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THE

CANADIAN AGRICULTURAL JOURNAL.

VOL. I. MONTREAL, SEPTEMBER 2, 1844. No. 9.

In reading the proceedings of the Royal English Agricultural Society, we cannot but be struck with the contrast between the conduct of the leading men of England, and those of Canada. In the former country, from the highest in rank, talent, and station, all are united in their endeavours to promote the good of their common country; but how is it in Canada? We must all see how great is the necessity for Agricultural improvement with us—there cannot be any difference of opinion on that subject, and yet with what perfect apathy it is regarded. The most trifling political subject appears to possess infinitely more interest for our best educated men, than Agricultural improvement, which is of vastly more importance to the inhabitants of the country, than all political questions put together. We appear to have different views and estimates of things here from any other people on earth. Perhaps it is not proper that we should refer here to what our own exertions have been to promote Agricultural improvement, but as we have become responsible for a considerable amount in the expenses of publishing this Journal in English and French for a year, we hope we may be pardoned, for expressing our regret at the deficient support we have received. We may safely state that we have expended more money, and time, on Agricultural publications than any other individual in the province, and we commenced this Journal in both languages with the sole motive of creating some interest, for Agricultural improvement, and certainly with the hope that we should not be at a loss, but would obtain ample subscriptions to cover all expenses. We find, however, that in the latter expectation we are likely to be disappointed. We have received the most flattering letters of approval from Roman Catholic Clergymen in all parts of Eastern Canada, but this will not be sufficient to remunerate our expenditure of time, and money. Had our means been more adequate, we would not regret the sacrifice of a few hundred pounds to promote the object we have so much at heart since we came to the country. Had we only ten or a dozen subscribers in each parish in Canada East, it would cover all expenses, and amongst seventy or eighty thousand proprietors of farms one would suppose we could not want support for the only Agricultural Journal published at the low subscription of one dollar annually. If our original matter is deficient in merit, we can state that our selections are made from the best publications in circulation, on agricultural improvements. Generous support to our humble exertions would encourage us to write what might be more useful to the public and more satisfactory to ourselves.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

MEETING AT SOUTHAMPTON.

Another great era has occurred in the agricultural world in the past week—a week which has proved fertile in pleasurable reminiscences; a week in which we have had the inexpressible satisfaction of giving to, and receiving from, the British yeomen—the honest propellers and supporters of England's greatness, her agriculture—the most hearty, the most heartfelt congratulations that we have been again permitted to meet together to celebrate another annual meeting of the Royal Agricultural Society of England. Without wishing to be prolix in our introductory notice, we cannot refrain from taking a slight glance at the past progress and present position of this truly national, this highly important Society. Looking then to the period of its formation, we honestly confess—assured, as we are, that all our readers will join us in the opinion—that its progress has been such, that its position is now placed on so firm, so solid a basis, as to produce in the minds of many no little astonishment. Thanks, then, to the increasing exertions of its supporters, whose numbers, though not quite so numerous as the particles of sand upon the sea shore, have swelled to those exceeding by far the expectations of even the most sanguine. Carefully—aye, most studiously, divested of all political bias—the improvement of agriculture, in the strictest sense of the word, being the great object in view—noblemen and gentlemen of all opinions have joined together to accomplish that important end. Who is there, then, but will hereafter revert with pride and satisfaction to this union? Who is there, then, that does not at once see that it is demonstrative of a future improvement of that science—though a primitive one—the agriculture of the united kingdom? That such a Society has now become indispensable, is evident; and that it is now the great centre from which may, henceforth, be directed human energy and skill, by the chemical and mechanical appliances of modern times to agricultural improvement, is equally apparent. Some may, perchance, be disposed to consider these observations superfluous; but we conceive it to be the duty of every person, whatever may be his station in society, to endeavour by all means, however humble, to support and carry out the principles of such a Society as that now claiming our attention.

The business of the day may be said to have been commenced by the opening of

THE IMPLEMENT YARD

to the public at eight o'clock. The portion of the ground appropriated to the implements was about half of the whole inclosure, which was much larger than on any previous occasion; hence, as may be inferred, the most ample accommodation was provided for the various exhibitors, and a good opportunity given to the visitors to inspect the ploughs, &c. This large square was occupied by open sheds, arranged in parallel lines, and beneath, the implements properly numbered and deposited. Viewing these sheds from any part, a most pleasing effect was produced; indeed, everything had a most pleasing, most unique appearance. As to the various implements of husbandry, we may venture to

observe that a greater display of human ingenuity and skill was never before seen. For instance, there were nearly fifty specimens of various kinds of carts, upwards of sixty of chaff, hay, and straw cutters, several varieties of churns and cheese pressers, between thirty and forty species of crushers, about 100 different kinds of drills, thirty or forty kinds of harrows, and ploughs to be reckoned by hundreds. Then there were pumps, racks, rollers, scarifiers, sowing machines, steam engines, troughs, wheels, weighing machines, winnowing machines, dressing machines, and machines and agricultural implements *ad fidium*: so that one might soon have become "muddled," ere he had half gone through this extraordinary exhibition, or comprehended a fiftieth part of the ingenious inventions which were submitted to his notice. As might, therefore, be imagined, the judges—with whose decision every one was well pleased—had a most arduous task to perform; but justice has, we are happy to say, been most fairly meted out to all.

As for the novelties in this exhibition, there were but few calling for any special observation. There is one point, however, worthy, at such a period, of particular notice—we mean the great improvement apparent in the draining machines. The comparative low price at which those tiles can now be produced, must prove a great boon to the agriculturists at large; bring spots into cultivation over which, otherwise, no ploughshare would, perchance, ever pass; and hence increase the cultivation of the soil. Although there were others in the yard of a very high character, the most simply constructed was that brought forward by the Messrs. Ransome of Ipswich, and to which was awarded £10, and a silver medal. We cannot praise this machine (worked by hand labour) too highly, for it is most decidedly the most unique and useful we ever witnessed. It is the invention of Mr. Etheridge. The attendance of visitors in this portion of the yard, to-day, was not very large, owing to

THE PUBLIC EXHIBITION OF THE WORKING OF THE IMPLEMENTS

being appointed to take place on the farm of M. C. Cator, of Swathling, such being the most interesting point of attraction; every vehicle was put in requisition to convey company to that place—the road from Southampton to the ground being literally thronged with carriages, &c., conveying the curious and interested to the place of destination, situate about four miles out of Southampton. It is estimated that upwards of 10,000 persons attended this trial.

The judges on this occasion conducted the proceedings most impartially, and in a manner which gave general satisfaction.

The field selected was a level of considerable extent, a clover ley, and adjoining the railway. The ground was not in good order for working, in consequence of its being unusually hard from the long drought. Precisely at 12 o'clock the ploughing-match commenced. There were 16 ploughs started, among which were two specimens of American ploughs presented by Professor Colman. The contrast between the working of these trans-atlantic ploughs and the English ones was most striking, and was the most perfect practical refutation to the self-congratulatory remarks of Daniel Webster, who, on his return from England, stated that he had not seen any implement in England worthy of comparison with those of America. We particularly examined the work of these ploughs; and, compared with the level rows made by the English plough, which appeared as though cut out by a plane, they were coarse, rough, and irregular. The work of the competing ploughs, with the two exceptions we have alluded to, was generally good, especially so, considering the state of the soil. One of the ploughs was a new implement made by Messrs. A. Ransome having a moveable nose-piece, which adjusted the pitch of the share either to take more or less hold of the ground, or laterally to give it an inclination more or less toward the land. This plough won the prize of ten pounds and a silver medal, in competing with the others as a heavy land plough; and also won the prize of ten pounds and a silver medal in its competition on the light land. Another of the ploughs was also a new implement by the same exhibiters, the peculiar feature of which is that the mould board of this plough is adapted for turning furrows four and a half inches deep, and nine inches wide so as to leave the angle of the furrow slice precisely at 42 degrees. Another plough, fitted for deep and tenacious land, was brought forward by the same exhibiters, and elicited great approbation. Mr. Locock's patent plough—also shown by the Messrs. Ransome—was a most excellent machine, and did its work remarkably well. A prize of £5 was gained for it. The other implements tried were a two-wheel pulverising plough, invented by Mr. Wm. Mason, for light soil; a one wheel or swing plough, by Messrs. Tasker and Fowle, of Waterloo Iron Works, Andover; an iron swing plough, by the Earl of Ducie, which obtained a prize of £5 at the Royal Agricultural Society's meeting at Bristol. A two wheel wrought iron plough, with patent coulter, by Messrs. Sanders, Williams, and Taylor, of Bedford, worked by two horses. A one wheel plough, by Mr. Hugh Carson, of Warminster; a patent iron plough, for sand and other light land; an iron plough, trussed beam, and steel breast, invented by Ransome, and manufactured by Messrs. Sims and Brown of Tollard Royal, Dorsetshire; a one wheel plough, invented by the exhibiter, Messrs. Barratt, Exall, and Andrews, of Reading, fitted with an open turn-furrow for ploughing loamy and other adhesive soils.

The trial in which the above implements were used, passed off tolerably well. At its conclusion, the other implements on the ground, consisting of drills, harrows, clod-crushers, and numerous other articles were tried in an adjoining field, and all excited general attention. This trial being over, the crowds of visitors betook themselves some to the implement yard, others direct to town by the most available means. This closed the first days proceedings.

LUCERNE.

We have often urged the culture of this excellent grass, and we have been greatly strengthened in our opinion of its superiority over all others, as an article for soiling, the present summer. We have had occasion to pass a small patch of *mixed lucerne and clover*, almost daily, and have taken particular notice of it. It has been cut twice already, and although the clover is but a few inches in height, the lucerne is ready for the third cutting, and we have no doubt will permit a fourth cutting before the frost sets in.

The value of a grass which will bear such a repetition of cutting, cannot be too highly appreciated, and we have regretted that there should be such a manifest indisposition prevailing among farmers to enter into its culture.

There are but few farmers whose pastures afford any thing like a *full bite* to their cattle during the later part of summer and fall: such might supply this deficiency by providing a few acres of this grass, to be cut for the purpose of soiling of a night, thereby relieving their pastures. Two acres well set in lucerne, if the soil be good and enriched with manure, would afford suf-

ficient food to soil 20 head of cattle, of a night, from the middle of July till frost, besides affording one crop of harvest.

Independent of the relief such management would afford to the pastures, the milch cows would yield more and better milk, as lucerne is known to contribute to the quantity and quality of that article, in an eminent degree. Another advantage to result from the system of night soiling, would be the greatly increased quantity of manure which the farmer would be enabled to make; and every body knows that manure made in the *summer*, is infinitely richer than that accumulated through the winter.

The labor of cutting and feeding out the green food for soiled cattle, we are aware has much force of objection with those who are content to let them pick up a precarious sustenance where they list; but to the economical farmer, who looks at the subject with a judicious, calculating eye, such objection should have no weight whatever, as the intrinsic value of the extra manure made, would more than compensate for the *time* thus occupied.

