident agricultural pupils; provided the pupils or their friends contribute a like sum.

"9. Where one teacher only is required, the commissioners will grant £10 a year for his services as agriculturist, in addition to his class-salary as a literary teacher.

"10. Where the farm consists of fifteen acres or upwards, the commissioners will grant salary to an agriculturist not exceeding £30 a year, and also to a literary teacher according to his class.

"11. The commissioners will require the teacher or agriculturist to pay a moderate rent for the land, and all taxes, rates, &c., allowing him the profits arising from the farm. They will also require him to enter into arrangements for keeping up the supply of stock, implements, &c., &c., and for providing for permanent repairs.

"12. The agriculturist will be required to conduct the operations of the farm according to the directions of the agricultural inspector, and must furnish accounts in the form prescribed by the commissioners. He must also submit annually to the board, to be laid before parliament, a statement of the working and progress of the farm during the past year.

"The commissioners, in consideration of the large amount of expenditure incurred by them, and the land being vested in them, deem it indispensible that they shall have the exclusive management of the model agricultural schools; the right of appointing and removing the teachers and resident agricultural pupils; the latter to be selected from among the pupils of the national schools in the district in which the model agricultural school is situated.

"We have heard, with much surprise, that an impression exists in many quarters that our agricultural schools will have an injurious effect, in confirming the practice of small farming amongst the people of Ireland. Instead of multiplying agricultural schools, with small farms attached to them, we ought, it has been said, to have expended the money placed in our hands by parliament for agricultural instruction, in the establishment of a few great agricultural schools, with extensive farms connected with them. To this we answer, that our intention in combining agricultural and literary instruction in the national schools, is to teach the masters and pupils agriculture *generally*, without reference to the extent of the farms in the cultivation of which they hereafter be employed. The

course of agricultural instruction which we are desirous of providing for the labouring classes in Ireland is equally needed by all farmers, and alike applicable to *large* and small farmers. Furthermore, a large portion of our expenditure under the agricultural department is incurred on our model farm at Glasnevin, which, instead of being a small farm, is, under the circumstances of Ireland, a large one, consisting, as we have said, of 128 statute acres. Upon this farm all the national teachers who, to the number of 200, are yearly trained by us, have an opportunity of seeing reduced to practice those principles of improved agriculture which the agriculturist, in his daily lectures, explains to them. In addition to this, the pupils and teachers specially trained in agriculture, at Glasnevin, are there fully instructed in the theory of agriculture, are engaged in daily labour on the land, and see exhibited there as good a specimen as can be furnished by us of the manner in which a large farm ought to be conducted. The number of these pupils and teachers is at present nearly 50, and will soon be 100. The agricultural pupils, who, as well as the teachers, are boarded and lodged by the commissioners, are selected impartially from the most deserving of all the pupils in the several agricultural schools in Ireland. These little endowments form, in fact, so many agricultural scholarships, and are calculated to furnish one of the most useful bounties upon agricultural education throughout the national schools. We might, doubtless, have proposed to expend the fund placed at our disposal, upon the establishment, throughout the several provinces of Ireland, of a few large model farms, similar to that at Glasnevin. Instead of doing so, we have, on the fullest consideration, greatly preferred the establishment of a large number of agricultural schools in all quarters, with farms annexed, which as they must be managed by the teachers of the respective national schools, must necessarily be small, and will probably vary from 3 to 30 acres. The question is, which of these two courses is the one which if adopted by the state, will most encourage the advancement of agricultural prosperity in Ireland. We feel confident that the course which we have adopted is a judicious one. It may be most desirable that large model farms should be established by the state, or by societies, in various parts of Ireland; but we are of opinion that the chief good that can be effected by us, in the way of agricultural improvement, is by blending, in as many of our 4,500 schools as possible, instruction in agriculture and daily occupation in agriculture, with the literary instruction already given in those schools. Should the plan proposed by us be largely adopted throughout Ireland, improved agricultural knowledge and skill will be diffused throughout every part of the country, and throughout the whole mass of the rural population. The boy taught in one of those schools will be enabled, in after life, to contribute his full share to the agricultural prosperity of the country, whether his vocation be that of a farm labourer, a small farmer, or a large farmer. He will, from his childhood, be taught to labour on the land, and to labour skilfully; to see displayed the rotation of crops, the application of manures, the management of cattle, the art of trenching and draining land. Every habit thus acquired by him, every kind of agricultural knowledge thus conveyed to him upon the limited farm of the teacher, will be equally serviceable to him, should he in after life become a large farmer, or if he never rise above the condition of a cottier.

On reference to the tables it will be perceived, that the richer and more enlightened provinces of Leinster and Ulster have, of ordinary agricultural schools, in the former, twice the number that are in Connaught, and in Leinster more than twice the number of those in Munster. Now, Connaught and Munster being the provinces most in need of instruction and encouragement—being also the districts most steeped in misery and destitution, should, in our humble opinion, be the districts that should more particularly engage the attention of the commissioners. We trust that this proportion will not hold much longer, and that the united exertions, energies, and the large means placed by the country at the disposal of the commissioners, shall be exercised for the next year in reversing the proportion, withholding from those less in need, and extending to those in absolute destitution, till the number of ordinary agricultural schools (in which we place the most reliance) shall at least double the numbers in the favoured provinces of Leinster and Ulster. We are also of opinion, that as money is of greater value in those poor provinces of Munster and Connaught, that the scale of local subscriptions should be reduced much below that which may be fairly exacted where the value of money is much less; in other words, the scale of local subscriptions should be in proportion to the money value of land and agricultural produce, as we think it preposterous to exact the same sums in districts where land is to be had for much less than 10s. the acre, as may be in districts where land brings 30s. and upwards. Unless some such modification as the above takes place, we much fear that Munster and Connaught, so capable of improvement, and the necessity of developing their resources so universally acknowledged, shall still remain in the back ground.

We trust that Dr. Kirkpatrick, whose exertions in the cause of agricultural improvement are so well known to the public, and whose position as chief inspector of National Schools in Ireland, must make him conversant with the facts we have stated, will lose no opportunity in recommending to the board those suggestions which we now deem in our duty to make.

ON THE ADVANTAGE OF GREEN CROPS TO A FARM.

In travelling to various parts of England, I have remarked how varied are the systems of culture, and the succession of crops. In one part I have seen more than half the land under the green sward, as the red marl district of Leicestershire. In another part I find no green sward but what comes under a rotation of cropping, or Down Land, such as the Cotteswold and Chalk hills.

In Cornwall I observed, some years ago, that the old cultivators continued to crop the ground with *cereals*, until it could produce no longer, and then it was put down in grass to rest; that is, by sowing amongst the crop of oats, grass seed, perhaps swept out of hay-lofts, with all manner of weed-seed. In this state it lay for three or four years, until it became so mossy and weedy that it would no longer produce grass; then it was broken up for wheat, by a process which, to us of the eastern part of England, was unique. A granite stone roller, about five feet long and 12 inches diameter, had steel edges or cutters fixed at every six inches of its length, projecting from the surface of the stone about three inches; this instrument was run over the grass- and one way across, and ploughed the other way; thus was the surface of grass cut into small squares, and thrown up roughly to rot; after which it was (during the early autumn) buried for wheat or other corn. The farmers of Cornwall are fast passing into a superior system, and no longer is there need for clauses in their leases restraining them from taking more than three crops of corn in succession.—(*See Journal of Royal Agricultural Society*, vol. 6, part 2, page 434.)

The subject towards which every system of culture should have tendency is, that of making the earth produce the greatest amount of return from the smallest possible expense; therefore the endeavour should be to extract from the soil a food for some variety of animal or other, and endeavour at the same time to increase permanent fertility. This only is to be done by leaving something behind, beyond what we take out of the soil; therefore, either more must be put on the surface, in the shape of manures, for the succeeding crop than it requires, or a portion of the crop must be left on the ground to constitute a pabulum for future crops, so to form a vegetable humus in the soil. This humus is the blackened material which is found in the pan under the usual tillage, and is the result of culture and manurings. The same humus is shewn by the blackened fertile soil of old garden grounds.

The object, then, of a proper succession of crops is, that a something should be left behind from each crop, which shall be of service to a succeeding one, and not to call on the soil to yield in succession the same valuable materials that are detracted by a crop of wheat which crop is, in all places, considered as the great desideratum. Green crops, therefore, when consumed on the land, are highly fertilizing operations; and at the same time, if the green crop is such an article that is suitable, so the animal reared or fatted on it, is sure to be highly remunerative as a marketable return. Tares, clover, turnips, &c., fed on the ground, will be charging the soil with a pabulum for future crops; and, after either of these expenditures, wheat may follow with propriety; and if these crops are only half consumed by the animals, (there being plenty of food on the farm) the advantage of ploughing in the half-consumed vegetable will be felt in the succeeding crop, for then, what is left will not have had detracted from it that portion which would have gone to constitute blood, flesh, bone, &c., in the animal that might have consumed the same.

Assertions are sometimes made by farmers, that to save a second crop of broad clover for seed will be more enriching to the land than if cut before it is ripe; that forming seed does not detract from the land; but the contrary is the fact. Producing seed is, in every case, the most exhausting of particular matters to the soil; but when this practice is set in comparison with other parts of the same field that had been cut green for foddering stock at home, it is likely that the appearance of the succeeding crop may be in favour of where the seed has been saved; for in such instances, the crop remaining on the land for a longer period, the plants lose most of their leaves, which fall to the ground as a nourisher; whereas, where the clover has been cut green, all has been cleaned away from the land. Leaves of most plants generally contain a very considerable portion of the inorganic fertilizers.

One of the greatest benefits to be derived from a proper succession of green crops, is the aid which the tap-rooted plants afford, by penetrating beneath the hard pan into the subsoil, there extracting and bringing up from a depth below fertilizing matters that may be deficient at the surface. These, as food to the plants, are most likely to be the aqueous particles that hold solvent in them various portions of alkalies and acids, phosphates and carbonates; and these matters are deposited on the surface at every fall of the leaf, combined with the solidified parts of air and water. Turnips, mangel wurzel, and other broad leaved plants that successively deposit their lower leaves, are enriching the surface with much organic and inorganic matters, which constitute their bulk; and this they do even if the bulbs and tubers are carried from off the land at an early period, when they have scarcely done increasing in bulk.

On referring to the analysis handed to us by Sprengel, I find that all broad-leaved plants take up from the soil much more of the fixed

ingredients than do the farinaceous crops that have narrow leaves. Cabbage, beet-root, Swede turnips, &c., take up double the quantity that would be extracted by a crop of wheat; hence the advantages of leaving the produce from these crops on the ground, and in particular their foliage.

I am aware of several arid soils in England and on the continent of Europe, which when first taken possession of by man, were not fit for agricultural purposes; but on their being planted with trees of various kinds that yearly shed their leaves, the ground has become lightly enriched for many crops that require the alkalies and carbonaceous matters to build up their structure: the alkalies having been obtained from below by aid of the roots, and carbon supplied from the carbonic acid which is solvent in the air.

