

# THIRD REPORT

### OF THE

# MONTREAL

# MORTICULTURAL SOCIETY

# AND FRUIT GROWERS' ASSOCIATION OF THE PROVINCE OF QUEBEC,

FOR THE

# YEAR 1877.

# Officer? for 1877-8 :

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HENRY S. EVANS, Sec'y. & Treas.

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# MONTREAL HORTICULTURAL SOCIETY.

THE Annual Meeting of this Society was held on the 14th December last in the Natural History Society's Rooms, the President, Mr. J. D. Gibb, in the Chair. There was a good attendance of members. The Secretary, Mr. H. S. Evans, read the minutes of the last annual meeting which were approved, and afterwards read

# THE ANNUAL REPORT,

### as follows:

As is customary at the annual meeting of this Society, I beg to present the following report of its proceedings for the past year: The Society has reason to be thankful and gratified at the satisfactory condition of its affairs; its progress for the last four years has been steady, and for the last two years especially-rapid. The very large number of members who have paid their subscriptions this year, in spite of the great depression, is an evidence of what can be done when proper and systematic efforts are made, and clearly shows that the Society has increased in public favor. The number of subscribers last year was almost four times larger than in any previous year. This large membership has been very nearly riaintained the present year, the Society having had 761 paying members on the roll. The labor of collecting from so many is most arduous, and it is hoped that for the coming year the Society may be able to procure the services of some of the members to assist in this work. If the city were divided into sections, in each of which a couple of the members would undertake to canvass for new subscribers, the Society's income and membership would be thereby largely augmented. Complaints are now made that the prizes are not sufficiently large, but in the face of the small amount granted the Society by the Government, in comparison with what is collected from

the members under the present system, it is not very plain how they can be increased, unless some such step is taken. The very valuable work that has been done by the Society the past two years, by gathering together information concerning the very important matter of the fruits best adapted for cultivation in this Province, has excited in the minds, not only of some of our own members, but also of several gentlemen, members of the Council of Agriculture for the Province, a desire that this work should be continued. The most valuable portions of the two reports published by the Society have been translated into the French language and printed by the Government. It is very possible some scheme might be thought out that would meet with their approval, and make this Society a sort of head society for the Province, having Fruit Associations in different counties in connection with it. If some plan could be adopted which would enable the Montreal Horticultural Society to offer prizes for county collections of fruit and have them exhibited alongside Montreal fruit at a general exhibition, a wonderful impetus might be given to fruit-growing in the whole Province. This, of course, as well as the publishing of fruit reports is Provincial work, and the Society would have to have assistance. The work has now been begun, and a considerable amount of matter is at hand for the publication of a third fruit report, but unless either a general Fruit Association for the Province is formed, or this Society is placed in a condition to continue the work, it will have to cease.

The Act under which all the societies are worked is to be amended this session, and the Board of Directors would be pleased to receive written suggestions from any person interested in this important matter.

The Society is again greatly indebted to the members of the Fruit Committee for their disinterested but highly useful labors. They not only gave much time to the consideration of matters connected with the report, but in several instances were contributors of articles on different subjects. One of them, Mr. J. H. Springle, an old and valued member, and an enthusiast in fruit culture, was stricken by the hand of death in the midst of his labors, and his loss to the Society cannot but be severely felt. They would also tender their thanks to other gentlemen in different parts of the country for their articles and valuable reports on fruits in their own districts

The usual Annual Exhibition of the Society took place on the 11th, 12th and 13th of September, the Crystal Palace Building having been acquired for the purpose, and several gentlemen, though not exhibitors this year, were so pleased at what they saw that they promised to be exhibitors another year. A Poultry and Dog Show was held in connection with it, and in every way it was very successful. A great amount of trouble was taken in decorating the building, and the effect was exceedingly fine. The Society is greatly indebted to Mr. Jas. Morgan, Jr., not only for valuable suggestions, but also for the very great amount of assistance given by himself and employees in doing the work; also for the liberal manner in which he arranged for the use of flags and bunting for decorating the building. Messrs. John Murphy, S. Carsley and H. & H. Merrill, also kindly loaned flags without charge, for which the Society's thanks are due. Some of the plants shown were exceedingly creditable to the exhibitors, and altogether the display was fine. It is, however, greatly to be regretted that some gentlemen's places were entirely unrepresented; but the President and Secretary having called on a number of gentlemen, it is hoped this may not occur again. The following have kindly promised to contribute to the exhibition next year : Sir Hugh Allan, Andrew Allan, Andrew Robertson, Hon. L. H. Holton, Henry Joseph, Jesse Joseph, Miles Williams, R. J. Reekie, Wm. Notman, J. T. Vanneck, Mrs. Dow, J. D. Crawford, W. F. Lewis, N. S. Whitney, R. W. Shepherd, Jr., Jas. Morgan, Jr. and M. C. Mullarky. Other g ntlemen have been called on, who have not been seen owing to absence from town. There are also several other regular exhibitors, such as W. F. Kay, Jos. Mackay, Capt. Raynes, and others, who will, in all probability, exhibit as usual. With such a list of exhibitors as the above, the Society should