There is another reason that has tended to retard the culture of lucerne. Most of the writers upon the subject of its culture, insist upon the necessity of drilling it, and whether rightfully or otherwise, we are aware that great aversion prevails among most American husbandmen, to such pains-taking culture. But we are fully impressed with the belief, that, if the ground be well and thoroughly prepared with a view to the destruction of weeds, that *broadcast* cultivation will answer every valuable purpose. If we were asked how we would prepare the ground, we would say, that it should be plowed deeply and subsoiled in the spring as early as good work could be done; that after harrowing, it should be permitted to remain until a crop of weeds started, when they should be plowed in a few inches; then we would harrow it and let it remain until a *second* crop of weeds had covered the ground, when we would haul on our manure, plow that in, harrow the ground finely, sow the seed 20 lbs. to the acre, harrow it lightly, in sow on the surface ten bushels of lime and as many of ashes to the acre, and finish by rolling.

If notwithstanding our pains in the preparation of the ground, weeds should make their appearance in quantities to threaten the lucerne, we should have them extirpated the first season. After that there would be no danger to be apprehended, as from the rapid growth of the lucerne, it would protect itself from all intruders of the weed kind.

With regard to the after-culture of the lucerne, we would top-dress it every fall with a compost made of equal parts of well rotted manure and ashes, taking care to give the ground a good harrowing always before spreading the compost; after the latter operation we would pass the roller over it, and each spring, as early as possible, we would spread a bushel of plaster over each acre of it.

This may be considered a troublesome method of culture; but it is only so in appearance; for whatever a man *wills* to do, is, in reality, no trouble at all, provided he sets his heart to its accomplishment; therefore, the apparent labor indicated by our method, should be viewed as trifling, when it is considered that a field of lucerne once well set, will serve as a soiling resource for ten or twelve years, and that by pursuing the plan of yarding and feeding the cattle at home of nights, the farmer is enabled to provide his crops with a more abundant supply of manure which would be otherwise dropt where it would be unavailing to him.

These are then considerations which should not be without their influence. The cattle generally would look better; the milch cows would be more docile, give more and better milk, and consequently yield more and richer butter, while the whole would enter upon their winter keep in better condition.—*American Farmer.*

LUCERNE.—In no former period (says a correspondent of the Mark-Lane Express,) have I experienced the value of lucerne, as during the present protracted drought; I have now nearly finished my first crop, which I have been cutting green for horses and cows, much of which measures in height 36 inches, and very thick; my second crop is now from 24 to 26 inches high, and as thick as the first. I am now about cutting this for hay. It does not appear to be in the least affected by the severe drought, which I attribute to the very great depth the roots run down. I would again urge all farmers to try to grow lucerne, for of all summer food for horses, this is the very best: I am inclined to say, likewise, nothing can be better food for cows, for my own have lived entirely upon it the last three weeks, my feeding pasture being quite burned up for want of rain, and have produced a full quantity of butter.—*Mark-Lane Express.*

From the Boston Cultivator.

RECLAIMING EXHAUSTED LAND.

MESSRS. EDITORS,—I present you with the following experiment in reclaiming worn out lands, which will be read with interest; for the mode adopted is so judicious and rational, that such a course of procedure must of necessity prove decidedly advantageous under any circumstances. I have no doubt the plan of mixing lime with earth before using, would be found of far greater importance in the application of that article to land than any other mode; allow me, therefore to call the attention of your readers to the circumstance of the compost acquiring, by frequent turning, "the appearance and smell of soaper's ashes," and proceed to give, in the words of the writer, the following interesting statement. S. MARSHALL.

I will inform you, the Rockland Farm exhibited a subject for experiment, as it has been reduced by cropping. Having read in various books the result of sowing plaster and clover, it was presumed that the sowing of these would be the extent of the expenses required to fertilize the fields in a few years; but the experiment proved that the plaster and clover used were both lost, as no one could point out at any season of the year, what field they had been deposited upon. The soil was a cold or heavy clay, blue, white, light brown, and a few spots of red clay, loaded with hard blue stone and rocks, chiefly quartz, mixed with iron and copper. Some of the experiments were made with plaster; others were made by top-dressing with lime, at the rate of 25 to 30 bushels per acre; the lime being brought 25 miles from the kiln, and laid on the land at 25 cents per bushel. It was formed into a bed, six inches in thickness, and covered with earth that had been ploughed and thrown over it before it was slacked; a heavy harrow was passed over it as soon as it had been reduced to powder, and the bed of lime and the earth then *frequently turned* by the plough and harrow, until the whole assumed the appearance and smell of soaper's ashes, containing about ten parts of common soil to one of lime. It was then carted and spread regularly over the field; and in every instance it gave a return of clover, equal to ten loads of stable manure to the acre. The idea of mix-

ing the lime and earth was suggested from spreading the refuse of lime and sand gathered from about buildings, and laid upon the fields, the effect of which I observed, was more immediate than any equal quantity of clean lime, although the mixture of lime and earth was equally so: the succeeding rains carrying the fertilizing principle of the lime, as from a sieve, into the soil below, completely dividing it, and rendering that which was before too compact and cold for the roots of the grass and grain to live in, both warm and open: when immediately the whole soil, which before felt hard under the foot, became so elastic that persons of observation, by walking over the field even in the night, distinctly told how far the lime and earth compost extended: the color of the soil was likewise changed into that of chocolate: now these effects seemed to prove that any thing which would separate the particles of the soil and admit the air, would render these cold and heavy clays warm and fertile, the free intercourse of air carrying off the acid, &c.; and to meet this idea, ploughing in the fall was adopted and found successful. As an experiment, one half a field, six years ago, was ploughed in the Autumn, the other half in the Spring; but that part which was ploughed in the Spring has never yet brought grain or grass equal to the other. Spreading manure in the Autumn from the compost heap, has also been attended with universal success, both upon grain and grass; the salts of the manure being carried into the soil by the rains upon the breaking up frost, which had in some measure prepared the soil to receive it. Vegetable substances have also been covered with earth, and when well rotted, the compost has been used with the same success as stable manure; and so long as they operate in separating the soil and promoting the access of the air, they fertilize and change the color of the mould.

W. Young.

CULTIVATION AND MANAGEMENT OF FLAX.

Weeding.—Weed the flax as soon as it is a few inches high, and can readily be distinguished from the weeds. One great cause of the superiority of the foreign flax arises from the pains taken to weed it; the crop is sure to pay for all the expense incurred. This is done abroad by women and children, who, with coarse clothe round their knees, creep along on all fours. This injures the young plant less than walking over it. They work, also facing the wind; so that the plants, laid flat by their pressure on them, may be blown up again, or assisted to regain the upright position. This fact proves what minute attention is paid to every circumstance which can possibly affect the crop. The tender plant, pressed one way' soon recovers; but, when twisted or flattened in different directons, that seldom occurs.

Pulling and Rippling.—To judge of the time of pulling, the best criterion is, when about two-thirds of the stalk is observed to turn yellow, and lose its leaves; but the fibre is in the best state before the seed is quite ripe: and, if the quality of the fibre alone be the object of the farmer, the flax should be pulled without waiting for the seed to fully ripen. The seed, however, is valuable for the oil it contains, or for feeding, and forms an important object in the value of the crop, as it will produce from 4*l.* to 7*l.* per Irish acre. These advantages are to be balanced and determined by the grower himself, and some judgment is required to ascertain the *exact time* when the greatest value from the crop may be secured; for there is great variety of opinion on this point. In Belgium, the early pulling is reckoned to yield the finer flax; while, in Holland, it is though that, though it may appear finer, it is weaker, and greatly deficient in weight, when returned from the scutchers and the hacklers. When any of the crop is lying, it should be pulled as soon as possible, and kept by itself: the long, middling, and short, being tied up separately. This is particularly attended to on the Continent, and must be a great means of enhancing the value to the spinner, and, consquently, to the grower, who will be amply *paid* for the extra trouble. When the flax is pulled, it is laid on the ground, in handfuls, heaped in small parcels, each handful crossing its fellow, and left to dry for a day or two. It is then tied up in sheaves or bundles (each of which would about fill the two hands); carried off the field, for rippling, or rippled on the spot, and then taken away to the steeping pools. The Courtrai system of stoking the flax, as soon as pulled (without being bound)' is well adapted to this country. The handfuls are set upright each resting against the other, the root ends spread out, and tops joining like the letter A, forming stoaks of about 8 feet long, and a short strap keeping the ends firm. In this way, it will resist rain, "wind" well, and dry fast. In eight or ten days it may be bound up in small bundles, and carried to ripple and steep; or it may be stacked in the field, or put into a barn; the seed to be taken off at leisure in winter; the flax to be steeped the following May. This is a system strongly to be recomended for this country, where the convenience of parties will admit. For steeping and grassing the best season of the year is thus ensured—a time of comparative leisure, when the time is not called off to the harvesting of other important crops. The flax is said also greatly to improve by keeping over even for *two or four years.—Belfast Mercantile Register.*

DR. MURRAY'S LECTURE ON CHEMISTRY.

The fact of plants which are growing in the dark giving off carbon and absorbing oxygen, gives rise to a particular process called blanching, which is used in order to render the plant tender; this is done by accumulating the oxygen in the plant; when the plant is brought into the broad light of day, the usual change taken place. Besides these there are occasionally other elastic fluids evolved from plants; these are ascertained to be chlorine, ammonia, and nitrogen gas; these are evolved by the plants, when the soil in which the plants grow contain much of the substances that have those elements in them. The leaf of the plant is an expansion of the bark; it consists of two layers of vessels, covered by a thin membrane on both sides, which are filled with an immense number of pores, and from these the exhalations proceed; those on the under side of the leaf are the absorbents; this may not be the case in all instances, but it is generally found to be so. The inner bark conveys the substances absorbed by the leaf to the root of the plant; and by means of the innes bark, the stem is enlarged by deposition of annual layers; in the bark of the root further changes take place, there being then an absence of light; these changes are observable from the fact that substances are frequently found in the root that are not to be found in the bark of the leaf or the stem—a number of medicinal substances for instance. Having considered the structure of plants Dr. Murray proceeded to notice the course of the sap, the vital or circulating fluid. If the trunk of a plant be cut off from the roots, and these plunged into a coloured solution, the coloured liquid will ascend and tinge the surface of the plant, and it will continue to ascend till it colours the leaf, the bark remaining untinged; it then begins to return down the stem and colours that portion of the stem down which it passes. It may be asked how does the water ascend in the stem? Various causes have been assigned for it, such as capillary attraction, that is, the attraction which minute vessels are supposed to have for fluids, in drawing them above their level; this action is shown by small tubes; if we take a portion of coloured solution, and place in it tubes of various sizes, the water rises in the tubes in proportion to their width; when we apply this to the vessels of plants, which are so very minute, it is possible that the sap may rise by capillary attraction; but it is known that if the top be cut off a plant when full of sap, the sap will continue to flow from the top in large quantities, sometimes for days together; these facts are irreconciable with the theory of capillary attraction; to obviate this difficulty it was supposed that the stem underwent an alternate contraction and expansion, but this explanation is by no means satisfactory. Another has been given, called *endosmosis* and *exosmosis*: if we take a wide tube, cover the end of it with a piece of bladder, introduce