The green corps on a farm must be made in proportion to the corn crops that are to be consumed. High farming may be denominated such a system that the principal part of the produce is consumed on the land, the wheat being the only crop of grain sent to market. The hay, straw, and green crops are best sent to market on four legs, in the shape of reared or fattened animals: these, according to the late prices of animal produce, have answered the best purpose for those farmers who could adopt it, and in particular those who could breed and rear their own stock; and for the land, such practices will at all times make that in the best condition.

Experience has taught the farmer, whenever he can spare a green crop, (it not being wanted for his animals) if the crop is rolled down before it obtains its full growth, and ploughed into the soil, that it is a great enricher of the same for succeeding produce. By this act, not only are all the inorganic matters deposited, but also a mass of organic in the shape of the solidifind ingredients of air and water. Vetches, buckwheat, rape, &c., may, with great success, be often ploughed into the soil for a succeeding and more valuable crop. Mere casualties have often proved to farmers certain facts; for instance, turnips have been fed off by sheep on one part of a field, and in the other part of the same field the like quantity of turnips have been rotted by winter frosts and then ploughed in for a second crop of Lent corn: it has always been the most superior in that part where the rotting had taken place, for this obvious reason, viz. that no part of the crop has been carried away in the shape of bone, flesh, and blood, but all, organic and inorganic, had been buried for the service of the succeeding crop.

On referring to ancient works of agriculture, it could be proved that the Roman nation were well aware that a judicious succession of crops was necessary, and that several corn crops ought not to succeed each other. Pliny informs us, that the Romans were conscious of the utility of alternating leguminous with farinaceous crops, the farmer acting as restoratives to the land, while the latter were exhausting ones. By burying vegetable matters in the soil, they give out their gases progressively as decomposition proceeds; thus the process acts as an aration of the soil, imparting warmth, and charging it with the gases obtainable from the air in the process of fallowing. A rotation of cropping may, therefore be adopted, by means of which the practice of fallowing may be totally discarded seeing that the foulest land may by cleaned of its rubbish by the horse and hand-hoe husbandry.

In confirmation of the view I have taken of the benefits to be derived from green crops, and of having one of these succeed between each of the cereals, I would quote the practice of Mr. Morton, on Lord Ducie's model farm, in Gloucestershire, where he is able to grow wheat with success every alternate year, half of all the arable land being occupied with the grain—this grain being chosen for the experiment, because it is the most remunerating one; and yet the land is not by any means exhausted, as is shown by the increasing yearly produce, the average of the farm being often about five qrs. per acre.

The practice of Mr. Morton is to vary the green crops, so that clover, for instance, should not be repeated on the same spot oftener than every tenth year; and this he is enabled to do by having five varied green crops, taking their places in succession one after the other regularly. I am not quite sure of the order of this succession, but it is sometimes after the following with respect to the green crops.

The manuring is of course ordered in such a scientific manner, that it shall supply the exhausting matters that are abstracted from the land. The soil of the farm is of a varied rocky character, a part being on the mountain limestone, other portions on the magnesian limestone, and another on the grit of the old red sand, or Silurian district.

THE ORDER OF CROPPING IS:—

1st and 2nd.....wheat succeeded by clover.
3rd and 4th.....wheat succeeded by carrots or parsnips.
5th and 6th.....wheat succeeded by vetches or peas.
7th and 8th.....wheat succeeded by turnips or Swedes.
9th and 10th.....wheat succeeded by beans.
11th and 12th.....wheat succeeded by clover.

By the above order of succession, it will be seen that a tap-rooted crop succeeds a green crop, that has its nourishment more particularly from the surface soil. It will also be evident that for the above order, it is necessary there should be ten enclosures or plots of about equal sizes. The success of this culture may, in part, be ascribed to the first spirited outlay on the land by his lordship in remodelling the farm, cutting down all the timber, under-draining, subsoil ploughing, new division fences made parallel with one another, and formed into

squares of about ten acres, each according to the fall of the ground—the ditches being kept open, and no wood allowed in the hedges to grow, to constitute a shade to the ground.

ON THE FOOD OF PLANTS.

If the substances of which we speak are only to be regarded as excretions, or as an attempt made by the organs to relieve themselves of useless matter, it becomes necessary to explain how it happens that potash and soda, added to a soil deficient in alkalies, so powerfully assist vegetation. We can only understand the action of these substances, by supposing them capable of supplying an element necessary to the growth of vegetation, and perhaps they also in some way or other assist the chemical changes which are going on in the interior of the plant.

For certain plants it is necessary to admit the value of chalk or lime; and the importance of gypsum to certain of our cultivated plants, is also sufficiently well known to prevent it from being considered a substance to which they are indifferent. If it be also considered that silica, alumina, phosphoric acid, oxalic acid, &c., are not deposited indifferently in all portions of the plant, but in certain special determinate organs; that there is, therefore, on the part of these organs, a certain power of choice—a vital action, which enables them to separate those substances from the sap which they require, to the exclusion of others—it is difficult to assign any other reason for this well known arrangement, except that nature has prepared a special place for each of these substances, and has assigned them certain determined functions in the formation of the vegetable tissues.

These reflections conduct us to the conclusion that a great number of the earthy and alkaline substances, carried by the current of the sap into the circulation, are useful to vegetation, by giving them their full vigour, their proper size, and their diversified properties. We do not yet pretend to be able to assign to each one of these various substances its particular function in accomplishing these important ends. It may, perchance, be shown at some future time, that certain compounds are absorbed and assimilated by plants in the state in which they exist already in the soil, or in the manure. The science of vegetable chemistry is yet far short of perfection, and holds out the most brilliant results to those possessed of industry and skill necessary to investigate this difficult subject.

After having thus settled the first question proposed, another one arises—Do all plants make a similar consumption of the soluble materials present in the soil, or have they the power of selecting those most suitable to their wants? In a word, do the different species of plants require, each a different nutriment?

Plants even when grown in the same soil do not draw up a sap exactly identical. Saussure has proved in the most positive manner that the roots have the power of selection, though his experiments on the unequal absorption of different salts are not quite satisfactory; for instance, sulphate of copper, though soon causing the death of the plant, is absorbed in as large quantities as any of these compounds which are beneficial to vegetation. Saussure explains this anomaly by showing that in the case of the sulphate of copper, the roots were decomposed, and consequently, except at the commencement of the experiment, only acted mechanically. It was well ascertained that the substances present in any solution were absorbed in very different proportions where their substances were not, like the sulphate of copper, positively injurious—for instance, *Bidens* (bur-marygold ?), *Polygonum* (buckwheat?), absorbed the salts in the following proportions:—

	Bidens.		Polygonum.
Chloride potassium	16	...	14 7
Chloride sodium	15	...	13 0
Nitrate of lime	8	...	4 0
Sulphate of soda	10	...	14 4
Muriate of ammonia	17	...	12 0
Acetate of lime	18	...	8·0
Sulphate of copper	48	...	47 0
Gum	32	...	9 0
Sugar	8	...	29 0
Humus (*extrait de terreau*)	6	...	5·0

These experiments were repeated with the greatest care, and it was proved—1st, That plants absorbed all mineral substances when dissolved in water: 2nd, That they were absorbed in very different proportions, according to the plant experimented on; this absorption was also quite irrespective of the fluidity of the solution: and 3rd, That organic matter, when dissolved in water, is not in that shape absorbed by the roots, but decomposed by their influence, and then partially absorbed.

1. Without entering into the minute details of the experiments, the absorption of the following substances was proved—prussiate of potash, chloride of sodium, sulphate of copper, acetate of lead, chloride of barium, ioduret of potassium, and many others. The absorption of nitrate of silver, corrosive sublimate, and gallic acid, did not take place until after the death of that portion of the plant plunged into their solution.

2. When the plants were placed in a solution containing two salts in equal proportion, it was satisfactorily ascertained that they were absorbed in different proportions. Even when the salts were present in different proportions, this elective absorption was not deranged. In a solution containing three times as much common salt as nitre, a plant of *Chenopodium viride* (Goosefoot) absorbed much more nitre than common salt; whilst the contrary took place with *Solanum lycopersicum* (Nightshade). Other plants selected also common salt, and the *Tamarix* choose only sulphate of magnesia.

3. It was also ascertained that, when a plant

was placed in a solution of fermenting manure, the disagreeable smell, which has been previously emitted, gradually disappeared.

If these experiments have not quite settled the question, they have at least strengthened the opinion that plants appropriate to themselves soluble substances in very different proportions. Chemical analysis of different plants grown on the same soil, also completely establishes this proposition. With regard to the oxygen, carbon, hydrogen, and nitrogen, chemical analysis has also proved that they are present in plants in proportions varying with the species, but agreeing very closely in the same plant. Analysis has also most clearly established the great diversity of the proportions in which different plants assimilate the alkaline and earths. For example, some plants will be found to contain common salt in large quantities, whilst wheat grown on the same soil will contain none. Other plants again, as the wall pellitory, the nettle, and borage, will be found to contain nitrates in large quantities, though they may be grown alongside of plants containing none at all. It seems, therefore impossible to avoid the conclusion that plants possess the property of choosing, or at least of retaining, certain substances in preference to others, and, consequently, that different plants require different food.

But this opinion does not rest on the authority of chemical analysis alone; it is confirmed by the experience of agriculturists. For instance, it is known that certain manures seem especially to favour the growth of certain plants—as gypsum for clover—that certain plants only thrive on soils where they can obtain an abundant supply of special ingredient, as the fern and the chestnut, on soils rich in potash, of such as are derived from slate rocks, and those of volcanic origin; that a mixed husbandry is the most productive; that a plantation containing a variety of trees produces more wood than if one species alone had been planted. These multiplied facts prove that it is not a certain quantity of a nutritive principle, but a choice amongst several that is necessary to vegetation.

Researches respecting the Food most suitable to different Plants.

The difficulties which are encountered in attempting to settle the general question becomes still more serious as the attempt is made to descend from general to particular cases.

It is rarely that an opportunity occurs which enables us to decide upon the effect of such or such a manure upon plants. To do this with certainty the substances tried must be in a state of chemical purity; and as plants are composed of a great number of different substances, it would be necessary to try each one of these separately, and to observe the effect of their application, and of the want of them—an admirable subject for the study of those who are ambitious to establish on sure grounds the principles of scientific agriculture. The long and difficult experiments necessary for this purpose have as yet hardly been commenced, and our knowledge of this important subject is as yet merely empirical. But the information we already possess must not be despised because it has not as yet arrived at the perfect solution of the question, especially as the benefit of certain mixed manures to certain plants is well known. In addition to the examples quoted in a former part of this paper, the benefits of lime to cereals, and of the sulphates to leguminous and cruciferous plants, are well known. But the very limited number of instances we can quote, is a significant proof of the state of our knowledge. The most of manures used contain a great number of the elements of vegetation, and it is difficult to distinguish what each plant carries off, and what is left for future crops.

In the mean time, until the experimental application of different manures shall have pointed out what is most suitable to the plant we wish to cultivate, we have no other guide than chemical analysis, or examination of the quantity of nitrogen, carbon, and mineral matter present in the ashes of the plant. Such an analysis shows us the substances which a plant has absorbed. But it is only after having submitted the growing vegetable to an experimental test, that the effect of these various nutritive matters, and the theory of vegetable food, can be established on a settled basis. When we shall have arrived at results from the combination of these two methods, first ascertaining by *analysis* the materials, and thus satisfactorily ascertaining their individual effect,, the science will then be perfect.—*Farmers Magazine.*

ON THE FOOD OF PLANTS.