certainly have a creditable show. The show of fruit was not as large as usual, and it is evident, after the really magnificent display got together last year, that the exhibition, especially in apples, should have been much larger.

One gentleman, who can probably show one of the finest collections of seedlings to be found on the continent, was unrepresented.

The Fruit Association of Abbottsford, a local Association only a few years established, and offering no prize above one dollar, far outstripped her sister society in the display of fruit made at an Exhibition held a few days later. Four hundred plates of apples including thirty-eight crabs, were shown. This collection embraced seventy varieties of apples and seventeen of crabs, besides others locally known and less prized. Fifty-six plates of out-door grapes were also shown, including twenty-three varieties, being the finest display ever shown in this Province. When it is considered that the Association has no Government aid of any kind, and that its great success is entirely due to the active interest taken in the work by the members, it should be an incentive to the members of this Society to bestir themselves and take more active personal interest in the object it has in view.

It is gratifying to be able to say, however, that a number of exhibitors were represented on the tables this year, both in flowers, fruits and vegetables, who have not shown before. This number might be largely increased if the prize-list was revised, and made more like the Ontario lists, especially in fruits. For instance, if prizes were offered for the best plate of Fameuse, Alexanders, or any other variety of apples, members who are now completely debarred from exhibiting, because they have not, at least, five varieties to show, would then be enabled to compete, and the number of exhibitors be thereby largely increased. The same rule might also be applied to the flowers. A Committee from the Society should be named at once to consider these matters, and make recommendations to the new Board, especially as it is proposed to have two exhibitions the coming year. A large proportion of the judges who acted at the late Exhibition were brought from a distance, and though, owing to the number required, the expense has been considerable (about \$125), still it is far the most satisfactory plan to pursue, as it effectually prevents all suspicion of partiality having been shown. It is a matter of regret that the handsome prize offered by a member of the Society, for the best bunch of black or white Muscat grapes, drew forth only one competitor. Last year there were only two for a prize of \$30.

It has been thought that the offering of some special handsome prizes might do much towards making the Society's exhibitions fuller and more attractive. This gentleman's experience though has not been very encouraging, and, as something of the same sort has occurred in other sections, it might be advisable to withold prizes where there is no competition, unless, in the opinion of the directors, the articles exhibited have very special merit. The plan of giving diplomas, medals, books or pieces of plate for some of the largest prizes, or to the winners of the largest number of first-class prizes at the Exhibition, might tend to promote a greater esprit de corps among the exhibitors, and tend more to elevate the standard than mere money prizes do. The formation of a library for the use of the members of the Society steadily progresses, and several reports have been secured during the past year. The following valuable works have also been presented to the Society the past year: American Pomology, by Warder, from the President ; Downing's Fruits and Fruit Trees of America, from Mr. Cheney; American Fruit Culturist, by J. J. Thomas, from Mr. J. J. Gibb. Immediate steps should be taken to place these books, about 100 in number, in some public library where the members could readily refer to them when they required information. Dr. Hoskins, of Newport, Vt., the agricultural editor of the State Journal, has contributed some valuable articles written by himself, which have been preserved in a scrap book for reference. The gross income of the Society for the past year has been \$2,972.45, derived from the following sources: Members' fees, \$1,522. Interest on bank stock and

current account, \$98.22. Receipts at door during the Exhibition, \$725.15. Government grant, \$328. Special do., \$200. Special prizes, \$68.' Sundries, \$31. The gross expenditure has been \$2,983.01, leaving a balance on hand in the Savings Department of the Merchants' Bank of \$618.48. About \$130 have been expended in the following manner :—Lumber, tinware, rope, hardware, &c., \$66; for desk, \$6; Lowden's Encyclopædia, and Scrap Book for library, \$4.38; H. Prenderville, for looking after fruit at Philadelphia, \$20; loss on publishing fruit report, \$20; rent of Natural History rooms, four years, \$24. All accounts against the Society have been settled promptly, and, where possible, discounts have been obtained.