into a smaller tube, and then place it in a coloured solution of a strong syrup, such as sugar dissolved in water, the coloured solution will gradually pass through the bladder into the wide tube; it will then enter the smaller tube, and will in time flow over at the top. Deutrochet attributed these effects to the action of electric currents; this throws some light on the mode in which the sap rises up and descends; the process will continue until the two liquids become of the same density. Dr. M next referred to the ultimate elements of plants, which are carbon, oxygen, hydrogen, nitrogen; there are also phosphorus, sulphur, and other ingredients, forming the inorganic portion of plants; these exist in almost all vegetables. Carbon forms a large portion of the plant; it is derived from various sources, such as from the decompositon of dead bodies, from manure, &c., but by far the largest supply is obtained from the atmospheric air, acting upon the leaves of the plant. The part of the plant derived from solid inorganic substances enters in also at the roots. The oxygen of the plants is derived from several sources; it forms a large constituent portion of water itself, and is also absorbed by water; it is easily separated from the hydrogen of the water, and hence a large supply is kept up. The atmosphere contains 21 per cent of oxygen, and the leaves of plants absorb it in certain cases: it enters into solution with water. Hydrogen is also obtained from water; from the facility of combination and decomposition between the elements of water, these changes are constantly occurring in the vessels of plants; there are other sources of hydrogen; caburetted hydogen is obtained from the decomposition of vegetable matter; a considerable portion is extracted from ammonia, the ammonia containing hydrogen and nitrogen; hydrogen will also be obtained from the soluble organic substances entering the roots of plants. The nitrogen of plants is in so small a quantity that we might suppose that it was scarcely essential, or that it exercised no important influence in the growth of the plant; but we find that this element is equally essential with any of the others, for if these small quantities are absent, the physical and chemical properties of plants are very materially altered, and an injurious effect is produced both upon animal and vegetable life; when we consider the whole quantity of nitrogen in a crop, it is absolutely large; if we take a crop of hay obtained from an acre of ground, we shall find the quantity of the whole of the nitrogen contained in it to be large; hence its important influence; nitrogen does not exist in the solid matter of the globe; there is no source but the atmosphere from which it can be derived, and the nitrogen of the atmosphere to a small extent may enter by solution with water, or be absorbed by the leaves; the quantity observed by water, however, is exceedingly small, and it is therefore improbable that plants can derive any considerable portion from it; ammonia is capable of entering plants in large quantities, and of yielding up its nitrogen; this is an abundant source; nitric acid can enter into vegetables, and produce nitrogen; we have an example of this in the application of saltpetre or nitre, from which nitric acid is produced; it is supposed that the salts formed by nitric acid are much more abundant in manure heaps than has been generally thought; it is found that this acid is readily formed where animal or vegetable matter is undergoing decomposition; other animal compounds, such as urine and night soil, afford a large quantity of nitrogen to the growing plants. In this mode a perfect plant derives its food. The next points to be considered are, the period of germination, the expansion of the leaves to the flowering, from the flowering to the ripe seed, and from the ripening to the fall of the leaf. First, the period of germination; the circumstances indispensable to the process are, first, moisture, second a free exposure to air, and third, a due degree of warmth. No circulation can take place in the plant until water is largely imbibed; no food can be conveyed through the vessels unless there be a constant supply of fluid. A slight elevation of temperature is necessary for the process of germination, and in most cases absolutely necessary, though some plants grow with a very little increase. Exposure to air is necessary, as shown by the fact that seeds will not grow if excluded from air; if buried deep in the soil, they remain long unchanged, sometimes for years, but when the soil is turned up, they speedily begin to grow. Light is positively injurious to germination; in the mode of sowing, much of the grain remains uncovered, and the prejudicial influence of light is one reason why by dibbling fewer seeds fail; the reason of the injurious effects of light is that the young germ requires to get oxygen from the air, and to evolve carbonic acid, and the opposite of this takes place under exposure to light: When the germ has extended to a sensible length, it has a sweetish taste—the saccharine matter, commonly called grape sugar, is formed in the sap of the young plant, which is one of the first changes of the starchy matter; the young wood consists of a mass of vessels, which increase and expand into leaves, when a different change takes place, the plant deriving its food from the air, under the influence of light, to which it has now become exposed; the leaf absorbs carbonic acid and evolves oxygen; it is therefore in the light plants increase in size and growth; as carbon is added to the plant in the presence of light, the sap unites with it, and forms any one of these compounds presented by carbon and the elements of water; the solid parts of plants are principally made up of carbon. The opening of the flower is the first and most important change towards the production of the seed; at first the flower leaves absorb oxygen and emit carbonic acid, and occasionally they emit pure nitrogen, but this process ceases when the flowers are matured; and in those plants which afford large quantities of sugar, the sugar becomes less abundant, passing into the state of starch or gluten, and beginning to form the husk of the future seed; it is first tasteless, afterwards sour, and finally sweet; lastly, the fruits, when green, act upon the air, absorbing carbon and evolving oxygen; but when they become ripe they absorb and retain oxygen; the same is the case with unripe fruit when taken from the tree. The chief energy of plants before flowering is spent in the formation of woody fibre; after the expansion of the flower, the woody fiber is not required, and the remaining functions are the formation of starch and gluten for the seed, and the husks to cover them; when the seed is fully ripe, the growth of the plant is ended: they no longer require carbonic acid as their food, having attained full maturity; their leaves therefore change their functions, absorb oxygen only, and resolve again into their elementary substances. Singular as these changes are, the rapidity with which they are carried on is surprising: tropical plants sometimes grow six inches or more in the course of a day, and when the solar heat is great they probably rise more. The rapidity of growth, and the quality of the plant are equally affected by circumstances, in the controlling and producing of which the practice of agriculture depends. On the deposit of rain, the action of solar light, and things of that kind, we have no control; but there are artificial methods by which we can hasten the growth, as in regard to the first change, that of germination, we can hasten it by moistening the seed with a certain solution. With water containing a solution of chlorine or iodine, the seeds germinate much faster. With sulphate of copper Sir Humphrey Davy ascertained that they germinated in two days, with sulphate of iron three days, nitric acid five days, and sulphuric acid in eight days. These substances seem to act as stimulants, and not as furnishing food to the plant. From what has been stated of the structure of plants, we will understand in what way the food is conveyed into them. The next inquiry will be into the chemical changes, by which the food is converted into the bodies of which the plants consist. The principles of plants are, as has been stated in a former lecture, divided into two classes ultimate and proximate. The ultimate or elementary principles are carbon, oxygen, hydrogen, and nitrogen; these four are the great constituents; they are simple bodies, and we call them elementary. The proximate principles of vegetables, are compound bodies such as woody fibre, starch, gum, sugar, gluten, vegetable albumen, diastase and vegetable ashes. Lignin, or woody fibre, which forms the great bulk of the plant, is composed of carbon, hydrogen, oxygen, and a little nitrogen. In this composition, hydrogen and oxygen are in the same proportions as are necessary to form water; hence, the composition may be represented by equal parts of carbon and of water. When the solid substance of the wood is examined,

it is found to consist of two kinds—cellulur tissue and solid wood; in roots, scuh as the potatoe, the proportion of woody fibre is small in the earlier stages, but if allowed to remain in the soil till old, the woody part is much larger, being increased at the expense of the other matter of the root. Starch, next to woody fibre, is most abundant and most important, and is one form of the ingredients which constitute the food of animals. To obtain this starch, take the flour of any of the grains and wash it with cold water through a cloth or sieve; a milky liquid passes through, and deposits the starch in the cold water. One of the tests of the presence of starch is a solution of iodine, which invariably produces a blue colour when it comes in contact with starch, and a very minute quantity of starch may be detected in this way. Starch consists of the same elements as woody fibre; hence, the facility of the conversion of one body into the other. Starch exists largely in the seeds of plants, and in some roots. Gum is a proximate principle, next in importance to starch, in a great variety of vegetables; it is obtained largely from the acacia tree, and is also prepared from a great number of common fruit trees; the composition of gum is the same as that of starch and woody fibre; it appears, therefore, that gum, starch, and woody fibre, are both represented by carbon and water. Gum is found in the roots of many trees, and it is a general product of the vegetable kingdom. Next to gum is sugar or saccharine matter; in the sugar cane, the maple tree, &c., sugar exists in large quantity, and is extracted for use; it may be obtained from many roots, such as the turnip, carrot, and beet; in the latter it exists in large proportion, and sugar is manufactured from beet in France and Germany; its chemical composition is the same as the other three bodies, and the constituents are in the same proportions; a variety of sugar exists, termed grape sugar, which resembles cane sugar in being less soluble in water, and less sweet; it is different also in the proportion of its constituents, having two times more water than cane sugar. These four bodies, then, woody fibre, starch, gum, and sugar, consist of these three elements, carbon, hydrogen, and oxygen, and of these the great bulk of vegetable products consists. There are other bodies which appear along with them, into which nitrogen enters. The proportion of starch in plants is as follows:—

STARCH PER CENT.