If we imagine a soil properly pulverized, and yet retaining such a degree of firmness and consistency as to give a secure hold to the roots, a plant situated in it will find a matrix at fluence, and also to supply the moisture necessary for the wants of the plant. But if the mineral ingredients of such a soil are insoluble and fixed (as it is expressed in chemical phraseology), a plant will certainly live in such a situation by deriving much of the food it requires from the atmosphere. But vegetation, in such a situation, and under such circumstances, will not suffice for the farmer. It is only by means of certain soluble ingredients in the soil that this normal state is attained; and if the soil does not contain these soluble substances, or does not contain them in sufficient quantities, it then becomes our business to supply them. These supplementary substances (if the expression may be allowed), this sustenance for the plants, to which the name of "manures," or "stimulants," have been given, according to the point of view under which they are contemplated, is therefore an

important subject for study. After having given the plant a suitable dwelling-place, we must also supply it with suitable food; in this respect plants resemble animals. But, in order to understand what we are about, it may be advisable briefly to recapitulate the principles of vegetable physiology on which this doctrine is based.

If we call to mind the mechanism of vegetation, we find that water, containing various substances in solution, penetrates by endosmose into the roots, rises from thence by capillary attraction under the bark, where it is called *sap*. When it reaches the leaves a portion is removed by evaporation, and the solution, of course, becomes more condensed. Under the action of air and light, the free carbonic acid it contains is decomposed—carbon is fixed in the plant, and oxygen given off into the air. During the night, on the contrary, the oxygen of the air is absorbed by the leaves, combined with the carbonaceous elements of the sap, to be again decomposed at the return of light. The solid matters present in the sap are deposited, according to their special natures, round the cellular vessels, or on the surface of the leaves, or at certain determinate parts of the structure; the superfluous or injurious matter being carried off by the descending sap, and eliminated from the roots as excrement.

It is unnecessary to follow the sap through the various changes its elements undergo—the successive changes by which sugar, mucilage, gluten, albumen, and the various vegetable acids are formed; this part of the subject belongs to vegetable physiology.

All soluble matters within their reach being absorbed by plants (a fact well ascertained, even in the case of virulent poisons), which of these substances are so essential to vegetation that plants in general cannot be deprived of them without suffering? And, in the second place, do certain kinds require certain substances to be present in the soil, which are not absolutely necessary to others? In a word, is there in vegetables a universal food, so to speak, or does each plant require a special one? These are the questions which we have to examine.

1st. *The food necessary for all vegetables.*

The attempt has often been made to ascertain, by experiment, the substances essential to vegetation, or those by means of which the vegetable can live and grow, though deprived of all others. It has, at least, been ascertained that a plant cannot live without oxygen and carbonic acid. In an atmosphere deprived of moisture a plant will not live; water is, therefore, also indispensable, not only on account of its solvent powers, but also because its elements enter into the formation of many of the products of vegetation. As for carbonic acid, that which is absorbed by the leaves, though sufficient to support life, does not appear to be enough to secure the full development of plants, as the following experiment (which also goes to prove the importance of vegetable matter in the soil) will satisfactorily show.

Two boxes were taken, the one containing soil calcined, so as to destroy all organic matter; the second contained soil in its natural state. In both a few grains of peas were sown, and it was observed that the plants in the former were much less vigorous than those in the natural soil. Upon examination, the first contained 46 of its weight, and the second 57, or rather more than half its weight of carbon. This difference was, undoubtedly, owing to the carbon present in the second box.

In all the experiments which have been made, none have, as yet, been undertaken under such circumstances as to exclude nitrogen in its simple form, so that we cannot speak positively as to its importance. But as it is universally present in the form of ammonia, and as it enters largely into all the more important vegetable products, we may safely affirm that nitrogen is requisite for plants.

Thus oxygen, water, carbonic acid and nitrogen, are the primary and indispensable elements of vegetation. Their action is undoubtedly assisted by the important agents, heat and light, and in all probability by electricity.

Chemical analysis demonstrates the justice of this conclusion. Amongst a great number of substances, varying with the species, and climate, and the soil, these important ingredients are always present. They exist in the form of starch, gum, sugar, manisite, ulmic, gallic, acetic, malic, citric, and other acids, and neutral substances. In a word, they form the basis of the almost endless variety of organic compounds which modern chemistry has brought to light.

2nd. *The special food of vegetation.*

It might have been thought that the above mentioned substances would have sufficed to give stability and solidity to plants, especially as carbon forms such a large proportion of the vegetable tissues. If even this had been possible, the framework of a plant is not exclusively composed of carbon, certain alkaline and earthy matters being always found to be present along with the organic portion of vegetation. The difficulty exists in the varying proportion in which these alkaline and earthy substances are found, not only in different plants, but in even the same species when grown upon different soils. They are, to a certain extent, interchangeable amongst each other, so that it is difficult or impossible to say which of them are absolutely indispensable to vegetation. It is even possible to imagine a plant *existing* without any of them, in the same way as a mammiferous animal may live after all the solid portions of the bones have been removed. In both

cases, though life might be maintained, neither the animal nor the plant could fulfil their destined uses. Besides the materials necessary to support life, as oxygen, water, carbon, &c., there are, therefore, others, which though of less importance, are necessary to enable plants, as well as animals, to arrive at full perfection. It is, therefore, of importance to ascertain how these are introduced into vegetation.

The plant lives and grows by absorbing into its substance the various gaseous elements that exist in the atmosphere and the soil. The water absorbed by the roots contains, in solution, a considerable quantity of the alkalies and earth: drawn upwards towards the extremities of the plant, this solution is evaporated by the leaves. The various solid matters which are thus introduced, after passing through a great number of chemical changes, are are then by the flow of the sap dispersed over the plant. Are we, then, to consider these substances as excretions which the vitality of the plant is able to carry no further, or are they essential to the organization of ths plant?

ON THE FECUNDITY OF ANIMALS.

"I see a mighty arm, by man unseen,
Resistless, not to be control'd, that guides,
In solitude of unshar'd energies,
All these thy ceasely miracles, O world!"

C. LAMBE.

——ubi temperiem sumsere humorque calorque
Concipiunt: et ab his oriuntur cuncta duobus.

OVID MET., lib. 1., fab. xi., 15.

SIR.—It must give us a very exalted idea of the wisdom and goodness of Divine Providence, if we contemplate how regularly all animals come into existence at the time when the food most requisite for their nourishment is in perfection, or that which supplies their parents with food for them till they are able to provide for themselves. Though the periods of gestation and seasons of love differ considerably among the quadrupeds that feed upon grass, however, the females uniformly bring forth in the latter end of Spring, or in the beginning of Summer when the herbage is tender and luxuriant. The mare brings forth her young in May, after eleven months' gestation. Sheep and goats come in season in the end of October, or the first days of November, and five months after produce, when the grass begins to spring—though the times of gestation are the same in all latitudes, the seasons of love and time of delivery vary with the climate; for instance, in Italy, sheep conceive in June or July, and bring forth in November or December, when the grass in that country is in its greatest perfection, it being burnt up in April, and sheep having nothing to browze on then but shrubs. Beavers copulate about the end of Autumn, and bring forth in January when their storehouses are full of provisions. Birds come forth when the food they delight in is most abundant. Caterpillars of every kind are never hatched till the leaves they feed upon have grown. The very number of the teats in most of the *mammalia* are the same species, and if they be more or less, it is for some wise purpose: thus, the cow has four milk-paps, and, generally only one calf, but Providence designed the superfluous supply for the good of the human family. The sow has 12 teats, though she often brings forth more than twelve young, but the surplus is also destined for the good of man; and I may observe, with Pliny, that of all meat pork is the most savoury; "there may be distinguished in it," says he, "up to fifty relishes." It is also very abundant; for in every country, as Bermardin remarks, "that which is best is always most common." I often wonder that when there are so many plants and animals exhibiting harmonies and proportions so beautiful, and proofs so evident of a Divine benevolence, that people should collect or preserve shapeless abortions, or monsters; such sights are sufficient to awaken in young minds doubts respecting the intelligence of their Author: "and show as much want of taste and unfairness in their collectors, as in one who should go into the workshop of a founder, and pick up the figures which had been accidentally mutilated—the bubblings over the melting pot, and the mere metallic moulds, which might lie scattered about, and triumphantly display them, as a proof of the artist's blundering ignorance. The ancients burnt their monsters, but we preserve them in spirits of wine. We resemble ungracious children, who watch their mother in the hope of surprising her in a fault, that they may arrogate to themselves a right to do what they please."—*See Dr. Hunter's Translation of St. Pierre's Studies of Nature.* vol. i. p. 217.

But I will not dwell on this subject; my design at present is, to lay before your readers a table of the ages at which the males of domestic animals are fittest to engender, and the females to produce their young; the number of years they continue fruitful; their periods of gestation, &c.; according to the results of observations made by the best ancient and modern naturalists.

Some of the above results, according to many writers do not answer this country. For example. they say that July is too late for the copulation of the cow, and that June would answer better, in order to have calves and milk earlier in the year. However, this depends greatly on the season, the growth of grass, or the purpose for which cows are kept, whether for dairy or domestic uses. In the latter respect, it is justly said, that "Milk never comes out of season."

For Leicester and Cheviot ewes, October is a good month to admit the tup. The number of years that cows and bulls continue fruitful might be extended two or three years beyond that given in the table, especially in the valuable breeds.

From observations, made by Lord Spencer, on

the periods of gestation of 764 cows, it appears that 220 days was the shortest time at which a live calf was produced—313 the longest; but none lived that were born earlier than 242 days; 314 cows calved before the 284th day; 310 after the 285th day. So the cow may be said to go 284 or 285 days, according to his remarks.

M. Teissier records the following results from his notes on the gestation of the cow, viz;—

21 calved between the 240th and 270th day, the mean time being 259¼.

544 calved between the 270th and 299th day, the mean time being 282.

10 calved between the 299th and 321st day, the mean time being 303.

Therefore according to him, between 9 and 10 months may be assumed as the usual period, though with bull calves cows go generally about 41 weeks—some days less with heifer calves. Mr. C, Hillyard, of Northampton, allows 9 calendar months and 9 days for a cow; 20 weeks for a ewe; 16 weeks for a sow; and 11 months for a mare. The males of all animals (hares excepted) are larger than the females, more especially if they be castrated. Twins are now more frequent than they have been formerly.