The Society, as far as appearances go, never had a fairer prospect. If the expenditure is kept—as it always should be —within the income, with such a large membership, money and property valued at cost at about \$2,400, and a band of really earnest workers in its ranks, success should be certain. The influence of such societies is for good. The love and cultivation of flowers is an elevating and ennobling taste, and those who fill up their spare hours in this pursuit will find themselves benefited by it both in body and mind. The cultivation of fruit is a source of both health and wealth to the community in which it is carried on. Ontario has shown her sister Province an example in this matter; let it be the part of this Province, led by this Society, to emulate her in so good a work.

Since writing the above Mr. Chas. Gibb has donated the Society fifteen books on various subjects connected with Agriculture and Horticulture; among them are two works by Downing; one by J. J. Thomas; one by Hayward; two volumes of the Gardeners' Monthly; Lowden's Encyclopædia of Agriculture, and other works. If other gentlemen will follow this liberal example, the Society will soon be in possession of a good library, a want that has been long felt.

JAS. D. GIBB, President.

HENRY S. EVANS, Secy. and Treas.

Montreal, Dec. 14, 1877.

COUNTY OF MONTREAL AGRICULTURAL AND HORTICULTURAL SOCIETY IN ACCOUNT WITH HENRY S. EVANS, SECRETARY AND TREASURER.

STATEMENT of Receipts and Expenditures for year ending December, 1877.

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618 48	of Canada	
	" Balance, cash on hand deposited in Merchants' Bank	"Sundry small Receipts
500 00	"Secretary's Salary for 1876	
49 51	" Desk and Lumber	"H. S. Evans, Sec'y, " 43 00
4 38	" Books for Library	"G. Cheney, for Special Prize 825 00
12 23	" Insurance of Society's Property	" Interest on Stock and Bank Account
134 00	" Rent of Building, &c	" Permission to sell in Building 8 00
80 90	" Incidental Expenses	" Entrance to Exhibition 725 15
443 99	" Printing, Advertising, &c., including Fruit Report.	"Subscriptions from Members, 761, at \$2 each 1,522 00
246 82	"General Management and other expenses therewith.	528 00
337 50	" Fitting up Exhibition Building, &c	"Supplemental " " 200 00
124 83	"Expenses of Judges at "	"Amount of Government Grant \$328 00
,049 79	By Premiums paid at Exhibition \$1	To Balance \$629 94
Contraction of the local division of the loc		

\$3,602 39

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# APPLES-BEST VARIETIES FOR LOCAL AND FOREIGN MARKETS-PACKING FRUIT.

# HASKETT & BROWN, MONTREAL.

Our trade is nearly altogether of a jobbing character, selling largely to dealers on the market and to exporters, and our sales varying from fifteen to twenty thousand barrels a year.

We presume you are gathering information for the benefit of growers in and near the vicinity of Montreal. Our experience would lead us to suggest, in fall apples especially, that they should be confined exclusively to high colored fancy stock, such as is always in demand, no matter in what state our market may be; for it is a fact that our market is at any time liable to be flooded with Western fruit which has to be sold, and if the home growth is no better than theirs we suffer greatly in consequence. Another reason is that this class of fruit, being so rich and tender, suffers greatly in transportation, and even if the same kinds are shipped here from the West, they cannot compete with fresh pulled apples grown near at hand.

The following are leading kinds and can be grown to any extent, as there are never too many of them : Alexanders, Duchess, King of Tompkins, Strawberry (of Montreal), Peach, Red Astrachan, St. Lawrence and Fameuse. But care must be taken that no "wild-cat" stock is introduced, and let every apple be true to its name. These kinds of apples are seldom exported, except, perhaps, the Fameuse, and even these are so risky that our export trade rarely touch them.

Apples for export are easily summed up. They are winter apples, and the fewer kinds in a shipment the better, always giving the preference to colored fruit, except it be Newtown

10

Pippins. The trade takes Northern Spy, <sup>6</sup> pitzenberg, Golden and Roxbury Russets, Baldwin, Leeks, Greening and sometimes Canada Red. If they can fill their orders with these kinus they want no others. They want no sweet apples. Intending growers of winter apples should confine themselves to these names. If they do so, they will not regret it. A moderate quantity of Pomme Grise are taken, but they are a great trouble in packing, and when not first-class are simply worthless.