Wheat flour	39 to 77
Rye, ...	30 " 61
Barley, ...	67 " 70
Oatmeal, ...	70 " 80
Buck wheat, ...	52
Peas and beans, . . .	42 " 43
Potatoes (water 75), . .	13 " 15

There thus appears to be a very small proportion of starch in potatoes, but then we are to take into account the large quantity of water; the other grains are nearly dry, while in the potatoe there are 75 per cent of water, consequently if we remove the water, the proportion of starch is relatively large. Of the principles which contain nitrogen, gluten is the first and most important. When the flour of wheat is made into a dough, and washed upon a sieve, a milky fluid passes through, from which starch subsides, but on the sieve remains a a soft, tough, and elastic substance, without taste and smell; this is gluten. The other grains yield it, but in less quantity than wheat; when dry it resembles glue but is dissolved by acids. Gluten is one of the most nourishing substances we have; its proportion in grain is as follows:—

Wheat, ...	8 to 35
Rye, ...	2 " 15
Barley, ...	3 " 6
Oats, ...	2 " 5

These different proportions show us one reason why wheat is more nourishing than any other grain; it is the tough elastic principle of gluten that gives flour the power of swelling up in sponge and fermenting; in oats it is small in proportion and from oat flour we cannot make the same spongy bread. There is another principle associated with gluten, termed vegetable albumen, to distinguish it from animal albumen, as the same principle exists in both animals and vegetables; the purest example of albumen is the white of an egg; it has the property of coagulating when heated, and becoming solid. If the water used in washing flour to obtain gluten be heated and allowed to boil, small particles subside, and these are albumen; when it is moist and fresh, it has neither taste nor smell; it is insoluble in water and spirit of wine, but is dissolved by vinegar and the alkalies. The per centage of albumen is, in

Wheat, ...	¾ to 1¼
Rye	2 " 3¾
Barley, ...	1-10 " ½
Oats, ...	1-5 " ½

In the fresh juices of plants such as that of the cabbage leaf, it exists much more largely; when these are heated the albumen coagulates; gluten and albumen appear to be as closely related to each other as sugar and starch; they consist of the same elements, and are capable of similar conformations; when exposed to the air in a moistened condition, they soon undergo decomposition, producing ammonia and acetic acid or vinegar. Another important principle is diastase; if malted barley be crushed and mixed with a large quantity of alcohol, a white powder falls to the bottom, and this is diastase; if we take a similar portion of unmalted barley, none of this diastase is produced, but if the seeds have germinated it is produced; it is obvious from this that diastase is produced by the germinating process; it is only found in the germ, and remains there during the growth of the plant, and when the first leaves are formed, which adsorb carbonic acid and water from the air, it disappoars. Another principle, kindred to this, is dextaine; if the solution from the barley be mixed with starch and heated to half the heat of boiling water, the whole of the starch is dissolved, and if the water be carefully evaporated, a yellow powder is obtained, and to this the name of dextaine has been given. Diastase has the property of changing starch first into gum and then into grape sugar; one part of diastase will convert 2,000 parts of starch into sugar; hence if the seeds were steeped in a solution of malted barley, it would probably increase their germinating powers; a solution of diastase, also, soon undergoes decomposition, and it yields a large quantity of ammonia; from this enumeration of its properties, we can understand the functions of this principle; the starchy food of the germ is prepared for the use of the plant, but in consequence of its being insoluble in water, it cannot be taken up by the young plant; for this reason diastase is formed at the point where the germ first rises; it is produced from the starch itself, and as soon as it is formed it renders the rest of the starch soluble in water, and therefore fit for entering into the vessels of the plant; when the starchy matter is exhausted, the action of the diastase ceases; it is only necessary till the leaves and roots are fully formed. Along with this principle there are some vegetable acids, such as acetic acid and oxalic acid. Acetic acid is the most extensively diffused of the organic acids; it is formed during germination, and exists in the saps of many plants, but it is most largely produced during the fermentation of vegetable products: combining with the alkalis it forms salts which are soluble in water; in the fermentation of vegetable matter carbonic acid is evolved, and oxygen absorbed, and it is from changes of this nature that this acid is found in the bases of plants. Oxalic acid has been already described; as it does not exist in the soil, it must be formed by the changes carried on in the vessels of the plants. The other vegetable acids being chiefly found in fruit and fruit trees, and scarcely existing in vegetables cultivated for food, it is not necessary for our present purpose to notice them.

HYBRIDIZING.

Among the many contrivances by which man has succeeded in converting the wild productions of untamed nature into bodies better adapted to his artificial wants, nothing has produced more past advantage or promises more future profit than *hybridizing*. We shall not refer in this place to what has been done in the animal kingdom, but confine the attention of the reader to its effects upon vegetation.

The practice is regarded as one of very recent date; and so it is, as an artificial process, applied by rule to definite

purposes. But he must be a bold man who dares assign to it historical limits; on the contrary, it may be supposed to date from the creation—or rather, it is in a manner certain that it does. The presence of winds or insects must necessarily from the beginning have produced effects upon plants which resulted in hybrid productions.

Hybridizing is effected by applying to the stigma of one plant the pollen of some other; the end of which is the generation of a form, participating more or less in the attributes of both its parents. Nature, in her wildest state, opposes no insurmountable difficulties in the way of this operation. Insects, bepowdered with the pollen of one plant, plunge into the recesses of another, and thus effectually destroy the purity of races. The natural brush on the body of a bee will convey the subtile powder as well as the trim camel's-hair pencil of the artificial operator.

It is contended, indeed, that this cannot be; because if it were so, all species must, in the lapse of ages, be confounded in one inextricable chaos, But in the first place, this supposition is of little force, till it is shown that that which is easily done artificially cannot possibly take place naturally; and secondly, it must be proved that the wild races of plants actually do remain in all their original purity. No botanist would, we suspect, venture upon such an argument as that. The genera Salix, Rubus, Rosa, and Carex, would make the stoutest advocate of original purity pause before he threw himself into the lists. Nobody, in fact, can possibly doubt that wild hybrids exist, are common, and perhaps much more frequent than we think for. We will not stop to quote notorious and proved instances of this, because we regard the fact as being beyond all dispute.

Let us not, however, infer from this that no natural obstacles are opposed to the indiscriminate mixture of races in plants; on the contrary, there are barriers which cannot be overleaped. By some mysterious agency, there is a complete bar to all intermixture of plants not closely related to each other. An elm may certainly mix with an elm, and perhaps with a nettle-tree; but not with an oak. A peach may, peradventure, cross a plum, but not an apple. These obstacles are, doubtless, connected with the molecular constitution of plants, the precise nature of which we have no means of examining. Another obstacle consists in the obvious fact that the pollen of a flower has a better opportunity of falling upon the stigma that belongs to it, than pollen brought from any distance; and we know that if pollen has once taken effect, no after-application of other pollen can change the result. In fact the natural hyrid of wild plants will generally take place when, owing to some accidental cause, the proper stamens of the flower prove defective.

But there is a still more effectual obstacle to the confusion of races by natural hybridizing. Although we conceive that the *production* of hybrid plants naturally is of more common occurrence than may be supposed, it must be remembered that the *preservation* of them is quite an artificial process. A hybrid tree springs up; it has no means of multiplying itself, except by seed. That seed has no stable constitution, but has a tendency to return towards the condition of one of its parents; in this way the hybrid disappears, while the parents remain; or it may be, and often is, barren; and then it remains as a solitary, childless individual. Again, a hybrid herb appears; it is exposed to the same obstacles as the tree, in the way of perpetuation: it is barren; its seed of themselves tend towards the original stock, which is recovered in a generation or two; or they are at once fertilized by the pollen of one of the hybrid parents, when the tendency to a return to its original stock is increased tenfold in strength. It is not, therefore, likely that natural hybrids will often be long perpetuated, although they may be frequently produced.

We mention these things by way of vindication of hybridizers, who have been accused of attempting to subvert the whole order of nature by monstrous practices. It is clear that they only imitate the practises of nature. It is equally clear, too, that the occasional formation of natural hybrids is intended as a manifestation to man of one of the sources of power with which he is so largely provided. His reason is to be called upon to turn to profitable account that which, in savage nature leads to no result.

Hitherto the operation of hybridizing has been mainly confined to gardens. But see what advantages have come of it there. What were our Roses in 1789, when the first China Rose reached England? and what are they now? The China Rose hybridizes so freely with almost every other, that there is hardly an ancient species to which it has not lent some part of its rich foliage, gay colors, and abundant blooming. Can anything be more striking than the effect of hybridizing upon Pelargoniums, Heaths, Gloxinias, Verbenas, and Gladioli? By this process we have given to the hardy Pears of the north all the richness and delicacy of those of the south; to watery grapes the perfume of the Muscat; to the pale-faced but hardy Rhododendrons of the Caucasus and America the rich and glowing colors of their tender brethren of India; to the gaudy Azalea of Pontus, the crimson of the small-flowered fragrant species of the United States.

Such striking consequences of the very first operation in hybridizing, have excited a univers. desire to vary and extend them. Everybody now, who cares for his garden, asks himself in the first place what he can do to get new seedings; and to hybridizing he looks exclusively for assistance.

Hybridizing is a game of chance played between man and plants. It is in some respects a matter of hazard. What increases the charm of the game is, that although the end of it may be doubtful, yet a good player can judge of the issue with tolerable confidence, and that skill and judgment have in this case all their customary value.

Though hybridizing has already led to important results, they are probably nothing compared with what may be expected to come of it. We anticipate through its assistance a change in the whole face of cultivated plants, and we shall be much surprised if even a few years do not bring us acquainted with races of trees, esculents, corn, and forage plants, of at least as much importance in their way as those which have already appeared among fruits and flowers: all that is wanted is to call attention to the subject, and to point out what the principles are which the experimenter has to bear in mind.

The effect is produced by applying the pollen of one flower to the stigma of another. The pollen indicates the male parent, the stigma the female. In performing the operation, it is necessary to use these precautions:—The female flower must be deprived of her stamens before they burst and disperse their pollen; and as soon as the stigma is glutinous enough to hold it fast, the pollen must be applied with care. Should this care not be taken, the stigma is very likely to be inoculated with the pollen of her own or some other flower, and then the pollen which it is intended to use will not take, for it must always be borne in the mind that a stigma once inoculated cannot be inoculated again. From want of these precautions, people are continually fancying they have obtained hybrids when they have only gained natural seedlings. At least half the specimens of so-called hybrids sent to us for examination, are not hybridized at all. When the Dean of Manchester, who is the greatest of all authorities in this matter, wishes to obtain a cross, he always endeavours to force the female parent before others of its kind blow, so as to be insured against accidental inoculation from pollen floating in the air. Want of attention in these minutiæ has led to some singular errors on the part of a very ingenious correspondent, who fancied he had obtained hybrids between Crinum, Ismene, Buphane, Calostemma, &c., while he had only raised the usual seedlings.

It is hard to say within what limits the operation may be successfully practised. The general rule is, that plants very nearly related, are able to inoculate each other. But there may be exceptions to this. At least we know that very near connexions have, or seem to have, a great aversion for one another. For example, a Raspberry and Strawberry are first cousins, yet they appear to have no mind for an alliance. A Gooseberry, Currant, and Black Currant, are still nearer to each other, and their repugnance seems invincible; at least nobody has yet found means to hybridize them with each other, though many have attempted it. On the other hand, Heaths, different

as they are from each other, intermingle freely; Cereus speciosissimus is readily inoculated with the night-flowering Cereus; and even the creeping Cereus has been crossed with the former; the Rhododendron will fertilize the Azalea; and, strangest of all, the Red Cedar has on several occasions been found to inoculate the American Arbor Vitæ, the issue from which is that curious whipcord-branched plant, called in the gardens Thuja filiformis. This singular shrub was so produced for the first time in Messrs Loddiges' nursery at Hackney, and has since been obtained in the same manner at Paris. These facts open a very wide field for inquiry, and are especially valuable as affording evidence that the limits of hybridizing are far from being narrow.