BONE-PREPARATION FOR MANURE.—There are three processes now in use for reducing bones to the crumbly or powdery state fit for manure: 1. Grinding, by which the harder parts are not often reduced much within a quarter of an inch in diameter: 2. Mr. Blackhall's steaming process, by which they are rendered tender and porous, and particularly suited for the action of acid to make the superphosphate. 3. Fermentation in heaps, with earth, sand, or saw-dust, introduced by Mr. Pusey, wherein ammonia being generated the bone acquires some of the qualities of guano; but is rendered unfit for the action of acids, which ammonia would neutralize. It becomes, then, an interesting question which of the three is the most practically effective and eligible. Mr. Pusey's has the advantage of requiring no apparatus, and no great skill; so that it may done by almost any farmer at home; if the waste of ammonia is duly prevented, it will have the effect of a mixture of bone-dust and guano—a result of some value, now that guano is so much in demand, and so largely adulterated. Mr. Blackhall's product is the neatest, and as fit for the action of the acids in the soil as of the sulphuric above mentioned. But how it competes in point of economy with the old process of grinding; how the fermented bone competes with the superphospate in fertilizing power; and how three kinds, crushed, steamed, and fermented, compete in cost and effect, without addition of acid, are questions on which light may be thrown by successive reports of the experiments now in progress in England, Scotland, and Ireland; likewise, if the experimenters will favour us with such reports from time to time.—J. PRIDEAUX.

CARROTS.—In the autumn of 1848 I selected a border in the garden, and dug it as deep as possible, and covered it with sand and leaf mould, to the depth of ten inches, and then trenched it up, so as to mix the soil with the sand. At four different times in the autumn I gave it a complete soaking of liquid manure, viz., cattle's urine. In the spring I put on a sprinkling of wood ashes, and pointed it lightly in. I sowed it with Altringham Carrot seed on the 14th of April, 1849. After they were well brairded I used nitrate of soda, and urine, three times in the course of their growth, and in the following October I lifted a beautiful crop quite free from disease. This year I have a crop almost free from wireworm. They were sown on the 23rd March, on the same land as last year, and treated in the same manner. In the autumn I tried a part of the land with dung manure, in order that I might see if it would produce as healthy a crop as that treated in the other manner, but they mostly failed.

In my own opinion the land should be made very strong with liquid manure, previous to putting in the crop, so as to make the Carrots rush quickly up.

ALEXANDER G. CUNNINGHAM.
Rosebank, near Currie.

THE DUST OF DEAD MEN'S GRAVES.

BY EMILY VARNDELL.

The ashes of the smouldering oak
To men no hist'ry tell
Of how in by-gone years it grew
Luxuriant and well.

They speak not of the cummer breeze
That through its branches strayed,
When lowing herds and fleecy flocks
Reclined beneath its shade;

Nor state they how the woodman came
And cast a glance around,
Beheld the monarch of the field,
And felled it to the ground.

So, too, the dust of dead mens' graves,
How voiceless and how mute;
How all unknown its ancient fame,
Its credit and repute;

The dust within the lone church aisle
The sexton sweeps away,
Was it of Prince or Peasant born
In life's momentous day?

The whirlwind wafts it mid the tombs,
Nor canst thou tell—Oh; man—
Which is the fine patrician flour,
Which the plebeian bran.

August 21, 1850.

Agricultural Journal

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, OCTOBER, 1850.

We have been at the Agricultural Exhibition which took place at Niagara on the 18th, 19th and 20th of September last, and were highly gratified at having an opportunity of seeing an exhibition of numerous specimens of the agricultural and industrial productions of Western Canada. These specimens were very creditable to that fine portion of the Province and afforded ample proof of the capabilities of the country, and of the skill and industry of its inhabitants to make the most of their advantages. The exhibition of neat-cattle, sheep, and swine was good. Of the first there were several varieties, Durham, Devon, Hereford, Ayrshire, and what was termed "Grade Cattle." There were several specimens, both male and female, of each of these breeds, proving that Western Canada has already at her disposal the means of improving the stock of neat-cattle. The sheep were excellent and of the most approved breeds, including Leinster, South-Down, Merinos and mixed breeds. The swine were of many breeds and crosses, but upon the whole were very good. When good breeds of neat-cattle, sheep and swine are already in the country there cannot exist any difficulty of improving the stock of the country, and in a very short period, particularly so far as regards sheep and swine, that increase so rapidly. The horses, although of large size, were not of that description that we would prefer for agricultural purposes. A sufficient size, and strength, may be combined in horses, with lightness, and activity. The great heavy horses that are employed in England in the waggon and dray, are not the most suitable for Canada. Smart, active horses, of moderate size, will answer best for almost every purpose on a farm. What is known as the "Canadian horse" of Lower Canada when of sufficient size, cannot be excelled for agricultural purposes, by any horses we have ever seen on this continent. They are strong, active, and enduring, and not so liable to diseases as other breeds of horses, indeed they appear to be the breed exactly suited for farmers in Canada, so far as we are capable of judging. The samples of wheat exhibited were excellent, but of other grain we did not see any that were of extra quality. The specimens of roots and vegetables, were of fair quality, but certainly not equal to samples we have seen in Eastern Canada. Of fruits, with the exception of peaches, we have no doubt that we can show as good, the produce of Lower Canada, as any exhibited at Niagara. There was a good show of Agricultural Implements manufactured in Upper Canada, and from the United States. Those manufactured in Canada were generally superior to those from the United States. We were rejoiced to see so good a show of Implements, the manufacture of Upper Canada. It is most desirable that such manufactures should be encouraged by every farmer in the country, who should not purchase a single implement of foreign manufacture, if they could be had and of home manufacture of a good description, and at a fair price. We hope that the Implement makers of Lower Canada will be able to enter into an honorable competition with those of Upper Canada at the great Exhibition in October next, and that they will not be classed second to them in any article they exhibit. The exhibition of domestic manufactures was very creditable, particularly in the article of blankets. We do not recollect ever to have seen better blankets than two lots of those exhibited at Niagara. They were of fine wool, heavy, and of beautiful texture, colour, and softness of feel. No country could produce a better article in the shape of blankets, and we hope that when articles of such a superior des

cription can be manufactured from Canadian wool they will preferred to foreign manufacture.

Some superior cheese was exhibited, one weighing about 300 lbs, made by a Mr. Ranney from the milk of 65 cows for two days milking. We had the pleasure of conversing with this intelligent farmer, who appears to understand perfectly the economy of the dairy. He informed us that he made about 150 lbs of cheese daily, from the milk of 65 cows, a very fair produce. In the article of cheese we maintain, however, that Lower Canada produces some as good as any we have seen in Upper Canada, and in butter the lower section of the Province is fully equal to the upper, in good samples, though not perhaps in its general produce, but this inferiority whenever it exists, is altogether owing to mis-management of the dairy, and can be remedied by any farmer, who adopts the proper means that are in his power constantly. We learned from dairy farmers, that cows of mixed breed, not over large, were considered best for dairy purposes, and produced the most milk, cheese and butter, during the year. We had an opportunity of seeing the ploughing match. The horses, harness, and implements were good, and the work was generally well executed. The furrow slice was of good proportion in depth and width, so essential to good ploughing. Ploughing Matches are a very useful part of Agricultural Exhibitions, as good ploughing is so necessary in all good systems of husbandry. A very correct idea may be formed of the state of Agriculture from the manner in which ploughing is executed, and if well executed at ploughing matches, it shows that there are good ploughmen in the country, who can show a good example, and prove the advantage of good ploughing. The favourable results, obtained from good ploughing, are the best recommendation to its general adoption. The principle object of our visit to the Exhibition at Niagara, was to see the Agricultural, and Industrial productions of Western Canada, and endeavour to compare them with those of Eastern Canada, and report the result for the consideration of readers of this Journal, to form their own conclusions. We regret we had not time to see more of the country, as well as the Exhibition, but upon the whole we hope we have it in our power to submit a report that may be useful, so far as to help to reconcile the farmers of Lower Canada, to their own position and circumstances, and to convince them that in neither are they much inferior to their brother farmers of Upper Canada. The staple produce of Upper Canada appears to be wheat, and the chief object of the farmer, so far as we could learn, is to produce large quantities of this article. This is the best thing they can do, and accordingly cultivate well, and judiciously for this crop, the seed for which is sown in the Fall. We hear constantly, of the fine wheat produced in Upper Canada, and what an advantage it is to the farmer, in that section of the Province over the farmer of Lower Canada. This matter, however, is not properly considered. If superior crops of wheat are produced in Upper Canada, the cultivation is superior, and the expense is much greater than is incurred in Lower Canada. Summer fallow, with manure, is the general preparation in Upper Canada, and this requires two years use of the land. In Lower Canada, on the contrary, the soil is generally only once ploughed in the Fall without manure, and the seed sown in the Spring. The crop in Upper Canada may be much larger than in Lower Canada, but the expense also is much greater in producing the crop. This extra expense of two years employment of the land, with three or four ploughings, if summer fallowed properly, and the manure, if applied which it frequently is, reduces the profit of even a large crop very considerably, and we have little doubt that a fair Spring crop raised in Lower Canada, if not seriously injured by the wheat fly, would leave as much actual profit to the farmer, as is obtained upon an average crop of Fall whea t

Upper Canada. There is a furthur item to be considered, that wheat sells generally for a higher price in Lower than in Upper Canada, in consequence of the expense of transport to a shipping port. There has been a great drawback to farmers in Lower Canada for the last 15 or 16 years, which has generally checked their progress, and which the Upper Canada farmers were not subject to. The ravages of the wheat fly in Lower Canada, prevented the cultivation of wheat in a great degree, while the farmers of Upper Canada continued to grow wheat successfully all that time with scarcely any injury from the fly.

This has produced a great difference in the circumstances of the two sections of the Province. The loss sustained in the Lower Section by the wheat fly cannot be much short of eight million pounds currency, and perhaps a larger amount. We readily admit that we should prefer the mode of growing wheat in Upper Canada, as it secures a better cultivation of the land, and must necessarily produce a better condition of the soil subsequently. As to actual profit, however, should we be able to raise Spring crops of wheat in Lower Canada, as we now hope we may, by proper precaution we have no doubt whatever that they would be as profitable as the Fall sown wheat of Upper Canada. We are further almost certain that we could grow Fall wheat in Lower Canada by preparing the soil by summer fallowing, sowing in time, and in drills. The sowing in drills might be done without a regular wheat drill. The land after receiving the last ploughing, should be harrowed, and then with a very light plough or with an iron plough with the mould board taken off, and with one horse, shallow drills might be made along the ridges, about 10 inches apart, the seed might then be sown broad cast, harrowed with a light harrow length wise, which would bring almost all the seed into the drills. The land should not receive much harrowing after the seed is sown, but allow the intervals between the drills of wheat to be higher than the drills. By this means there is a shelter for the young plants, and in the Spring the soil is wasting down as sort of dressing to the wheat in the drills, and thus preventing the plants from being raised out of the soil by the action of thawing and freezing. The land should be left as dry as possible, by furrow and other draining. Barley, oats, peas, potatoes, and other root-crops, hay, and pasture may be produced fully as good in Lower as in Upper Canada. Fruits, (with the exception of peaches) and vegetables of every description, are as good, if not better, with us, than in the Upper Section of the Province. We have heard it asserted that the beef, mutton, and veal, of Western Canada are better than in Eastern Canada. We visited the market of Toronto, and did not see any proof of this being the case. Perhaps we have more of inferior meat in our markets, than is to be seen in those of Upper Canada, but we certainly have as good beef, mutton, veal, and lamb in Montreal, as we have seen in any part of Canada, and if we have any that is inferior, it is the fault of the farmers who do not pay due attention to their feeding, and is not attributable to any inferiority in the soil or climate of Lower Canada, more than of Upper Canada. The fowls with us are much better than any we have seen in any other part of North America. We have thus fully submitted our humble ideas of the relative capabilities and productions of Upper and Lower Canada. We had not sufficient opportunity of seeing the country to compare the general quality of the lands, with those of Lower Canada, or the general system of farming. There may be some of the lands of Upper, superior to those of Lower Canada, but we did not happen to see any of them. The general system of farming may also be better than our general system, and we are sure it is, and is more calculated to keep the soil in a constant state of fertility, but we unquestionably have some as good farmers in Lower as in Upper Canada. There is another circumstance in favour of the Upper

section of the Province, that a large proportion of emigrants coming to Canada with capital and other means settle in Upper Canada, and commence farming at once with ample means to carry it on successfully, while very few of them remain in Lower Canada. These are very great advantages to a new country. The most skilful of emigrant farmers, and farm labourers also proceed to Upper Canada at once. All these causes act in favour of one section of the Province above the other. We cannot speak of the general quality of domestic animals, compared with ours, but we believe those of Upper Canada are superior, from more careful management. Swine perticularly, of a good breed, are more general there than here. We take upon us to state distinctly, that every defect in our state and circumstances is capable of remedy, if we chose to adopt it. There is another circumstance which is highly favourable to Upper Canada, and that is, the most respectable of the community take a lively interest in Agricultural affairs, and regard Agriculture as the basis of their prosperity. This we could readily perceive at the great Dinner at Niagara, as well as from conversations with gentlemen we happened to meet with. The farmers also, appear to take a greater interest in their business, and in what would promote its improvement and prosperity than with us.