# II.

As regards packing, one great requisite is honesty. There are more frauds perpetrated in packing apples than perhaps in any other single article of commerce in the country, and it is a fruitful source of trouble between the dealer and the consumer. The loss connected with this falls more immediately on the dealer, but in the long run it must fall back on the men who practice it. In packing get good new flour bartels, full size, and some handy baskets to let down inside the barrel. Take out the bottom end of the barrel, select a sufficient number of your finest clear apples, of uniform size, to cover the top of the barrel inside, and put down these carefully with the hand, so as to be stem up when the top is taken out of the barrel. After doing this, use your baskets to fill up, shaking the barrel well down several cimes while filling. When well filled and a few thrown in on top, place on your cover and drive it home with a screw or lever-press. They must not shake or be slack in any way after the barrel is filled and coopered. Let them be as uniform in size as possible. It is better to grade them into large, medium and small, than to have assorted sizes in the same barrel. Reject all wormy, defective and under-sized apples, and always use new barrels. The apples must be hand-picked, and in packing and handling too much care cannot be taken, as every bruise shows itself sooner or later. Grow good straight kinds of apples, handle them carefully, pack them properly and honestly, and you will find it a profitable business.

# APPLE CULTURE IN THE COLD NORTH.

# DR. T. H. HOSKINS, NEWPORT, VERMONT.

It is well known that the lines of equal temperature for the whole year, or for the different seasons, do not follow the geographical lines of latitude. Indeed, so widely are these lines divergent that England, whose southern limit lies several degrees north of the city of Quebec, has a winter climate like the sea coast of Virginia and North Carolina, while Quebec has the summer temperature of the South of France.

Even on our own continent the windings of the isothermal lines are remarkable, and have a vast influence upon the growth of vegetation, and the suitability of points on the same degree of latitude for the growth of crops. Especially is this the case in regard to trees, which must endure all extremes; and tree fruits of all descriptions are found, or not found, on the same lines of latitude across the continent, not according to the location of those lines, nor even according to the isothermal lines of annual temperature, but according to the lines of equal winter temperature—the so-called isochimenal lines.

Thus, while even the peach will grow and produce fruit freely around the Grand Traverse Bay, at the northern extremity of the southern peninsula of Michigan, on the same line of latitude in the meridian of Quebec, or even of Montreal, only a few of the hardiest apples succeed. On the parallel of 43°, west of the Adirondac Mountains and south of Lake Ontario, is one of the most favored fruit regions of the world; while on the same line eastward, in the Green Mountains, and even in the Upper Connecticut Valley, not enough tree-fruit of any description is grown for home use. To cite one more, and perhaps the most striking instance of all—while on the eastern shore of Lake Michigan every kind of tree fruit of the temperate zone flourishes, on the west shore, but a hundred miles away, in Wisconsin, the climate is even less favorable for the orchardist than that of the Province of Quebec. It is for the reasons illustrated above that I choose to qualify the title of this essay as I do, and to speak of apple culture in the "Cold" North, not merely in the north. And perhaps, in order to be entirely definite, I should say that by the Cold North I mean those regions where the winter temperature often sinks 20° below the zero of Fahrenheit, and sometimes more than 40° below that point—those regions, in short, where the mercury sometimes freezes in the bulb.

There can be little doubt that there is an exact limit to the vitality of every species and variety of plant, as regards temperature. Whether that limit in the downward direction is the point of complete congelation, as some maintain, I, in common with most fruit-growers in the Cold North, have serious doubts. Where mercury freezes, I do not believe that any portion of the sap of any tree remains unfrozen; yet the trees adapted to such extremes endure them unharmed. Our experience tells us that varieties of trees which endure without injury a temperature of 20°, are killed at 25°, and so on, all the way down, until at last all but the birch, the spruce and the willow perish, where 60° to 85° are recorded by Arctic explorers.

It is plain that there can be no safety in planting an orchard of trees that cannot be relied upon to endure all probable extremes of cold in the place where they are to grow. Hundreds of those who have thought differently have been brought most unwillingly to accept this conclusion as one not to be evaded. Therefore the limit of successful orcharding northward is absolutely determined by two factors: the intensity of the cold, and the resisting power of the trees. Practically, in the Cold North of which I write, the planting of orchards must be limited to the species and varieties that are not killed by a minus temperature of 42°. This is the *aerial* temperature. A much less degree of cold will destroy the roots of any kind of fruit tree with which I am acquainted.