In the midst of many experiments conducted without exactness, from which no safe conclusion can be drawn, there are some which, in the hands of such men as the Dean of Manchester, seem to justify the important inference that, as a general rule, the properties of the male parent will be most conspicuous in the hybrid. For example, Mr. Herbert crossed the long yellow-cupped common Daffodil, with the small red-edge-cupped Poet's Daffodil; and the seeds of the common Daffodil furnished a bulb with most of the attributes of the Poet's Narcissus. The same gentleman obtained also out of a capulse of Rhododendron ponticum, inoculated by Azalea pontica, seedlings which had entirely the habit of the latter or male parent. When the common scarlet Azalea, with its crimson flowers and narrow leaves, was inoculated by Azalea pontica, Mr. Gower found that its seeds produced plants much more like the male than the female parent. Exceptions, or apparent exceptions to this, do no doubt exist, and hybrids could be found which are either half way between their father and mother, or more like the mother than the father; but as far as any means of judging at present exist, these would seem to be the exception and not the rule; and therefore the greater influence of the male may be taken as a tolerably safe guide in all experiments upon this interesting art.

The Canadian Agricultural Journal.

MONTREAL, SEPTEMBER 2, 1844.

This makes the ninth number of our Agricultural Journal, and we beg to state, that a considerable number of copies both in English and French, complete from the commencement, remain on our hands for new subscribers. We have printed a large number of copies in both languages, in full expectation of obtaining subscribers for the whole, but we now find that we have not subscribers to the extent we expected. By some mistake, the Journal has not been sent to several individuals who, we believe, would have been subscribers, and have only discovered this error within a few days. We trust, however, that our friends will pardon the neglect, and we shall now furnish full copies from the commencement. Our Journal is not like a political journal, out of date when a few days old. Most of the contents of an Agricultural publication will have interest at any time for the farmer—or the farmers' friend. We have done all in our power to make our Journal interesting and acceptable to subscribers, and it certainly should not be too much to expect that we would find subscribers to cover all our expenses. If the Journal is not deserving of any encouragement we would not ask for public support, but if its contents are of any value, we think it strange that the only Agricultural Journal published in Canada East should not be well supported. We have been at the expense of translating the Journal into the French language also, and it now remains with the friends of Agricultural improvement whether they will remunerate us for the expenses we have been at on account of this publication.

We may congratulate the inhabitants of Canada on the progress to completion of the St. Lawrence Canal, a public work, that, when finished, must prove a general benefit to the Province, affording easy means of communication from the remotest parts of Canada to the sea. This grand water communication will be as useful to those who have to buy as to those who have to sell, inasmuch as the facility of transporting produce either way, will be greatly improved, and the cost reduced. This will act as an encouragement to the farmer to produce, and to the merchant and consumer to buy. In all cases where a large proportion of the production is consumed in the cost of transporting to market, it must very much check production. This canal when completed, will be equal to offering a premium of fifteen pence the bushel on wheat produced in Canada West, and all other productions in the same proportion—and will be giving the Western country a fair chance of improvement. Many view the construction of this canal as a waste of money, but in the first place the money expended is not lost, but is on the contrary circulated, in the most useful channels in which capital could be employed. And it will be our own fault if the country do not produce what will give ample employment to the canal. We may further congratulate the public on the prospect we have of a Rail-road through the Eastern Townships towards Boston. This Rail-road would be an immense advantage to the inhabitants of the Townships and they have a reasonable claim that this advantage should be theirs as soon as possible, as nothing ever has been done for them to improve their means of communication with Montreal. We can answer for the people of the United States that they are most anxious to see it complete from Montreal to Boston. It is already in full operation from Boston to Concord, a distance of 75 miles, towards the Canada Line. If this Rail-road were completed to Montreal, the journey would be made from this to Boston in little more than twelve hours; from Concord to Boston is now done in three hours. We hope that every exertion will be made to have this road completed as soon as possible. It will afford means of communication with our neighbours of the United States, and we are convinced that such friendly intercourse between nations that ought to be English, in manners and feeling at least, would have a most happy influence. We may be anxious for this easy means of communication by Rail-road without desiring that the produce of the United States should be admitted duty

free, unless our produce and British manufactures are admitted to the United States on the same terms. When a law of perfect reciprocity shall be established between both countries, the farmers of Canada will not desire any partial law of protection for themselves. They will stand or fall on that law.

We have not seen much summer fallow this year, though we believe, that a considerable quantity of land has been cultivated in that way, and the summer has been very favourable for it. This is a mode of improving land which we wish was generally introduced, and we know not of any means more easy. We know that summer fallowing is disapproved of by many. In the British Isles where green crops—turnips in particular, may be grown to a great extent, the lands might be kept in a good state of fertility without much summer fallow, but even in these countries, there are some strong clay soils which require to be summer fallowed in order to clean them, and break up the soil properly. A large proportion of the Canadian lands are strong clay, and cannot be brought into a fit state of cultivation until summer fallowed. There is not a farm in the country that may not be greatly improved by this means judiciously executed—and we would strongly recommend its adoption. We cannot grow green crops here to the extent that would be required to keep the land in good order.

In England, at the present day, it is considered that only what we understand as "book-farmers" can practice agriculture to advantage. We do not, however, pretend to say, that the instruction contained in books would make up for the want of practical experience. What we contend for is—that the information which is at present in general circulation in agricultural publications in England and elsewhere, must be a great benefit and assistance to the practical working farmer—however skilful he may be—by long practice. Few farmers have it in their power to try new experiments, but in agricultural publications they can see the results of experiments made by men of wealth, and can adopt new improvements at much less expense and risk, than if they had to make the first experiments on their own account.

The farmer who may have the most confidence in his own skill, might find in agricultural publications useful suggestions which he had never previously thought of, and that farmer who could not collect from an agricultural paper during a whole year, more benefit than would compensate for a year's subscription, must indeed be a very selfish man, if he will not allow his brother farmers and the world to benefit by his superior skill, and judgment, that are of so high a character as to be incapable of further improvement. We would recommend most urgently that such men as have confidence in themselves that they cannot benefit by further instruction, would give some of the advantages of their skill and attainments to instruct others who have no such pretensions. There is a sort of obligation on all members of a community to act thus towards each other. We do not expect them to become schoolmasters, but we would propose to them to follow the example of our friends in the British Isles, and let them instruct the ignorant to practice the art of agriculture to the best advantage. We would offer one more observation. Perhaps in all cases where farming may be practised in the best manner, the results may not have greatly augmented the farmer's wealth. But in such cases we should see whether there has been a large produce raised. If there has—the distribution must have benefitted others; and if so, the whole community. If a large produce is raised upon a farm, though most, or all, this produce would go to pay the labour and expenses, it would certainly be a greater benefit to the country, by affording means to employ labour, than if the farm was only to produce half or one fourth the quantity. The man who raises a large produce whether advantageously for himself or not, must be a more useful member of a community than he who allows his land to be unproductive. This a plain proposition, and is worthy of attention.

Having said so much in recommendation of our Public Works, in contemplation and in progress of construction, we may offer a few observations respecting the trespass to which farmers may be exposed on the line of these works during the progress of their construction. It is, we believe, considered by many, and by most persons not exposed to the trespass, that because the farmers are paid the value of the property actually necessary for the construction of Canals or Rail-roads, ascertained by arbitration, that they should make no complaints, whatever further trespass or damage they may sustain. This we conceive to be a very unjust opinion—particularly as regards farmers residing on the Island of Montreal, who never can profit by Canals as a means of transporting produce to market. One great cause of trespass on farmers is, that of collecting a large number of labourers along a line of works, without shelter or firewood being provided for them. These poor men are only able to put up a shed constructed of board, not good enough to shelter cattle, and they must, as a matter of necessity, have fire-wood to warm them and cook their provisions, wherever it can be had. In such cases it will not be very likely they will enquire much into the right of property of the most convenient wood they can find, being in America, where wood is considered so abundant. The consequence is that farmers must suffer damage in their woods or fences, and in the loss of their fences, the injury is often very great, exposing them to trespass in many ways. These are evils of public works which we conceive might be prevented in a great measure by providing suitable shelter and fire-wood for the labourers, and making it a part of the expenses of constructing public works. We

think it would be much more just to do this than allow farmers to be injured, or allow the labourers to suffer very great hardships for the want of proper shelter and firing. If this was provided for by the Board of Works, or the contractors for the works, the labourers would be better disposed, because they would feel that some care was taken for their comfortable living. The works cannot be executed without them, and we are persuaded if more care was taken to provide for their comfort while executing the works, they would conduct themselves much more satisfactorily, and advantageously. We cannot on the present occasion point out how this might be done, and perhaps we should not attempt to do so.

We are however satisfied it could be done, and we believe it would be a great inducement to the labourers to conduct themselves properly. The Canal cannot be constructed without the labour of these men, and as they cannot procure houses to lodge in on the line, shelter and firing should be provided for them as a necessary of life, whatever wages they may receive beside. If this provision was made for the labourers they might then be kept under proper regulation, and prevented from committing any trespass. It would be greatly for the advantage of the labourers and for the whole community, that some measures of this nature were adopted on all public works, that comfortable lodging and firing should be provided for those employed. This would, at all events, check the necessity of stealing wood. When men think that circumstances justify them in appropriating any thing that does not belong to them, it leads them on into bad habits, and into a disregard of the right of property. The men should see that their comfort is cared for, when their labour is required. It is not sufficient that they receive a certain amount of wages, however liberal that may be, if they have only the open fields to lodge in, or such miserable sheds put up by themselves, as we have seen them obliged to spend a Canadian winter in, and these sheds they may carry away at any time they are discharged from work.

We do not impute any blame to the contractors for the work, for these matters, and we introduce the matter only to bring the subject under the consideration of the proper authorities. It must have a very demoralizing tendency that men employed under the government should have no shelter or firing provided for them, but as they will procure it wherever they can find it, we know that it is most injurious to the farmers. The labourers should be told "We want your services—we have provided you comfortable lodging and fire, and we give you besides so much wages, and we expect in return that you will do your duty, and conduct yourselves properly while employed." By the present system, the labourers are set to work where there are not houses for them to lodge in; they receive a certain amount of wages—and they may find lodging and shelter under the next tree or in a ditch, and firing from the next wood or fence—no matter who it belongs to. We candidly say we could not expect that strangers separated from home and kindred, in a strange land, would be very particular in their conduct under such circumstances. There are reciprocal duties between the employer and employed which must be fulfilled on the part of the educated party first, by way of example to the other party.

AGRICULTURAL REPORT FOR AUGUST.

We have had a considerable quantity of rain in the beginning of the month, and exactly that sort of weather that would produce rust in the wheat crop; but to what extent the disease has been produced, we cannot exactly state. One farmer informed us that he had sown on the 20th April, the common four months wheat of the country, and though not much injured by the fly, it was destroyed by rust, and that he had sown in the same field in an advanced period of May, some of the newly imported three months wheat, and that it was free from both rust and fly. We have wheat of the latter variety some on the 24th and 25th May, which is free from rust and from fly. If all farmers were to reserve such varieties of wheat as have proved to escape both rust and fly this year for seed the next year, and to sow no others, we might be sure to raise full crops of wheat again in Canada. We believe there is a sufficient quantity of suitable wheat now in the country for seed next year, and we would strongly urge farmers to use it only for seed. It is needless to offer any remarks on the sowing of fall wheat, as that should be sown before now, if possible, but where not sown now, we would recommend that it should be put in before the middle of September or not at all. On summer fallowed land it will succeed best, and if it were possible to apply even twenty bushels of lime to the acre, it would amply repay the farmer the cost of the lime.