We must not omit to state that farmers as a class, are better educated in Upper than in Lower Canada, and this circumstance has a most favourable influence upon the husbandry of the former country. An educated man is more ready to receive and adopt improvements proposed to his notice, than an uneducated man, who has generally a prejudice against any changes, and a high opinion of his own skill in agriculture.

Upon the whole, our visit to Upper Canada has by no means diminished our estimation of the capabilities of Lower Canada, as compared with any part of North America that we have seen, and we have no doubt that Lower Canada might be made as abundant in agricultural products as Upper Canada, or the neighbouring States. The means that are necesary for the improvement of the country are in the power of the Legislature and the people, and we deny that the climate or soil of Lower Canada are unfavourable for successful agriculture.

AGRICULTURAL REPORT FOR SEPTEMBER.

THE month was fine throughout, and afforded farmers a most favourable opportunity to complete the harvest, and house their grain in the best condition. The harvest, altogether, has been one of the finest we have seen in the country, and there has not been any waste of either labour or produce. The advantages of fine harvest weather, cannot be too highly estimated, and upon an average, we have more favourable harvests here than in the British Isles. Wheat, we believe, is a fair crop, and has not suffered much from the fly or by any other injury, from the first appearance of the ear. The plant may have been thin in many instances, from various causes—such as want of fertility in the soil, insufficient cultivation, and draining, wire-worm, and slugs devouring the plants, &c., but the season has certainly been very favourable for wheat where justice has been done to its cultivation. For all other grain crops it has been equally favourable, and there is every reason to hope the returns from barley, oats, peas, beans, and indian-corn, will be a fair average. The quantity of barley grown this year is not so large as usual, but it may be equal to the demand and consumption. All these grains have a right to be sound and well got in, the harvest has been so continually dry. There have been various reports of the potato crop—and of the appearance of disease in the tubers. We have seen potatoes taken up that were very much diseased, but to what extent the crop is generally affected we cannot pretend to say. The fine weather during the month of September was calculated to check the disease.

We have seen the vines or tops very suddenly blackened, without any frost to produce this change, and in fields that were not planted early, and were not nearly at maturity. This must be produced from an unhealthy state of crop, as no such change ever took place in the potato crop, previous to the appearance of the disease, unless it resulted from frost, or the maturity of the crop. The disease in potatoes is an unaccountable visitation, and has never yet been satisfactorily explained. The best prevention of disease is to plant early in dry soil, only applying special manures, such as ashes, soot, charcoal, salt, lime and gypsum. It is very essential to their preservation for the winter, to have them well dried before they are stored. We have seen it recommended to place them in small heaps in the field, about a bushel in a heap, cover them with the soil—and leave them in this way while the weather is fine, to season and dry. It is a troublesome mode of proceeding, but if it would prevent the rot, it would be well to make the experiment. There are some varieties of the potato less subject to the rot than others, and such ought to be cultivated. Those of the dryest quality are the least liable to disease. When in Upper Canada about the 20th of September, it was reported that the potato disease had commenced very generally. In storing potatoes for the winter, the hulls of oats taken off for making meal, is a good substance to mix with them, and they should not be put up in too large quantities together. A moderate temperature, very little over the freezing point is the best for potatoes, and all root crops. For carrots, parsnips, turnips, and beet, the temperature should not be much over freezing, during winter—and they should be made up in the root houses in separate piles with alleys between to give them air, and there should be constant ventilation. The aftergrass and pastures are very green though we have not much rain. The market is well supplied with butter, cheese, butcher's meat, and vegetables in abundance, and all at moderate prices. The price of hay is from 25s. to 30s. the 100 bundles of 1600 lbs., and of straw from 15s. to 20s. the 1200 lbs. These prices will probably be kept up, and it would not be for the interest of any party that they should not. The land is not yet generally in the best order for ploughing. It requires some more rain for strong clay land to make it fit for ploughing. Now is the time for draining, and putting the ploughed land in good order for working in the Spring. In land intended for summer fallow, it might be sufficient to make it into a sort of drills, ploughing only half the soil, by what is known as ribbing. This rots the soil, and exposes it to the action of the frost. In Spring these drills may be harrowed down for ploughing cross wise. In many situations, the mixing of soil by the plough may be expedient, but this must be left to the farmer's judgment. If the surface is different from the subsoil, and would be likely to improve it by mixing, it will be well to allow one plough to follow another in the same furrow—not a subsoil plough, but a common plough if it can do the work. It might be necessary to have the share of the second plough not so broad as that of the first, but if the object be to mix the soil, it is better to have a common plough to follow the first, than a subsoil plough. The second plough may require more power than the first. The mixing of soils *judiciously*, is one of the best modes of improvement in the farmer's power, and is permanent. By this mode a soil may be changed altogether, and made much more fertile. Moss is a good substance to mix with clay or sandy soil, as clay or sand is good to mix with moss soil. It is a good plan where moss is convenient, to cover the farm yard with it at this season of the year. It will imbibe the liquid manure, and all the soaking from the farm yard manure and will make a good dressing for land in the Spring, or may be mixed up with the dung. It is a good substance to put into compost heaps with lime, ashes, gypsum, &c. In making drains we would again recommend to

take off the slopes, in the proportion of at least two feet wide at top to one foot in depth, and not have the drains more than the width of the shovel at the bottom, unless a large quantity of water has to be discharged. Every farmer who has the means should slope his drains, as it will save much labour for the future, and give a much better discharge for the water. Drains cut almost perpendicular, are very likely to be inefficient when most required. The frost of winter, and thawing in Spring is apt to cause the sides to wash in, and damage the drain when its free action is most required. As draining is most essential to good farming the drains should be kept in the best order constantly. We cannot say what prospect there is of prices but it is probable they will not be very low for grain, at all events not under the prices of last year, but perhaps over them.

30th. September.

The approaching Industrial Exhibition to take place at Montreal, the 17th, of October, is expected to be very creditable to the country, and there is little doubt that we shall have an Exhibition that will not be surpassed in North America. Indeed we are prefectly certain that we shall have some articles manufactured in Montreal that will do the country credit. Perhaps, however, it would be too much to expect that any articles of our produce would enter into successful competition with English products. All we can reasonably expect at the Great English Exhibition would be to show respectable samples of the products and industry of Canada, that would give an idea of the capabilities of the country. These samples, we hope, will show that this Province is one of the most valuable appendages of the British Empire, and one that offers the greatest encouragement to immigration, and the safe investment of capital. The Exhibition, we have no doubt, will prove beneficial to this country, and show it in a very favourable light to our fellow subjects in England. This country is not properly known in England, and it is most extraordinary that parties who ought to know our country, are apt to mis-understand, or mis-represent it. We have heard a gentleman, travelling in Canada say, we had no good vegetables here, particularly cauliflowers. He goes to England and makes this statement, and of course those who hear him, conclude the country is not fit to live in, as good vegetables are highly prized by Englishmen. Now any one who has resided in Montreal for any time must know that we have the very best description of vegetables, and in great variety, and cauliflowers in the greatest perfection. Our beef, mutton &c., is also said to be not equal to that of England, but we certainly have constantly a supply of as good beef, mutton, lamb, and veal as in any country, not, perhaps, so fat as that of England, where a large portion of the fat goes to make soap and is only worth about the fourth part of what it cost the farmer to produce it per pound. The over fattening of animals, is now, however, discontinued in England, except occasionally to show what beasts may be brought to weigh. Canada products of every description are good, we only want to have them in greater abundance. We were rejoiced to see, this year, excellent cheese of Canadian make, equal to any we have ever seen of American manufacture. And when this can be done in the country by one farmer, it may also be made by others, who adopt the necessary means. We have as good butter here as in any country. What then are we deficient in. In the products of agriculture? We may, and we have inferior articles certainly, but this results from want of skill, and careful management, that may be remedied. We hope the Industrial Exhibition, here and in England, will place matters in a new light, and show our friends at home, that although this was a country of forests, of frost, and snow, it is now one that produces almost all the necessaries of life in a very respectable degree of perfection, and in proportion to the skill and industry employed for their production. Even in Upper Canada

there is a general mistake with regard to Lower Canada. We have been asked how any farmers could succeed in it, when we have eight months of winter, of frost, snow, and bad weather. If it was the case it would undoubtedly be very difficult for farmers to succeed, but it is not so, and we feel persuaded that we are not so subject to frosts at unseasonable periods of the year, when they are injurious, as they are in Upper Canada, nor are we so liable to long droughts, and heavy falls of rain. The general temperature for a year is higher at Montreal that at Toronto by several degrees although our winters are colder than at Toronto. We believe on an average of years our hay crop is better here than in the Upper Section of the Province or in the United States. From all these considerations, we have every reason to be satisfied with our country compared with any other on this continent.

On a recent visit to Quebec, we had the honor of an interview with his Grace, the Archbishop of Quebec and his Lordship, Bishop Turgeon, who received us in the most kind and condescending manner—made numerous inquiries as to the state of Agriculture, and the best means for its improvement, and graciously assured us they would do all in their power to forward its improvement. The Archbishop had already addressed a "Circular" to his Clergy, recommending them to favour Agricultural improvement, and to support this Journal, and this "Circular" was productive of much good by its influence with a large portion of the Clergy and Laity. It is very gratifying to find that the heads of the Roman Catholic Church take a lively interest in this matter that is of such vast importance to the Canadian community, and there is every reason to hope that through their influence, the Lower Canada Agricultural Society will be able to effect much good, and by degrees carry out the object for which they were organised, and Incorporated by the Legislature. The worthy secretary of the Archbishop, the Rev. Mr. Cazeau, is also a most zealous advocate for Agriculture, and we heartily wish all other Clergymen were influenced by an equal degree of zeal in so good and honorable a cause. We rejoice to acknowledge the support of several other Clergymen, who, however, might not be pleased to have their names mentioned. We humbly presume that it is not inconsistent with the sacred calling of the Clergy of any denomination to aid and countenance the improvement of Agriculture. We beg leave to offer most respectfully our sincere acknowledgements to His Grace, the Archbishop of Quebec, and His Lordship Bishop Turgeon, for their very kind and flattering reception on the occasion of our interview, and for the interest they manifest in the cause we have humbly endeavoured to advocate.