This last mentioned fact, that the roots of fruit trees are much more easily killed by cold than the trunks and limbs, one of the highest importance, and one which is not y understood in all its bearings as it should be. It is the keynote of the cry that comes to us from all the most observing and intelligent orchardists of the cold north-west—mulch ! mulch !! MULCH !!!

With us in Quebec, Northern Vermont, New Hampshire, and Maine, we have not been taught this lesson with the severity that has pressed it upon the experimental orchardists in those districts where, not unfrequently, the greatest extreme of cold will come while there is little or no snow upon the ground. Under such circumstances it will often occur that whole orchards of unmulched trees will be killed, while those trees that have had adequate root protection come out entirely unharmed.

When I first set out my orchard upon the shore of Lake Memphremagog, there was no dwelling-house upon the farm, and I resided in the village, some distance away. I did not visit the orchard in winter, and was very much puzzled to find in the spring that some of my hardiest trees were dead while others of the same kinds, often not more than twenty feet away, were quite unhurt. Trees replanted upon the same spots were killed year after year, until I came to the conclusion that there were places, though often only a few rods square, where the soil was unsuited to apple trees. But when I had built a house and began to live near my orchard, so that I could see it during the whole year, the mystery was solved. Those trees were killed in spots were the snow blew off; and now I can grow trees on those spots, on the sole condition that they must be heavily mulched, or with something placed on the windward side to catch the snow.

It is everwhere insisted by orchardists that crchard land must be well drained, either naturally or artificially, and that not only the sub-soil drainage, but the surface drainage as well, must be seen to. These rules are still more imperative in the Cold North. Trees standing in even a very slight depression, where water will settle around them but two or three inches deep, will be killed or seriously injured by thawy weather at any time before the frost leaves the ground. I have known large blocks of nursery trees destroyed in this way, for want of surface drainage. Not a few planters lose their trees from this cause, as well as from lack of natural or artificial root protection. Frequently they are wholly at a loss as to the reason, and charge the trouble to poor trees or defective soil.

While the apple tree will do well in as great a variety of soils as any other tree, it is hopeless to try to grow a thrifty orchard upon land having an impervious sub-soil, or hard-pan near the surface. Though such land might, at great expense for drainage and ridging, be made to sustain a growth of fruit trees, it ought never to be taken if any other can be had. Neither should an orchard be set over a ledge of rock where the soil is not at least three feet deep in the shallowest spots. I have seen orchards do apparently well on such localities until just as they were coming to full bearing, then in a dry season, be cut off almost to a tree. A strong clay soil requires thorough under drainage, and subsequent deep tillage, before being planted to an orchard. The ground should be strongly back-furrowed, and the trees set upon the ridges. The land ought to be in perfect tilth, not cloddy or lumpy, when the trees are planted.

The most perfect soil for an orchard is a naturally rich loam, gravelly or stony, rather than sandy, but with a pervious sub-soil. The dark, shaley, calcareous slate loams on Lake Champlain, and the west shore of Memphremagog, are ideal apple lands.

Though hill-side land is often selected for an orchard, and many good ones are so situated, yet so important is tillage to a young orchard, and so difficult is it to till a hill-side without exposing it to injurious washing, that a more level spot is desirable. A north-western slope is perhaps the best, but it is not indispensable, since good orchards are found with other exposures.

Protection from prevailing winds, especially the fall and winter winds, is very desirable; and for this purpose the lee of a hill or of a forest may be chosen. When these are not available, wind-breaks of spruce, hemlock or arbor-vitæ are worth far more than they cost, and should be planted out with, or before the orchard, and well cared for. But an orchard ought not to be planted too near to woodland, so as to be robbed by the roots of the forest trees, nor be in complete shelter from the wind by being surrounded on all sides. Such orchards are apt to be badly infested with insects, especially the borer, the codlin moth, and the forest and tent caterpillars.

If it is important to select only sound and thrifty young trees for planting in the best apple regions, such care is doubly necessary in the cold north. To an experienced eye the clear, bright bark reveals the healthy tree. If there is any doubt, do not hesitate to break one or two across your knee for examination, and *never* plant a black-hearted tree. A black-hearted tree is one injured by cold, and is selfcondemned for planting where the winters are severe.