It is much to be regretted that lime is not more employed in agriculture in Canada. There is no substance that could be applied to the soil which would produce more of the improvement required for good crops of wheat and barley. The cost of the article should however be much lower than at present to encourage farmers to make use of it.

We want some of that public spirit here that will urge forward these matters—and establish kilns of proper construction for burning lime to be furnished to farmers at a moderate price. It is a great mistake to suppose that attention to such matters would not be productive of general benefit to the country—but this appears to be lost sight of. The quantity of wheat raised in Canada this year will be considerable, and it is most encouraging to know that this valuable grain can be produced. The barley crop was excellent, and will be got in generally. We do not suppose that there was as much sown this season as the last, as there was much more wheat sown, and we rejoice at it—as the latter is the only grain we export. Peas are as good a crop as we have seen while in the coun-

try. A gentleman has informed us this year of the vast benefit produced in peas by the application of gypsum—and we believe it will produce more improvement on this crop than any other.

Oats will be a good crop—Indian corn has greatly improved, where sown in suitable soil. Potatoes are generally good, except where the seed has partially failed from dry rot, and from wet in the soil. They are now so far advanced as to give promise of an abundant crop. Hay was a full crop, but much of it has been injured in saving. We believe a large proportion is deteriorated in quality. The price in market at present, is very little over what would refund the farmer his expenses of mowing, saving, taking to market, and town charges, and have scarcely anything for the land which produced the hay, and this has been the case generally for several years. We think, however, that hay will advance in price before another crop is produced. Hay sells in Montreal now, for about one-fifth what it sells for in the principal markets of England. This makes a vast difference in the value of the returns obtained from Agriculture in both countries. The produce of the dairy is abundant, and prices moderate. This is a branch of Canadian farming which is not managed to the best advantage, and we conceive one great want is proper dairies, utensils, and dairy-maids acquainted with butter and cheese making. Fruit will not be abundant this year, in consequence of the caterpillars in spring having made great ravages in the orchards. Labour may be had, if farmers had the means to employ it. We think it would be a great benefit to farmers to offer premiums to good and efficient farm servants. One that is well acquainted with the work of a farm, and willing to execute it with care, and dispatch, when the employer is absent as well as present, is better than two or three men who will not act thus. In no business are good labourers more necessary than on a farm, and when they are good, and faithful, they should be encouraged as an example to others. Good crops may be produced, and preserved when they are produced, with much more ease and certainty when good and skilful servants are employed, than when they are otherwise.

Côte St. Paul, Aug. 31, 1844.

We find it a great check to Agricultural improvement in this country, that we have no opportunity of the choice of Agricultural implements, seeds, &c., as in England. Had we such a Society as the Royal English Agricultural Society, we might expect the same results from it—such a Society might have model farms with schools and libraries attached. On these farms might be shown, after patient investigation, the most perfect modes of drainage; the most complete, durable, and economical arrangement of farm buildings; the most advantageous modes of tillage, and course of crops; the greatest economy in manure and labour; the quantity of seed to be sown to the acre, and distance in sowing; the effect of steeping seeds in manure or other liquids; the most advantageous state of ripeness in which to cut grain or grass; the most advantageous mode of housing and feeding stock in winter, and of fattening cattle and sheep on grass in summer; the best mode of fencing, and the cultivation of live fences. All these objects should be accurately ascertained by a competent and paid responsible director, or board of directors. The results of all experiments might then be confidently recommended for general practice, and there would be an opportuniry of personally inspecting the farm, the work, the implements, and management in every depar' ent, and all these matters should have general pub city.

We have seen the result of an experiment reported to the "North Cornwall Experimental Club," on the 27th June last, of the effects of covering grass land with layers of straw. The field was viewed by several members of the Club, who were perfectly satisfied with the result of the experiment which is described in these terms:—

"The straw had been spread over about one-third of the breadth of the field, and through the entire length from east to west. Mr. Jones caused the straw to be raked off for some width up and down the line of division, and from several patches in different parts. The difference was very marked: where no straw had been laid, all the grasses were thin and short, and the field appeared almost as brown as the soil itself. But where the straw had been spread, the grass presented a lively green, and in quantity was thick and matted, corroborating Mr. James' statement of the enormous increase. He had cut and weighed it, and the increase was at the rate of 2,240 lbs. to the acre. Immediately after dinner at the Tree Inn, the chairman read a letter he had received from the Rev. J. Davis, of Kilkhampton, stating the complete success of an experiment he had made with guano for the destruction of the wire worm, a mere contact with which in its native strength will be followed by almost instant death."

There cannot be a doubt that a given quantity of straw will produce more good upon the soil as ploughed into it, than the same quantity would, after being simply rotted without any other addition to it,

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The want of capital, as well as the want of skill, is a great bar to the advance of improvement in Canadian Agriculture, and both must be provided before we can expect that much improvement will take place. Without practical skill, capital cannot be employed advantageously by the farmer, but it is equally certain that whatever be the practical skill, much good cannot eb effected without capital. In Canada, those who have capital appear not at all inclined to invest it in land or agriculture, and this will account, in a great degree, for its backward state at present. In the British Isles, it is only where there is abundant capital at the command of the farmer that agriculture is carried on in a proper manner. The monied institutions in this country are altogether, or nearly so, commercial, and for the accommodation of trade, and are unconnected with agriculture. It is quite otherwise in the British

Isles, particularly in England and Scotland, where agricultural improvement has lately made such wonderful advances. *Men who are in situations that give* them great influence here, will be ready enough to find fault with the backward state of our agriculture, but they never adopt any measure that would make it better than it is. The cultivated lands of Canada might be made to produce three times the value they do at present, by the employment of more capital, under skilful management, in their cultivation; but not the slightest move is made towards the accomplishment of this desirable object, that would augment the disposable means of the Province several millions of pounds currency annually. What are all the political questions that have so long agitated our people, in importance to them, compared with the advantage it would be to double their annual income, or means of comfort? We have a long time endeavoured to draw attention to this plain proposition, but we regret to say, with very little success. We hope, however, that the period is not distant when this subject will engage more attention.

It must be gratifying to the friends of Agriculture all over the world, to hear of the proceedings of the Royal English Agricultural Society, at their late meeting. It should be particularly so to us as setting us a noble example to follow. At that meeting men of all parties united most cordially in promoting the objects of the society. The Earl of Carnarven made a most excellent speech at the dinner. We are sorry we cannot copy it entire. We, however, select the following:—

The exhibitions to which you have all been witness show as magnificent a display of power and perseverance, combined with sagacious thought, as, perhaps, the world ever saw; indeed, I doubt much whether such an exhibition, practically tested as it has been, has ever yet been witnessed in the history of the world (*great cheering*). You all know that the experience of any single neighbourhood is extremely limited, and all parties have imagined that their own local knowledge has been the best. It has frequently happened that the man who has returned to his home a disappointed competitor, has, eventually, been improved by defeat. He felt, for the first time, that other means had been successfully tried which he had not previously thought of resorting to. He then looked more narrowly into the subject; and perhaps, in the hour of defeat, speculated on the adoption of improved future plans. He thus gradually rises in the acquirement of that knowledge must calculated to improve his position, and place him in that estimation which a British farmer is entitled to hold amongst his countrymen (*cheers*). The British agriculturists, as a body, only require a greater share of that diversified knowledge which this Society is pouring down like a flood of light, and the interchange of opinion between practical and scientific men, as a tendency to the improvement of all. Every improvement introduced in agriculture is diminishing the cost of cultivation to the farmer, and thus adds not only to the wealth of the agriculturist, but also to the resources of the state. Who is the labourers' best friend? The English farmer. He who knows that labour skilfully directed, leads to the prosperity of both, for the prosperity of the farmer must improve the condition of the labourer, upon whose faithful services the agriculturists and all other classes of society are dependent. All are bound together by one magic charm. (*Cheers*). When I now look upon the effects of thorough-draining, the value of studying the different soils, and by a good adaptation of the peculiarities of each, I feel that I am saying that which will be brought to bear. While dwelling upon the agricultural wonders which have been worked in different parts of England, with which, by the way, I am not particularly acquainted—when to go no further than the Hampshire hills, I perceive the produce of wheat has been prodigiously increased by chalking—when I see the effects of draining in raising the value of land, and when I take into consideration the gallant spirit of enterprise which has ransacked the whole foreign world for further aids to British agriculture—when that enterprise has sent our vessels to the shores of Africa and the islands of the Pacific for the hoarded manure of ages, I feel that we possess the means of a greatly increased production. There is, however, much to be done in different parts of the country: there are even now places where the practice of hoeing turnips has not yet been followed. (*Hear.*) There is still a conflict going on between the old modes of husbandry and better principles; but the Directors of this Society have adopted the best method to dissipate the clouds which have so long overhung national agriculture, by successfully visiting every part of the country, and by attracting within their influence the whole length and breath of the land. (*Applause.*) It is, however, essential to the complete success of their scheme, that they should put out the whole of their mental and physical energies in the pursuit of agriculture, without which the agricultural body will not be one to give birth to those great results to which I have referred, and which I confidently anticipate. I will only further add, that my hopes are much strengthened, when I consider the high moral character of those in the country who have formed this institution—(*cheers*)—of those who are at its head, and who are leading you on to conquest far more durable and valuable than the conquests of war. I need not name those gentlemen, many of whom are now around me—I need not name the noble President and the noble Duke in their vice chair, as instances of that high moral character. (*Great cheering.*) Though this Society may not be exempt from all the errors of human institutions, I think there is less wrong in it than most other societies. In this Institution we are unvexed by political or personal differences; its energies are directed solely, continuously, and peaceably to the one great object—the improvement of the soil, and the consequently ameliorated condition of man; hence I sincerely trust and believe, that every year which adds to the existence of this Society will add to its strength, usefulness, and popularity.

We must also give a selection from the speech of the Prussian Minister who was at the dinner—who made the following observations:—

Allow me to say that, during all the years I have resided here, I have taken the deepest interest in the rising progress of this society (*hear hear*). It is needless, then, to explain all the reasons why I have taken that deep interest; for it is evident that the prosperity of English agriculture will stimulate the progress of that science in my own and in other country (*hear, hear*). I will now say a few words on the general interest which attaches to the prosperity and operations of your society. There are many things more striking to foreigners who for the first time have visited this coun-

try, and who are endeavouring to investigate the history of the rise and progress of the unparalleled power and greatness of England; but I know nothing more striking than that which I now see around me. That country must be blessed and happy for many years which has the good fortune to possess nobles and statesmen who consider it their greatest pride and their highest pleasure to occupy their leisure for the improvement of agriculture and for the happiness of the cultivators of the soil (*loud cheers*); not, as in some other lands, confining themselves to gaudy palaces and the pursuits of dissipation, but mixing—both publicly and privately—with the active business of life. The manner in which the retired soldier in this country turns his sword into a plough-share is an example of the highest admiration; and the honours which he has won from the soil are not, in reality, less glorious or less valuable to his country than those he has won in the fields of war (*cheers*). It has often struck me—when I have read of the ceremony which the Emperor performed as the first act of his reign—that of turning over the first sod with a golden plough-share, that it is an act worthy of the monarch of one of the largest empires of the world, and is beautifully symbolical of the great truth that the promotion of agriculture ought to be the first care and solicitude of every good and wise government (*loud applause.*) Is it not an encouraging spectacle to see a society like this setting such an example for the rest of the world to follow?—an example which, in Prussia, we, of the good old Saxon blood, are trying to follow (*cheers.* We delight, in times of peace, in our homes and our domestic fire-sides; and we know no men whose energetic minds and bodies are more calculated to maintain peace than the agriculturists.