We had an opportunity recently, of seeing a large portion of the grand water communication that connects the Atlantic ocean with the vast lakes of Upper Canada, and it certainly is a work to be proud of as Canadians. To Upper Canada in particular it is of vast importance, increasing the value of all that farmers have to sell; and diminishing the price of what they have to buy in consequence of the cost of transport being diminished, we suppose, three fourths or more. We should have been unworthy of this fine country and these great inland seas, if the St. Lawrence and other canals connected with it had not been completed on their present scale. It opens a vast country for settlement and production, that would otherwise be comparatively of little value. Upper Canada is a great gainer by these noble works, and she certainly has excellent means of communication already, in all directions. These means of communication are admirable from their great capacity for carrying bulky produce, lumber, &c., for more than 1000 miles inland, to the ocean. No country on earth had such means of communication provided for their people.

The old settled parts of Lower Canada are not so well provided with means of com nu-

nication, and we hope this may be looked to, as this want will greatly retard the advance of improvement. There are many of the rivers of Lower Canada that we believe might be made navigable for small steamers for a moderate outlay. This would be very desirable. Nothing would tend more to advance improvement than ample and easy means of communication to all parts of the country. It would induce the farmers, to improve their lands, and raise a large produce if the market were of easy access to them. They would see that it was their interest to raise a large produce when they could dispose of it. They would also come out of their back settlements, and see the progress of improvement near our cities and towns. There cannot be any doubt that travelling, and seeing the country, has a great tendency to remove prejudices that we are apt to imbibe when we never see anything but our own farm, and our own management. Travelling gives an opportunity of comparing other farming with our own, and he must be a very good manager indeed if he does not discover some errors in his practice when he sees the practice of many others.

We have seen a report of a trial which took place in England lately, with wagons and carts in taking in a crop of wheat and oats from the fields to the stack yard. The trial was made on two different fields, and where the access to the fields was hilly in one case, and not so in the other The distance was from half a mile to a mile. There were 5 carts with 5 horses, and 5 wagons with 10 horses. The attendence of men and boys to each was equal. In both instances the carts finished their work before the wagons had done theirs. The experiment was made in the presence of several respectable witnesses. We have been always persuaded that carts are more convenient in a field in harvest than wagons. The wagons are too heavy, and not so easy to manage in a corn field, particularly if the land is not very hard and dry. The hay cart of Lower Canada is the most convenient and efficient machine we have ever seen for carrying in the harvest, and we were quite surprised to see that they have not been introduced in Upper Canada, but it only shows how much parties are prejudiced in favour of what they are accustomed to, even though they should not be so good or convenient. The Canadian truck we did not see in use in Toronto, but we did see carts that we humbly conceive bear no comparison to the truck in usefulness and convenience. We may be thought to be wrong in our estimate of the hay cart and truck of Lower Canada, but we should certainly be glad to see them fairly in competition and their merits and convenience fairly tested in every possible way. The hay cart is more easy to fill, and is not so top-heavy when filled as a frame cart or wagon. Hay-carts frequently carry with one horse, one ton of hay to the Montreal market, but 100 bundles or about $\frac{3}{4}$ of a ton is quite easy to put on when required. These large loads, however, are not necessary, on the road or in the field, and moderate sized loads are much better. A truck can carry conveniently 8 barrels of flour, and one man can easily manage it. They frequently carry a ton weight, and for iron or almost any article, the truck is perfectly convenient. We hope whatever changes may come, we shall never see Lower Canada without the hay-cart and truck, and good Canadian horses to draw them.

We copy the following articles from the North British Agriculturist, relative to the wheat fly or midge. It corresponds so exactly with what we have known of the habits of the insect in this country that it is as applicable to us as to the Carse of Gowrie. As the writer observes it is most extraordinary, that the habits of this fly are not known to every farmer who pays any attention to the progress of his crops. We see it is the same case here, they call it the weevil, which is altogether a different insect and never injures the grain until it is in the granery. We have constantly watched this

insect, and the article we now copy is a most exact report of its habits in Canada. One side of the ear is destroyed, while the other remains untouched, because the other side remains partly covered for a few days when the ear is first appearing, and the fly cannot injure it until the grain becomes too hard for it. We have see by reports from various sections of the British Isles, that the wheat fly has done considerable injury to the wheat, and in numerous instances it does not appear that farmers understood what has injured their crops, some attributing to a blast, red gum, &c. &c.

Wheat Midge—Carse of Gowrie.—The deficiency in wheat caused by the larvæ of the wheat, midge is not great on an average of the whole district. Some fields are not a little deficient from this cause; but their numbers are few, and many fields have entirely escaped. This resulted from the stormy nature of the weather in June, when the ears were bursting their sheath the high winds forcing the delicate midges to take shelter amongst the foliage till the ears were fairly past danger. Those fields that have suffered happened to be just showing ear on one or two mild evenings when the insects were able to ascend. On one of these evenings the large number of 40 midges were observed on one ear, some of them busy depositing their eggs on the upper part of the glumes. The circumstance that one side of the ear is generally attacked, while the other remains safe, gave rise long ago to the notion that the insects were produced by equivocal generation and appeared subsequently to easterly fogs; the side of the ears facing the east having been observed in some instances injured, while no larvæ were found on the glumes on the other side. This and many other foolish notions were entertained by some of our Carse farmers in 1827, and the two following years, in which years it was estimated that the injury done by this insect cost the farmers in this district £90,000. Such opinions are now no longer entertained here, for our farmers have had too many opportunities of studying the habits of the insect in its various stages. It would seem, however, from paragraphs and reports in newspapers, that farmers in many parts of the country are even now but entering on an acquaintanceship with this small, delicate, yet formidable insect. Some talk of sifting the larvæ and pupæ from amongst the grain on the barn floor, not knowing that the wheat midge, Cecidomyia tritici, and the insect that infests wheat in granaries, are entirely different insects, not even belonging to the same genus. When the larvæ of the wheat-midge have done their work, they immerge from the glumes on a fine sunny day, when these burst open by their natural elasticity, and then, gathering their two ends together, spring from the ears and immediately dig about an inch or so into the soil, and pass the winter there in the pupa state. The pupæ are all safe below the ground about a month before harvest. By using a skim coulter in winter-ploughing, the pupæ may be buried too deeply to allow of the midges coming up next summer; but even where this has been done, and beans sown next season, the midges have found their way to the surface by ascending between the bean roots and the soil around them. A mean temperature of 56 degrees for a week in the beginning of summer brings the insect into the fly state, and it hovers about the field where it found its winter quarters, till the wheat in neighbouring fields begins to show ear, when it is directed towards it by the organs of smell. By collecting a few of the pupæ from the soil in autumn, a flock of midges may be had from them in mid-winter, by imitating the requisite natural temperature artificially. The larvæ found in the envelope of any one grain are produced from the eggs deposited therein, and the insect in the larva stage does not go from grain to grain. Before speaking of plans to guard against this, or any other insect, its habits should be studied. Could anything be done by spreading quicklime between the drills of wheat just at the time when the larvæ are ready to descend from the ears and burrow in the ground? or would a layer of salt, soot, or other material pernicious to insects, prevent their burrowing?

It is very strange that they do not appear to be generally acquainted with the wheat-fly in England, though it appears that the insect has done considerable damage there this year. The following extract of a letter from the *Mark-Lane Express*, gives a description of the larvæ of the wheat-fly and the injury done to the wheat. There cannot be any doubt that considerable damage is done to the wheat crop in the British Isles by the fly, but the farmers do not appear to understand the matter there so well as they do in Canada. The wheat crop of Lower Canada has suffered some injury from the fly this year, but we do not think the injury very extensive. The following, is the letter referred to:

Since my communication of the 19th of last month, I have submitted the wheat blight to a microscopic test, and find the animalcula in three separate states:—1st, a caterpillar of am-

ber colour, having many legs, and a horned head, similar to that of the earwig. 2nd, a chrysalis of amber colour, covered with a thin and almost transparent skin. 3rd, a winged aphis with four legs, large head, and broad nose. In the caterpillar form it is only to be feared: in that state it feeds upon the pulpy corn, until it is consumed, when it assumes a chrysalis form at the bottom of the husk, in which state several lie coiled up together to the number of from 4 to 25; in this state they lie from two to four days (according to the weather), when they assume their winged state, and if the day be fine they fly abroad, when, owing to their minuteness, they become lost to sight. However insignificant these animalcula may appear, they have power to destroy all corn they seize in a few days; and had it not been for the continued and heavy rains during the last fortnight, which has drowned and washed away the blight, a fearful loss to the farmer would have been witnessed. As it is, some few ears of wheat are completely lost, some half, some a row, and others single corns.

The following is the number of perches (16½ feet to the perch) of drains in an English acre, at different distances apart, viz;—

At 21 feet apart	225 ½	perches
24 do	110	do
27 do	97¾	do
30 do	88	do

The best top-dressing for meadow is plenty of good farm-yard manure, or rich liquid manure. The next is bones, dissolved in sulphuric acid, and mixed with rich earth. Guano is excellent, mixed with from 5 to 10 times its weight of rich earth, ashes, &c. Lime is good, but should be mixed some time in compost, with an old head land. If the land is well drained, from 40 to 80 or 100 bushels of lime may be applied to the acre mixed in compost in this way.