In regard to age and size for setting in the orchard, my own choice is for straight, unbranched trees of two years growth from the root graft, or one year from bud, and from 3 to 4 feet high. Such trees need no pruning when planted, and in skillful hands none afterwards, except such as may be done by the thumb and finger, or a penknife.

Though the writer is a nurseryman, he feels obliged to say that it is not of nearly so much importance where young trees are bought, as what kinds are bought. Though there is great prejudice against New York and Ontario trees, I think this is due mainly to the fact that the kinds grown in those sections are not the kinds we want, rather than to essential defects in the trees themselves. Poor trees are grown everywhere. There is, however, a great advantage in buying trees from local nurseries, where the grower is a man of skill and experience; because he will be apt to have exactly the sorts that do best in that vicinity, and to know the peculiarities of soil and climate, and other points of special adaptation, that may be decisive in regard to success or failure. Never buy trees of pedlers whom you do not know to be the authorized agents of some responsible and reputable nurseryman. Better, in all cases where it is practicable, to buy direct of the grower.

Pruning has destroyed millions of trees. This is more true in the Cold North than elsewhere, but it is true everywhere. Each wound made by the knife or saw is a danger and an injury. By beginning right and making the subject a study, trees may be grown to maturity without a scar. The earnest, intelligent orchardist should bear these prime facts in mind and govern himself accordingly. Yet ill-grown trees must sometimes be pruned. When this is the case, the first question is as to the proper season. The governing principle in all cases is to have as small an exposed surface as possible for the winter's cold to act upon. This bars out fall-pruning, in our climate, altogether. When pruning is done early in April, the wound will go on healing all Summer, and many of the smaller cuts will be nearly or quite healed by the Fall. In July all that will not be so healed should be covered with some elastic waterproof cement. The best that I am acquainted with is made as follows: Take one quart of fine North Carolina tar, and boil it slowly for three or four hours. Add to the boiling tar four ounces of tallow and one pound of beeswax, and, when melted, stir until well mixed. Then remove the vessel from the fire and stir the contents until partially cooled. Have ready one pound of dry, powdered and sifted clay. When the cement begins to thicken, stir this into it. Continue the stirring until the mass is nearly cold, so that the clay will not settle to the bottom. In summer weather this cement is just soft enough to be easily spread with the point of a knife. When applied to wounds on the tree, it completely excludes moisture, does not harden or crack off, yields to the growth of the new bark, and can at any time in moderately warm weather be pressed by the finger into the corners and crevices of the wound which may be uncovered Tar differs somewhat in consistency, but comes to about the same thickness when well boiled, which is also necessary to drive out the turpentine oil that would, in some cases, injure the tree. This composition is almost identical with the imported " L'Homme Lefort Mastic."

B

There is a good deal of complaint about the "bleeding" of pruned or otherwise wounded trees. I have never known a tree, that was not black-hearted, to bleed. But nothing is sure to make a tree black-hearted than to allow a pruned or broken place to go unprotected by some good cement through the winter. After a tree becomes black-hearted, in our climate, it might as well be dug up at once. With care some will seem to recover, but never live very long, or become profitable.

This is not, perhaps, the place to speak at length of the propagation of apple trees in the nursery. But there are a few points to which I wish to refer. The question is often put, whether a budded or a root-grafted tree is to be preferred? This is a question that cannot be answered absolutely or without qualification. In theory, I know no reason for preferring one method over the other. In practice, while budding is the more costly and laborious, yet as it is surer to produce a stem in one season long enough to be branched the next, many nurserymen prefer it. In a hard winter there is hardly a variety that will not lose its terminal bud in the nursery. If the stem is not then long enough for branching, it must be grown another year from a side bud; and at the point where this second year's growth begins there will be a crook, greater or less as the variety may be a spreading or an upright grower. This crook is of no real importance, and generally it quite disappears as the tree acquires age in the orchard. But it hurts the tree's looks, and that is a very important matter to the nurseryman.

In propagation by budding, in our climate, it is important to use as small stocks as can be worked, so that the cut made in removing the stock above the bud, may heal over the first season, otherwise the tree runs a risk of becoming unsound at the point of union.

In root grafting (and in budding as well) the choice and selection of stocks is most important. They should be grown from the seeds of perfectly hardy kinds, and the fruit from which the seed is taken ought to be well grown and well ripened. I am strongly averse to growing stocks from crabapple seed, except those which are to be used for grafting with buds or scions of crabs and crab hybrids. I do not believe that trees on crab stocks are more hardy, and I am sure that they are neither so healthy nor so long lived as when worked upon the right kind of apple stocks. Working the apple upon the crab produces results analogous to those which result from working the pear upon the quince. The cases where success follows are rare and exceptional.