The speech of Lord Palmerston is so excellent that we must give insertion to a part of it :—

The toast which I wish to propose is—" Prosperity to agriculture, manufactures, and commerce"—the three great supporters of the prosperity and power of this mighty empire. These three branches are inseparably dependent upon each other, and entwined together. In the infancy of the State, agriculture was first established; that gave employment to commerce, and commerce to manufactures. Agriculture has risen from its plain and primitive condition till it has assumed the proud and pre-eminent position it now occupies in this great country (*cheers*). There is, indeed, no country in the world, I might venture to affirm, in which these three great sources of national prosperity stand forward in such bold and pre-eminent relief. Our commerce sends our merchant ships to the most distant parts of the ocean; our commerce is wafted on every wave that washes the remotest shores of the habitable globe; our manufactures supply the wants and wishes of the greater part of the human race; and our commerce, with our manufactures, has accumulated the wealth which furnishes the means of development to our agriculture, without which the resources of the soil could not be fully developed, whilst it brings to the people of this country the productions of the remotest corners of the world; our manufactures keep daily bringing increased numbers of people to consume the produce of our agriculture, thereby increasing the value of the land, and giving the crowning reward to the industry of the tillers of the soil (*cheers*). Commerce, indeed, stands distinguished both from agriculture and manufactures, because the functions of commerce are distributive, and not creative; agriculture and manufactures are both of them creative pursuits—they differ more in name and degree than in reality and principle. The manufacturer and the agriculturist have both enlisted in their service the laws and powers of nature, and both are dependent for their exertions on the skill and ingenuity of the mechanic (*cheers*). And I might venture to say that if one of those agriculturists who lived a century and a half ago could rise to-day from his grave, and witness the magnificent display of mechanical skill which is to be seen in the show-yards of this town, it would be difficult to persuade him that the great and expensive specimens of the results of human industry there brought together did not belong to the manufacturers of several large towns, instead of being implements of agriculture (*hear, hear*). Whenever it had been the misfortune of this country to be compelled, either for the defence of its interests, or in vindication of its honour, to draw the sword and engage in the calamities of war, the result has been to record in the pages of history the triumphs and glories of British arms (*cheers.*) That result must ever be the consequence of the unconquerable energy and untiring perseverance, of the inexhaustible resources of the national character; but I trust the day is far distant indeed when it may be our unfortunate lot—for so I must consider it whatever the result may be—I trust the day may be far distant when it will be again our lot to be compelled, by the aggression of any foreign state, to add another chapter to the military and naval glories of Great Britain (*cheers*). Meanwhile let us employ our national energies in attaining the distinction, which is far superior in point of advantage, and by no means inferior in point of honour, that we may rise to still greater pre-eminence in the arts of peace; and among those arts of peace, what is there more deserving to be cultivated by a great and free people like one own, than an instructive and enlightened agriculture? An instructive and enlightened agriculture is the best foundation for a high, exalted, sterling, national character, and is the surest basis for a permanent national prosperity. To promote it has been the object for which this great national association has been formed; that is the object for the attainment of which it has laboured with most exemplary perseverance and astonishing success; and on that account I may venture to say there never was an association, found in a great empire which more deserved the good opinion and support of the rest of the country than this, and the self-satisfied feeling which must be shared by all who have the honour to belong to it.

These speeches give some idea how Agriculture is regarded by the most talented and best educated men of their respective nations.

At the late great Agricultural meeting of the Royal English Agricultural Society at Southampton, the following resolutions were adopted in reference to an Agricultural College :—

" That schools of agriculture are much wanted in this country, in which a knowledge of the sciences, now admitted to be essential to the successful pursuit of agriculture, may be learned in connection with the practical working of a farm on the most approved principles."

" That the plan for the establishment of an agricultural college near Cirencester, explained by the deputies attending this meeting, is calculated to effect this desirable object."

" That this meeting warmly recommends the agricultural community to give every support and encouragement to the establishment of this college, which they regard as the first step in the right direction for

training up the rising generation of farmers upon a sound foundation; and they would especially urge on farmers generally the importance of securing to their children, intended for the same occupation, the great advantage to be d rived from the kind of education provided by such an institution."

The following observations by Earl Hardwicke, at the meeting of the Royal English Agricultural Society, are deserving the attention of our Canadian politicians. A difference in political feeling does not appear to prevent men in England from uniting for the public good:—

"They had the pleasure of seeing around them men of all shades of political opinion, who were united for one common object; and he took that opportunity of saying that, in his opinion, they were under the deepest obligation to their noble president, Earl Spencer, for having come to the manly resolution of refusing to accede to the demands of those who could have but little understood the nature and constitution of that society when they called upon him to resign his present position because he differed from them on a political question (*cheers*). Oh, what a state would this country be reduced to if there were no resting-place from party strife, no neutral ground where they could meet for the common good of the country (*hear, hear*). That neutral ground they had now got in this society —a ground where no political animosities were allowed to intrude; and they were deeply obliged to Lord Spencer for having had the manliness to confirm, by his determination, the spirit of the laws of the society, thus setting the question at rest for ever, and sealing the destination of the society as a lasting and enduring institution for the public good (*cheers*)."

Destruction of Rats.—Dr. Ure, F.R.S., communicated through Mr. Pusey, M. P., the following results of experiments on the best mode of preparing phosphorus as a poison for rats:—"In the Journal of the Royal Agricultural Society there was published, several months ago, a prescription for preparing a poison for the above purpose, by an English gentleman resident in Germany. That preparation consisted essentially of phosphorus mixed with flour and sugar. It has been tried by a friend of mine in Derbyshire who has a most extensive farm, and has been found to answer the purpose well; but there is a great difficulty in preparing it, from the insolubility and even immicibility of phosphorus in water, attended with no little danger of fire. The process I have found to succeed perfectly is as follows:—Melt hog's-lard in a bottle plunged in water heated to about 150° F.; introduce into it half an ounce of phosphorus for every pound of lard, then add a pint of proof-spirit whiskey; cork the bottle firmly after its contents have been heated to 150°. taking it at the same time out of the water-bath, and agitate smartly till the phosphorus becomes uniformly diffused, forming a milky-looking liquid. This mixture being cooled, with occasional agitation at first, will afford a white compound of phosphorus and lard, from which the spirit spontaneously separates, and may be poured off to be used again, for none of it enters into the combination; but it merely serves to comminate the phosphorus, and to diffuse it in very fine particles through the lard. This fatty compound, on being warmed very gently, may be poured out into a mixture of wheat-flour and sugar incorporated therewith, and then flavoured with oil of rhodium, or not at pleasure. The flavour may be varied with oil of aniseed, &c. This dough being made into pellets, is to be laid in rat-holes. By its luminousness in the dark, it attracts their notice, and being agreeable to their palates and noses, it is readily eaten, and proves certainly fatal. They soon issue from their lurking places to seek for water to quench their thirst and bowels; and they commonly die near the water. They continue to eat it as long as it is offered to them, without being deterred by the fate of their fellows, as is known to be the case with arsenical doses. My friend in Derbyshire bought a pot of Mr. Meyer's rat-poison, and found it to be an analogous phosphoric preparation. The present mode of preparing it is the result of my own experiments, made with the view of diffusing phosphorus through a flour and sugar, &c., without the risk of fire."—The paper in the Society's Journal, referred to by Dr. Ure, will be found in the third volume, page 428, and was communicated to the Society by Captain Stanley Carr, Tuschenbeck, near Lubeck, in the Duchy of Lauenburg. It may be an easy guide for those members of the Society who are desirous of following Dr. Ure's prescription, and may not have a thermometer at hand, to know that a temperature of 150° of Fahrenheit is equivalent to a degree of heat mid-way between that at which (according to Schubler) white of egg coagulates and wax melts.

Mr. Miles, M. P., stated the success with which Captain Carr's remedy for destroying rats had been tried by himself and others, in Somersetshire, and the extraordinary manner in which the rats came to eat it.

What a curious hallucination that is which supposes the sap of trees to fall, or settle, in winter into the roots! One would have thought that the notorious difficulty of cramming a quart of water into a pint measure might have suggested the improbability of such a phenomenon. For it certainly does require a very large amount of credulity to believe that the fluids of the trunk and head of a tree can, by any natural force of compression, be compelled to enter so narrow a lodging as the root. The idea, however, has established itself in some persons' minds, and, we presume, in connection with that other old vulgar error, that the sap is in rapid motion in the spring time, in the roots of a tree, before it begins to flow in the branches.

These whimsies took their origin in days when the world was contented to accept assertions upon trust, and when hypotheses and vain imaginings formed the debased paper currency of science. But now men have found out the value of a golden standard, both for money and for knowledge; they call for facts before theories; and the result, already, is a wonderful disturbance in the crowded ranks of scientific as well as historical legends.

We shall assume the word sap to signify the fluids, of whatever nature, which are contained in the interior of a tree. In the spring this sap runs out of the trunk when it is wounded; in the summer, autumn, and winter, it does not, unless exceptionally, make its appearance. But in truth the sap is always in motion, at all seasons, and under all circumstances, except in the presence of intense cold. The difference is, that there is a great deal of it in the spring, and much less at other seasons.

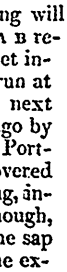
When a tree falls to rest at the approach of winter, its leaves have carried off so much more fluid than the roots have been able to supply, that the whole of the interior is in a state of comparative dryness, and a large portion of that sap which once was fluid has become solid in consequence of the various chemical changes which it has undergone. Between simple

evaporation on the one hand, and chemical solidification on the other, the sap is in the autumn so much diminished in quantity, as to be no longer discoverable by mere incisions. The power that a plant may possess of resisting cold is in proportion to the completeness of this drying process.

When the leaves have fallen off, the tree is no longer subject to much loss of fluid by perspiration nor to extensive chemical changes by assimilation, for the leaves are the principal organs of perspiration and assimilation. But the absorbing power of the roots is not arrested; they, on the contrary, go on sucking fluid from the soil, and driving it upwards into the system. The effect of this is, that after some months of such an action, that loss of fluid which the tree had sustained in autumn by its leaves, is made good, and the whole fabric of the plant is distended with watery particles. This is a most wise provision, in order to insure abundant food to the newborn leaves and branches, when warmth and light stimulate them into growth.