Nice White Veal.—We shudder at the cruelties practised upon Strasburg geese to produce the celebrated *pates de foie gras;* but remorse would assuredly afflict the amateurs of veal with indignation, if they reflected on the tortures to which calves are subject, to cause the very unnatural colour of the meat they so much prize. The natural and wholesome tint of veal is not white, but pink. An ancient French traveller in England (1690) says that the English veal has not the "beautiful red colour of the French." Dr. Smollett, in "Peregrine Pickle," upbraids epicures on the scores both of cruelty and unwholesomeness, saying that our best veal is like a "fricassee of kid gloves," and the sauce of "melted butter" is rendered necessary only by the absence of juices drained out of the unfortunate animal before death. The process of killing a calf is a refinement of cruelty worthy of a Grand Inquisition. The beast is, while alive, bled several times; in summer, during several hours of the night, and frequently till it faints, when a plug is put into the orifice till "next time." But the lengthened punishment of the most unoffending of animals is at the actual "killing." It is tied together, neck and heels, much as a dead animal when packed in a basket, and slung up by a rope, with the head downwards. A vein is then opened till it lingeringly bleeds to death. Two or three "knocks" are given to it with the pole-axe whilst it hangs loose in the air, and the flesh is beaten with sticks, technically termed "dressing" it, some time before feeling has ceased to exist. All this may be verified by those who insist on seeing the penetralia of the slaughter-houses; or the poor animal may be seen moaning and writhing, by a mere glance, on many days in the week, in Warwick-lane, Newgate-street. This mode of bleaching veal is not only a crime, but a blunder. The flesh would be more palatable and nutritious killed speedily and mercifully. But were it otherwise, and had it been twenty times more a luxury, who, professing to honour the common Creator, would, for the sensual gratification of the palate, cause the calf to be thus tortured?—*Dickens's "Household Words,"*

M. Soyer's Exeter Pudding.—Put in a proper sized basin, ten ounces of fine bread-crumbs, four ounces of sago, seven ounces of suet chopped fine, six ounces of moist sugar, the peel of half a lemon grated, a quarter-pint of rum, and four eggs: stir for a few minutes with a spoon, add three more eggs, four table-spoonfuls of clouted cream, mix well, it is then ready to fill the mould. Butter the mould well, put in a handful of bread crumbs, shake the mould well till the greater part stick to the butter, then throw out the remainder, and have ready six penny sponge cakes, two ounces of ratafias, and half a pound of either raspberry or strawberry jam; cover the bottom of the mould with a layer of ratafias, just cover them with a layer of the mixture, cut the sponge cake lengthways, spread thickly each piece with some jam, put a layer in the mould, then a few ratafias, afterwards some of the mixture, and so on, till the mould is full, taking care that a layer of the mixture is on the top of the pudding. It will take about forty minutes baking. The sauce: Put in a small stew pan three table spoonfuls of currant jelly, and two glasses of sherry, warm on the fire, and pour over the pudding cloth, and serve hot.

THE INTERNATIONAL EXHIBITION.—It is perhaps, questionable whether London ever held so distinguished a position, or whether Britain was ever so truly great, in the sight of all nations, as at this moment, in anticipation of that grand cosmopolitan centralization of the whole world's enterprise, which will virtually elect the capital of England into the commercial metropolis of the nations. For then, without the slightest vestige of a hyperbole, will there be here assembled the representative fruits of the genius and industry of "every nation under Heaven" to do homage to the pre-eminence of the British Empire, as at least the central mart for all, whatever be the result to it in particular, as that "Great Babylon" to which "all the merchants of the earth" will doubtless be devoted till the ominous end of their commercial empire. The several anouncements of the intention of many of the more civilized nations on the Continent of Europe and America to take part in the great jubilee or fair have long been made known, as indeed have subsequently those of the less-civilized Asiatic nations—such as the Hindus, Chinese, and Persians. Still more recent announcements are those from Turkey, the Sultan having decided that specimens of Turkish manufactures shall be sent in to the Exhibition; and from Peru, the President of which has issued a decree appointing a commission to select and take charge of the Peruvian contributions. In short, the whole world is astir, and London and its next year's sights are the anticipative subject of that whole world's wonder and expectations, from the present time forth till the grand consummation.—*The Builder.*

EXHIBITION OF 1851.—We understand that a register is about to be opened at No. 1, Old Palace-yard, Westminister, by the Secretary of the Executive Committee for the Exhibition of 1851, in which will be entered the names and addresses of persons disposed to provide accommodation for artisans from the country whilst visiting the exhibition next year. It is proposed to furnish copies of this register of lodgings and accommodation to all the local committees. Other arrangements are under consideration for guiding the working classes on their arrival by the trains, to the lodgings they may select. We believe the register will contain a column, in which the nature and charges for the accommodation each party proposes to afford will be entered.

THE EXHIBITION OF 1851.—The whole of the immense area in Hyde Park, assigned for the Exhibition of 1851, is now enclosed with railings about eight feet high, and men are now busily engaged in staking out the ground for the foundation, which, it is understood, is to be wholly of wood-work. Some notion of the enormous glass-house to be placed on the spot may be judged of from the fact that it commences opposite the officer's house at the Knightsbridge barracks, and nearly reaches to the first gate of Kensington Gardens, being a length of 700 yards, by about 140 in depth, and extending from Rotten-row to Kensington, to the barracks. As the whole, when sent, will be ready for fixing, it is confidently stated this gigantic structure will be erected by the close of the year.

FLOWER GARDEN AND SHRUBBERY.

According to present taste, a large and well ordered flower garden is one of the greatest trials of skill within the whole range of Horticulture. When at Drumlanrig Castle the other day, we were informed that from 60 to 70,000 pot plants are propagated annually, and kept over the winter for bedding out, besides pounds of this annual and half pounds of the other; and on looking over *The Cottage Gardener* on our return, we find our highly intelligent friend, Mr Beaton, of Shrubland Park, very coolly speaking of putting in cuttings of Scarlet Geraniums in the open borders much in the way ordinary men prick out cabbage plants. He says, "our first stock plant of Geranium is our own Scarlet Seedling called *Punch*, and of it we annually root 5000 cuttings;" and yet he in the same column informs us that his list of Scarlet Geraniums contains 89 names, and to these he threatens this season to add some half a dozen more; verily we may exclaim with Dominie Sampson, "Prodigious!" Nor is it in the vast number of these plants that Mr Beaton cultivates, that our astonishment or admiration is to be entirely arrested; his mode of propagation to secure these results is equally interesting, both in regard to success, and the very simple means employed. Speaking of his favourite PUNCH (and, by-the-by, he has his JUDY also), he says, "This is the greatest number we strike of any one sort, and it is very seldom we put cuttings of these kinds of Geraniums in pots, unless it is a very delicate or rare sort which we can ensure better that way. The whole are rooted in the open ground, and full in the sun, and the hottest day in the year will not hinder our propagation when we once begin, and we never shade a Geranium cutting. The Vine and Peach borders are generally the propagating beds, and it is a good old plan to put a slight coat of some light rich compost over these borders in July, when most of the liberal waterings are over for the season, the borders being first stirred with a fork to the depth of 2 or 3 inches and then a couple of inches of the mulching compost is added. The whole is then raked, and the usual alley is marked out near the wall, and the place is ready for the cuttings. You begin at one end of the border, and plant the cuttings in rows across it, two inches between every cutting, and six inches between the rows. Care is taken to

keep each sort by themselves by apportioning the ground to the number of each sort required. The following is so wide apart from general practice that we cannot resist the temptation of making the brief extract of it:—"For those who know very little of these things," Mr B. says, "I may now give the details. The border or open space of ground in a very sunny aspect, as we shall suppose, is ready, and I put most stress on having the place full in the sun, because half the world lie under a mistake on this head, and suppose that a north aspect is the best, which is indeed a very wrong notion. Then look over the bed or plants from which the cuttings are to be taken, and select carefully those shoots near the centre of the plants where they are most crowded; and in this early searching for cuttings you are to study 'the look' of the plants rather than the number of cuttings, for if we 'take the market on the day,' we have plenty of opportunities yet for an abundant supply of them. Then, at this early period, be content with a few, if judiciously chosen, and that few will rather improve the look of the plants, and enable them the sooner to extend sideways. The cuttings of strong growing Scarlet Geraniums may be six or seven inches long, as an average; three of their bottom leaves to be cut off and the bottom of the cutting to be a clean cut just under the bottom leaf. Some people say that these cuttings should lie by for a while to dry,, so as that the fresh soil should not 'damp them off;' but this is hardly necessary; the soil is dry enough to suck off any moisture that may be on the cut part, and a cutting in the open ground is not at all so likely to rot as one placed in a pot." The process of putting in, watering, &c., is as usually practised, only care is to be taken not to exceed in the latter. It is probable that many other soft-wooded plants might be struck in the same way. At all events early propagation should not be disregarded.

Ashes.—The following remarks of Dr. Faraday on the subject of Ashes, delivered in his recent Course on Domestic Chemistry will be read with interest:—"One of the points he wished particularly to enforce was the great use and importance of the result of combustion, which was in general regarded as refuse to be thrown away. The ashes which remain after all the combustible parts of the fuel are consumed, may generally be found in the fuel before it is burned, but other parts of the ashes are the products of combustion, and not refuse; and these form an important class of bodies. Taking, however, the term 'ashes' in its general acceptation, Dr. Faraday first showed the value of the mere refuse of our domestic fires, and gave a short history of the processes by which the clearings out of dust-holes are separated and appropriated to various uses. After the separation of the old pieces of metal, bones, skins, and others heterogeneous substances, the actual ash that remains is employed for manure, and for the manufacture of bricks, for which latter purpose no other material answers so well. The value of the sifted ashes varies greatly, according to the demand for brick-making—the dust contractor being able at times to obtain 20s. per chaldron for the refuse, whilst at others he can only obtain one twentieth part of that price. The ashes of plants consist in a great portion of silica, which is found most abundant in the stalks and leaves, and from which they derive their firmness and necessary strength. The amount of silica in wheat straw is equal to 67-90 parts in every hundred, while the quantity in the grain is only 1-18. The silica contained in straw being so abundant it may be rendered visible and converted into glass by heat, as Dr. Faraday exhibited by burning a straw in the flame of a spirit lamp and producing, as the result, a minute globule of glass. The proportion of silica varies considerably in various classes of plants. In rushes there is a less proportion than in straw; but in canes, silica is so abundant, that accretions of the mineral in a solid state are not unfrequently found inside bamboo canes. That class of ashes which are the product of combustion, and not merely the refuse of the fuel, include both soda and potass. It is well known that Sir Humphrey Davy discovered that the alkalies are but the ashes of inflammable minerals, which have such a strong affinity for oxygen, that they cannot, in ordinary circumstances, be prevented from combining with it and burning. The ashes of these minerals are abundant in several plants, and when they are consumed the alkaline ash remains. The vegetable alkali (potash) is derived from the combustion of plants containing it, and Dr. Faraday illustrated the development of that alkali by rubbing some wood-ashes on moistened turmeric paper, which became instantly marked with dark brown, indicating the presence of an alkali. By treating the ashes of sea-weed in a similar way, the same effect was produced, the alkali in this instance being soda. That very peculiar substance, iodine, was first discovered among the ashes of sea-weed, as explained by Dr. Faraday, who performed several experiments to illustrate its remarkable properties. He pointed out numerous other instances of the importance of ashes, one of which was the manufacture of glass—an article that is formed entirely by a combination of ashes of various kinds. Among other substances in nature which may be regarded as ashes, he mentioned volcanic lava and meteoric stones."

To find one who has passed through life without sorrow, you must find one incapable of love or hatred, of hope and fear—one that hath no memory of the past, and no thought of the future—one that hath no sympathy with humanity, and no feelings in common with the rest of his species.