Besides being careful in the selection of seeds for growing stocks, it is important, in root grafting, to use large and whole roots. If this is done there is much less difficulty in getting a tall and vigorous stem the first year without over-manuring, which gives a soft and tender growth. For the slow growing varieties I would use two years old stocks, trimming the side roots but very little, and setting them in the nursery with the spade, instead of the dibble. If this is well done, even the Tetofsky will make three or four feet of growth the first year, and ripen its last buds well.

A great many of the more extensive wholesale nurseries in New York and of the West use short roots and long scions. setting them so deep that it is expected to get roots from the scion. Some advocate this as the best of all methods. The growth the first year is small, and is cut back the next spring so as to get a shoot from near the ground, which gives the appearance of a budded tree. There has been much controversy over this way of growing trees. My own opinion is that it is neither so good nor so bad a way as it is made out to be by its friends and its opponents. Some varieties can be grown by it better than others, for some root freely, and others refuse to root at all, from the scion. I do not see why those varieties which will grow, like the quince, from cuttings, may not be as well grown, and become as good trees (and perhaps better) this way as any other. I have a very good row of Duchess of Oldenburg in my orchard, grown by this method, as an experiment. But I do not practise it.

The subject of varieties is one which is so thoroughly

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treated in these reports, not from the stand-point of a single grower, but from the practical experience of many, that I do not feel it necessary to add to the length of this essay by dilating upon that point. Tetofsky, Red Astrachan, Summer Harvey, Duchess of Oldenburg, Plumb's Cider, Fameuse, Magog Red Streak and Scott's Winter are the varieties I find most profitable. They cover the whole season, from August to June. If I were to drop any from this list it would be the Red Astrachan, as not quite hardy enough, and replace it with Yellow Transparent, one of the new Russian apples imported in 1869 by the Department of Agriculture at Washington. The Fameuse is also rather tender with me, and I have the hope of being able to replace it by the Wealthy. The Magog Red Streak and Scott's Winter are not of the highest quality as dessert fruit, but they are hardy and productive, and the fruit is very saleable. We want something better, however, for a choice, all-winter apple.

# THE BAKER'S EASTER PIPPIN APPLE.

Thetree is a seedling at least 60 years of age, standing on the Baker Homestead (now owned by Chas. D. Baker),  $1\frac{1}{2}$ miles south of Dunham village, Missisquoi County. The fruit is borne at the ends of the twigs, giving the tree a drooping appearance. It has yielded twelve flour barrels of fruit in some years, but seven or eight are the usual product, and a windfall is scarcely ever seen, even if not gathered till very late.

The tree is straight in growth and quite ornamental in appearance. This apple has been kept till September, being in perfect condition for several months—juicy, aromatic, and high flavored.

Mr. Chas. Gibb, writing to Mr. Baker, has given the following description of the fruit:---"Fruit, medium or below, "roundish, slightly oblate; skin smooth, yellowish, partially "covered with bright red in marblings and splashes; flesh, "yellowish, not very firm but crisp, with more flavor and "juiciness than is usual in long keepers. In flavor it is mildly "and pleasantly sub-acid, and is a good dessert fruit.

"Compared with a well-colored and well-preserved speci-"men of Northern Spy on 13th March, I find it to have the "crispness and remarkable freshness of that variety, with "quite as much and perhaps rather more flavor.

"In our city markets there are long keepers it cannot com-"pete with, but for local markets and home use it is well "worthy of a fair trial."

### BEE CULTURE.

### THOMAS VALIQUET, ST. HILAIRE.

Before the discovery of the reproduction of bees by Dzierzon. and that of the mobile light by Langstroth, beekeeping was altogether conducted in an empirical manner. Each apiarist had his own notions, each more faulty than another, as to the manner of treating his hives so as to make them a profitable source of income. The greater part of these erroneous ideas had been handed down from father to son; for ordinarily the hive was transmitted from generation to generation, and lived as long as the son desired or knew how to apply the instructions given by his father. Unfortunately, the son was not ways capable of te ding the hive, notwithstanding his unscientific way in performing the work ; so the hives became extinct, and the family persuaded themselves that this loss was occasioned by negligence in not having made known to the bees the death of their master, or not having made them go into mourning. It was superstition, and this superstition should have disappeared as all others before the discoveries of science. We know now that a hive does not become extinct if conducted in a proper manner. I say a hive-I should say that a simple colony of bees should never die in the hands of an apiarist who understands his business, and who will give himself the trouble to put into practice his knowledge.