During all the winter period the sap appears indeed to be at rest, for the re-filling process is a very gradual one. But M. Biot, many years ago, proved, by an ingenious apparatus, that the rate of motion of sap may be measured at all seasons; and he ascertained it to be in a state of considerable activity in midwinter. Among other things he found that frost had considerable influence upon the direction in which sap moves. In mild weather the sap was constantly rising; but when frost was experienced the sap flowed back again —a phenomenon which he referred to the contracting influence of cold on the vessels of the trunk and branches, the effect of which was to force the sap downwards into the roots, lying in a warmer medium; then, again, when the frost reached the roots themselves, and began acting on them, the sap was forced back into the trunk: but as soon as a thaw came on, and the ground recovered its heat, the roots out of which a part of the sap had been forced upwards, were again filled by the fluids above them, and the sap was forced to fall. A large Poplar-tree in the latter state, having been sawed across the ground-line, the surface of the stump was found to be dry, but the end of the trunk itself dripped with sap. Sap, then, is always in motion; and if it ever settles to the root in a visible manner, that is owing to external temporary causes, the removal of which secures its instant ascent.

As to the idea that the bleeding of a tree begins first at the root, and in connection with this supposition, that what is called the rise of the sap is the cause of the expansion of buds and leaves, and branches, nothing can well be more destitute of any real foundation. If in the spring, when the buds are just swelling, a tree is cut across at the ground-line, no bleeding takes place, neither will the sap flow for some distance upwards, but among the branches the bleeding will be found to have commenced. Let the line A B represent the trunk and branches of a tree; let incisions be made at *c*, *d*, *e*, *f*; the sap will run at *c* first, then at *d*, next at *e* and last at *f*, next the roots. This was observed some years ago by Mr. Thomson, at that time the Duke of Portland's gardener, who thought he had discovered that the sap of trees descends in the spring, instead of ascending: a strange speculation enough, it must be confessed. The fact is, that the sap is driven into accelerated motion, first at the extremities of a tree, because it is there that light and warmth first *tell* upon the excitable buds. The moment the buds are excited they begin to suck sap from the parts with which they are in contact; to supply the waste so produced, the adjacent sap pushes upwards: as the expansion of the leaves proceeds, the demands upon the sap near them become greater; a quicker motion still is necessary on the part of the sap, in order to make good the loss: and thus, from above downwards is that perceptible flow of the fluids of trees, which we call the bleeding, effected.



A correspondent remarks that the well-known fact of trees sprouting in the spring, although felled in the autumn, proves that the sap had not that at time quitted the trunk to take refuge in the roots. And we agree with him in considering that such a common occurrence should have put people on their guard against falling into the vulgar erors on this subject.

MAKING STRAWBERRY BEDS OR PLANTATIONS.

Those who intend to form new beds or plantations of Strawberries, are admonished that if they wish to be successful, it is time to be preparing their ground and making ready for the young plants. Every family who have a few rods of ground to spare, should have strawberries, for home consumption at any rate, as it will require but little care to keep a plantation of sufficient size in order, and a few rods will produce a bountiful supply for a large family, of the most delicious and healthy fruit our climate or any other affords. If situated near a city or market town, any surplus amount of fruit may be disposed of at high prices and at great profit; and if in the interior, the time spent by the children and female part of the household in trampling over the farmer's grass, "strawberrying," as it is termed, were devoted to the culture of a strawberry bed, more fruit and of a better quality would be obtained with the same labour or time, and then there would be no scolding about the grass, which sometimes causes the farmer some unpleasant feelings, as he sees a gang of youngsters driving through the thickest of it for a few miserable little strawberries. We advise all to have a strawberry bed and to take immediate steps to form one.

The location for a strawberry bed should be neither a very dry or wet one—for if made on a dry spot, in seasons of drought the crop will be a meagre one, as we have ourselves experienced the present season—and if very wet, in rainy seasons the ground will be so saturated with water that the fruit will be of inferior quality, and the plants less luxuriant and productive. A reclaimed meadow well drained, or a rich loamy soil inclining to moisture, will be most favorable for the growth of the strawberry plant, and produce the best fruit.

The ground should be enriched with fine, well rotted barnyard manure, and faithfully pulverized and dug to the depth of fifteen inches or more; it should then remain a week, when the soil should be dug over again, after which it should be raked and made perfectly fine and smooth, when the bed will be ready for the plants, after it has been lined out in drills eighteen inches apart. The plants should be the offsets of the present season, the first ones thrown out by the parent plant, which are the strongest and best, Old plants should never be used, as they are not so sure to live, nor will they make vigorous, fruitful plants. The proper time for planting is as soon as the offsets have become well rooted, which will be from the 10th to the 20th of August. They should be set out a foot from each other in the drill, and if the operation is well done, having the earth pressed closely round the roots, they will be sure to live, unless an unusually dry time succeeds, when it will be well to give occasional waterings at the close of the day. They will need no other care than to keep down the weeds, until severe cold weather, before winter sets in, when the plants should have a slight protection of strawy horse manure or sea-weed. Covering too deep is injurious, and sometimes destructive.

For a plantation two rods by one, in drills 18 inches apart, 360 plants will be required, but as it is well to have a few supernumerary plants in case of accident, 400 may be ordered, or 200 per square rod. If they are planted in beds with three drills lengthways in the bed, with a space of 2 1-2 feet between the drills in each bed, the exact

number wanted per square rod will be 150. Some prefer to plant in this way.

As to the varieties to be recommended for family use, there may be different opinions. There are some very fine varieties which are desirable, on account of their exquisite flavor, or large fruit, or for forcing, &c., which every amateur in strawberries will desire to possess. Some of these are shy bearers, tender, with stems insufficient to bear the fruit erect, or some other failing, as an offset to their good properties. We have had considerable experience in this matter, and have made many inquiries among market-men and other gardeners, who have a natural propensity to find out which varieties are the most profitable, and they agree with us that, for our climate, the Early Virginia, Hovey's Seedling, and the Red and White English Wood are, upon the whole, the most desirable.

WHEAT—LIME.—We saw yesterday a parcel of very superior red wheat, weighing 64 pounds per bushel, which was raised under circumstances showing what good management may effect in the agricultural line. The wheat in question was the product of a field which a short time since was part of a waste common that had been uncultivated for many years, and was deemed to be too poor and worn out to yield any thing. After enclosing it, the present owner put lime upon it in the proportion of 100 bushels to the acre, and followed the lime with a liberal application of stable manure. Last fall the field so prepared was sowed in wheat, and just returned a crop of the very best quality, averaging 30 bushels to the acre. The field thus restored and enriched, will require but little additional outlay for years to come, and in the mean time will yield a liberal annual return to its sagacious owner.—*Baltimore American.*

TRANSPLANTING FRUIT TREES—Capt. Josiah Lovett, of Beverly, Mass., plants his fruit trees between the 20th of August and last of September—immediately after the summer growth of wood has ripened. He cuts off all the leaves before removing, with a pair of sharp scissors, and then in the morning of a clear day, raises the tree, and places the roots in a tub of soapsuds till the afternoon, then replants it. He also grafts in autumn, (he does not mention at what time,) for fruit for the next year.—*Hovey's Magazine.*

DISEASES OF POULTRY.—The common remedy for the bib or gape is to peel off the membrane with the nails, and afterwards rub the tongue with butter and honey. Upon dissection after death, however, there have been found in the windpipe several small red worms, varying in size; they can be removed with safety and facility in the following manner:—Let the operator take a small but firm feather, from a hen or pigeon, and strip it from the stem, excepting about an inch and a half from the tip end, according to the size of the chicken, wetting it a little at the extreme point. This is to be placed in the mouth of the chicken, and as soon as it breathes to the introduced into the windpipe and pushed gently down and turned round, by which means some of the worms will adhere to the feather, and others will be loosened so that the chicken will sneeze them up and throw them from its mouth.

HERBS.—Herbs should be cut when the flowers are fully matured, and dried in the shade, and when thoroughly cured, placed in tight paper bags, so as to preserve the peculiar aromatic principle. Many plants, by a neglect of this, lose their efficacy and fragrance before they are used.—*American Agriculturist.*

RUST IN WHEAT.—Mr. William Messie, in a communication published in the Northern Planter, says—"Wheat sown on land where gypsum is used freely, is certainly more apt to rust, than where it has not been used." Does the observation of others corroborate this?

WARBLES IN CATTLE.—A few applications of strong brine will at once destroy warbles in cattle, in whatever stage they may be found to exist; after which the animal will thrive better, and when it comes to be slaughtered, both the hide and carcass will be more valuable.

MONTREAL MARKET PRICES.

CORRECTED BY THE CLERK OF THE MARKET.

New Market, September 2.

Wheat,	per minot	5/6 @ 6/3
Oats,	do	1/3 @ 1/6
Barley,	do	2/0 @ 2/4
Peas,	do	2/6 @ 3/9
Buckwheat,	do	1/8 @ 2/1
Rye,	do	2/6 @ 3/0
Flaxseed,	do	5/0 @ 5/6
Potatoes, New,	do	1/0 @ 1/3
Beans, American,	per bushel	4/0 @ 4/6
Do. Canada,	do	6/0 @ 6/8
Honey,	per lb	0/4½ @ 0/6
Beef,	do	0/2⅔ @ 0/6
Mutton,	per qr.	1/6 @ 4/6
Lamb,	do	1/3 @ 2/6
Veal,	do	2/0 @ 10/
Pork,	per lb,	0/3 @ 0/5
Butter, Fresh,	do	0/7½ @ 0/9
Do. Salt,	do	0/5 @ 0/6½
Cheese,	do	0/3 @ 0/4½
Lard,	do	0/5 @ 0/6
Maple Sugar,	do	0/4½ @ 0/5½
Eggs,	per dozen, fresh,	0/5 @ 0/6
Turkeys, (old),	per couple,	5/0 @ 6/0
Do. (young)	do	2/0 @ 2/9
Geese,	do	2/6 @ 4/0
Ducks,	do	1/8 @ 2/6
Fowls,	do	1/3 @ 1/8
Chickens,	do	1/0 @ 1/6
Partridges,	do	2/6 @ 3/0
Hares,	do	0/10 @ 1/0
Apples, American,	per barrel,	10/0 @ 15/
Do. Canada,	do	0/0 @ 0/0
Flour, per quintal,		12/6 @ 13/4
Beef, per 100 lbs.,		20/0 @ 30/0
Pork, Fresh,	do	22/6 @ 27/6
Hay, per 100 bundles,		20/0 @ 27/6
Straw, per 1200 lbs.,		12/6 @ 17/6
Woodcock, per brace,		1/6 @ 1/8
Peaches, half barrels,		15/0 @ 24/6

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