Time of Reaping.—At a late meeting of the Ulster Chemistry Association, Dr. Hodges gave an abstract of the various experiments which had been made in England, and other countries, to determine the proper method of reaping the grain crops. He said that, though in many places in this country, early reaping was regarded as an innovation on the old rules of sound husbandry, yet, that the practice was not of modern origin, but strongly advocated by the agricultural writers of ancient Rome, one of them remarking that, with respect to wheat, "the later it is reaped the better it casts, but the sooner it is reaped the fairer the sample. The best rule is to cut it down before the grain is got hard, when the ear begins to have a reddish brown appearance. "Better two days too early than as many too late" is a good maxim, and might pass for an oracle. In modern times (Dr. H. remarked), the opinions of the old Roman had been revived, and their correctness proved, both by scientific investigation and the experience of observing farmers. Dr H. continued to give an account of the characters presented by the cereal plants at various periods of growth, and directed attention to the valuable experiments by Dr. Hannam, an experienced English farmer, and also to the analytical investigations lately published by Dr. Voelcker, Professor of Chemistry in the Royal Agricultural Collage at Cirencester, which had been undertaken at the suggestion of Mr. J. Walker, of Glynn, a member of the Society. Dr. H. urged the propriety of reaping grain at a much earlier period than usually practised in this country, as, at the period of full ripeness, a similar amount of flour and a greater proportion of bran was obtained, and the amount of muscle-sustaining ingredients both in wheat and oats was less than in the grain cut at an earlier period. It has been proved by analysis, he said, that ripe oats afforded only about 15 per cent. of muscle-sustaining matters, while the same kind of oats, cut green, yielded about 18 per cent. It might, therefore, be inferred, so far as present knowledge extends, that the practical rule laid down by Mr. Hannam, of cutting wheat at least a fortnight before full ripeness, should be adopted; and, also, that oats should be cut when the ear has become so firm that no milky liquid can be expressed by pressure on the grain. The Chairman asked, if any experiments had been made to ascertain whether grain was good for seed when cut so green? Dr. Hodges said that no trustworthy experiments were recorded. He would prefer the fully ripe grain for sowing. He trusted that, next year, some of the members would be prepared to give the details of experiments showing the produce and value of the grain crops cut at various periods of growth. Mr. Andrews said that they had been cutting earlier in his neighbourhood year after year. The old popular notion was that "a green shear was a bad shake." Dr. Orr exhibited samples of wheat and oats cut at different periods, some of which showed how much the ears continued to fill after being placed in the stooks. Dr. Orr proposed, and Mr. Andrews seconded the following resolution, which was adopted:—"That it is the opinion of the meeting that all kinds of cereal grains should be reaped while the pickle is still in a soft and doughy state, and at the time it has ceased on pressure to exude a milky liquid."

Peat Charcoal.—An interesting meeting was recently held at the private house of Mr. Pinney, M. P., of persons interested in the Irish Amelioration Society, a chartered company formed for the purpose of manufacturing peat from the bogs of Ireland into charcoal, partly with a view to afford employment to the Irish peasantry, and partly with a view to profit. We have not much faith in semi-philanthropical enterprises, and we are therefore glad to see that this company's proceedings are likely to succeed on the sounder basis of commercial profit. Mr. Pinney, who is an active director of the society, and Mr. Jasper Rogers, the society's engineer, made statements, and referred to experiments which prove that peat may be converted into charcoal, by the company's patent process, at a cheap rate, that when so converted it furnishes a complete deodoriser for sanitary purposes, and that the charcoal, alone or mixed with nightsoil, is very useful for agricultural purposes. At the same time the company's operations afford much employment in Ireland to the most destitute portion of the peasantry. Nightsoil mixed with the charcoal is quite inodorous, and according to an analysis made by Mr. Nesbit of Kennington, the value of the compound manure is about one-half that of guano. We have at this moment in progress a practical trial of the agricultural value of the peat charcoal and nightsoil manure for turnips, as compared with guano, nightsoil and mould mixed, and manure from cattle fed in boxes. At present the box-fed manure—a heavy dressing—has produced the largest plant; on the peat charcoal manure, and the mould and nightsoil, the plants are as nearly equal as possible, but the expense and trouble of carting, mixing, and laying on the mould and nightsoil were very considerably more than the peat charcoal. The guano is five cwt. to the acre, equal in money value to the charcoal manure, and as yet the plants on the charcoal are better than those on the guano. The peat charcoal, applied alone to potatoes, is said to prevent disease; and as the selling price in Ireland is 35s. per ton, and a comparatively small quantity is stated to produce such important effects, attention ought to be drawn to the subject.—*Economist.*

Envy—punishing ourselves for being inferior to our neighbours.

American Mode of Preventing Potato Rot.—Heat in a moist atmosphere increased the destruction, and samples which had been cooled, and thereby partly protected, readily passed through all the changes when again exposed to warm and humid air. After using several substances by direct contact with diseased parts of potatoes, I soon found that the mixture of sulphurous acid, nitrogen, and common air, such as exists when sulphur is burnt in closed vessels, would prevent the further progress of the disease, in tubers already affected, and when exposed in contact with tubers passing through all stages of the disease, no further change in the prepared ones was induced. The trials were varied, and the uniformity of the results has led me to conclude, that the fumes of burning sulphur, flowing in contact with potatoes partly diseased, will arrest the further progress of the disease and prevent decay. It is proper that this conclusion should be received as an expression of fact, under the circumstances of experiments on a small scale, and with no more than two varieties of potatoes; but I confidently expect that the importance of the application will be seen in the largest exhibition of its effects. The practical use of the sulphurous acid gas is very simple, and not expensive.—Crude sulphur inflamed in a shallow cast-iron vessel, or an earthen pot, furnishes the fumes, which may be led by wooden pipes to the lower part of bins filled with the roots, until the occupied space is filled with them. As the fumes cool, they become heavier than air, and will then enter every interstice. By placing the pot of burning sulphur in an empty barrel, and inverting over it a barrel filled with potatoes, having a light rack in place of a head, the fumes will slowly rise within, and impregnate the mass; the barrel and contents being then removed, and the head replaced, the exposure may be considered as ample. Where the quantity is large, it would be more economical to leave a space vacant below the loose floor on which they repose, and introduce these fumes until part of the heap of potatoes has received a share. It should be remembered that this application will injure, if not destroy, the vegetating power of the tubers, and that although this result may be highly desirable for all that are preserved for food, those intended for seed should not be so treated.—*Dr Hayes, in Hovey's Magazine of Horticulture,*

General Caution relating to Buying Horses.—Never purchase a horse from a friend; nor from a litigious man; nor a petty lawyer; nor from one who cannot pay the expenses of a law-suit. Never, before purchase, show that you are exceedingly well-pleased with the horse. Hear all that the seller and his grooms say about a horse; but be certain of nothing until you have ocular demonstration. Never appear to know any of the tricks of dealers, unless they be attended with cruelty, when it may be proper to discourage and punish them by expressing disapprobation, and refusing to have any transactions with such men. But never be so rude as to betray any want of faith in the dealer. It is always very offensive, quite useless, impolite, and it may be erroneous. If you discover an unsoundness, or vice before purchase, it is needless to point it out. To say that the horse is too good for your purpose may serve as well. You need not offend the owner; and you have no right to give the horse a bad character, even when you are quite sure he deserves it. Seldom give the price first asked; twenty, thirty, or even forty per cent. is no great abatement in horse-dealing. Be cautious when a seller warrants a horse, and at the same time candidly tells you of some defect. A little tenderness produced by a bad shoe, may mean incurable lameness; a slight cough, of no consequence, may signify broken wind, or chronic cough: and when it is said that the horse is a little troublesome to go about, it may often be concluded that he is notoriously vicious. When an auctioneer says that the horse is not warranted, but that he will warrant him for a guinea, his offer may sometimes be taken, but upon condition that a fair trial be allowed before payment. Always, when possible, delay payment until the horse has been minutely examined and tried. Be suspicious when delivery is refused until the price is paid, or a certain portion of it deposited—that is, when you are known to be credit-worthy. When a horse has many faults, object only to that for which he can be returned. To object first to the price, then to windgalls, and last of all to spavin, is to say that right or wrong, you are determined to break the contract. To a person of doubtful character never, and to a dealer seldom, return a *paid* horse until the price is refunded. There are men who manage to keep both the horse and the money.—*Stewart's Advice to Purchasers of Horses.*

Water Barometer.—A simple but effective barometer is in use at Liverpool by Captain Jones. The instrument is made of glass; in form it is like a balloon turned upside down, and a long upright spout, open at the mouth, affords the opportunity of filling it with water, and marks the state of the weather when in use. The elongated globe is filled with water till the fluid rises about an inch in the tube, and its action consists in a rise or fall of the water; the latter indicating wet and stormy, and the former fine weather. It is acted upon by the pressure of the atmosphere, requires no correction of any kind and is more sensitive and unerring than the column of mercury. The barometer is ornamental in appearance. It is much used in France, and its cost would not exceed 5s.

VEGETABLE GARDEN CLOCKS AND BAROMETERS.—We find the following curious observations published in the *Bell, or Weekly Intelligencer*, a literary gem of the last century. Fortunately at the present day clocks and watches are so plentiful that but very few persons would like to regulate their time by the flowers of the field. It is, however, interesting to notice the various influences and effects of the weather in relation to plants as well as animals and there can be no doubt whatever that much may be learned by studying their action:—"As there are but ten of the equinoctial plants which *open* at stated hours, the two first on the following list are taken from those which *shut* at a given hour:"—

	English Names.	Scientific Names.
Shut at 1	Proliferous pink	Dianthus prolifer
" 2	Marsh sow thistle	Sonchus palustris
Open at 3	Yellow goat's-beard	Tragopogon pratense
" 4	Yellow devil's-bit	Leontodon autumnale
" 5	Common sow-thistle	Sonchus oleraceus
" 6	Spotted hawkweed / Narrow-leafed ditto	Hypochœris maculata / Hieracium umbellatum
" 7	Broad-leafed ditto	Hieracium sabaudum
" 8	Narrow-leafed ditto	Hieracium auricula
" 9	Smooth-leafed ditto / Carolina mallow	Hypochœris glabra / Malva caroliniana
" 10	Garden lettuce	Lactuca sativa
" 11	Alpine bastard hawkweed	Crepis alpina
" 12	Blue-flowered alpine	Sonchus alpinus.

To this curious time-piece a couple of vegetable barometers may be added, which act upon similar principles, and are likewise sufficiently accurate for the gardener and farmer. The first barometer is the African marigold, or Calendula pluvialis. If the African marigold does not open its flowers in the morning about seven o'clock, you are sure to have rain that day, except it is to be accompanied by thunder. The second barometer is the Siberian sow-thistle, or Sonchus sibericus. If the flowers of the Siberian thistle, keep open all night, you are sure of rain next day.—G. T.

A Large Onion Grower.—The *Essex Herald* says—"That Mr. Circuit, a farmer at East Ham, has at the present time upwards of 600 people—men, boys, and women—employed in pulling, carting, and peeling onions for pickling, and they will be thus engaged for two months. He pays wages to the amount of £200 weekly, and the cost of each acre of onions averages £100. This includes preparing the ground, seeds, weeding, gathering, and peeling. Last year he sowed nearly a ton of onion seed. The onions are pulled by women, by the rod, and skinned by the gallons. At this season he makes about 1,500 different payments daily, as the people employed receive their money three or four times a day."

Animal Manure.—A vessel named the Othello arrived from Buenos Ayres, has brought a cargo of animal manure. This is a distinct description of manure from guano, and is officially designated by the term mentioned.

Few people know themselves, because they find the study of themselves an employment but little calculated to satisfy their pride or vanity.

The sweetest flowers are those which shed their odours in quiet nooks and dingles; and the purest hearts are those whose deeds of love are done in solitude and secret.

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