By the side of this superstition, which we find only among people altogether behind the age—by the side of this superstition and resulting therefrom so to speak—owners of bee-hives smothered the bees. When the hive was rich, or when fearing to see it perish from want of attention in winter, a lighted sulphur taper was placed beneath, the bees dropped suffocated, and their honey was taken. Unfortunately, this barbarous and senseless method of killing the hen for the sake of the egg still exists. I say more—it will last as long as ignorance, for it is ignorance which begets it, and it is ignorance which sustains it.

The Government of the Province of Quebec desires to see this branch of industry, at present so little understood, taken up, and with a laudable initiative it has ordained that beekeeping shall be taught in the schools. At present the Society of Agriculture of Montreal, seconding the Government, and recognizing that our two branches of instruction should go hand-in-hand, comes to the aid of the new school of beekeeping by helping it to make its first steps. Let us note these two facts as a happy presage for the bee-keeping of the future in the Province of Quebec.

Nowhere, except, perhaps, in California, can we find in the plants which grow naturally in the soil so abundant a harvest of honey as in our noble country. True, our winters are long, but we know how to take care of our bees, and we know how to preserve them even for seven whole months in their winter quarters. And spring time come, what profusion of flowers offer themselves to them, which open successively and give them rich food ! What riches are lost for want of enough bees to reap the harvest! I know several districts where twenty well-cared-for hives would yield \$200 a year, without counting the profit from new swarms. I cited California; our harvests are doubtless less abundant, but they are more certain, for we rarely have bad years here. Since I began a course on apiculture in Montreal, I have been able to appreciate how enthusiastic students become in this study. This enthusiasm will bear fruit; not only will the teachers benefit beyond \$300 or \$400 a year, but more, teaching by word and by example, they will disseminate the taste and the science of bee-keeping among all our apiculturists, and augment considerably the wealth of the country. Science will have created these riches—yes, create is the word—since the bee places in the flower a substance which would the lost without its intervention. This gift is used, also, in aiding the flower to fecundate its seed. Admirable reciprocity, from which we reap profit on both sides !

Let us, then, do our best to increase the number of our hives. The bee is not like our domestic animals. To feed it we do not require vast pastures; a little corner or patch of ground is sufficient. Ten hives can easily be kept in the space required for raising one hundred cabbages, and they do not require much more work, though bringing a hundred times more profit. The bee, to find its food, goes far away; it does not respect high walls, nor fences, nor hedges. It lives on the neighboring fields without being treated as an offender; on the contrary, every one, on the return of fine weather, likes to hear its gentle song, which causes day dreams, which elevates the soul by giving us an attractive example of useful employment.

I should wish to see every house in Montreal that has a garden attached ornamented with a few hives. Our streets adorned with soft maples offer a rich spring harvest, not of honey but of pollen. The pollen is the daily bread which serves to feed these little ones. Our flower gardens furnish them with an infinite variety of flowers; our fields are white with clover. This multiplicity of resources permits, therefore, the advantageous keeping of bees in the very heart of the city.

The great city of Paris has its bee-hives; Milan, also, as well as St. Louis; so Cincinnati, where a dealer in groceries and honey, Mr. Charles Math, has sixty hives, which thrive on the flat roof of his shop.

Our Province is far, very far, from possessing the number of hives which it could sustain. The kingdom of Hanover has 216,000 hives, of which 52,000 are in the towns. But in order that the number of hives should increase rapidly, it is necessary that legislation should intervene. There are laws protecting animals against ill treatment. There are others which provide against the destruction of our preserves in forbidding the killing of game at certain seasons of the year; which protect fish during certain months to prevent the extinction of the species. Why should not the same law exist for the bee? We can harvest then a purer and better . honey without destroying the bee. The means are varied and in the power of all, on the sole condition that they should become known. There is there fore, but one thing to do prevent the destruction and spread instruction.

We need not fear that by increasing production in adding to the number of hives, and by more scientific care, we shall overstock our markets, or glut them with an unsaleable article. Honey is liked by all; it is a beneficial food; it is a certain and agreeable remedy in many maladies; therefore, we cannot produce too much. No doubt abundance will lower the price, but this reduction in price will create a demand. And what harm will there be when the price will be sufficiently low that each household can partake of this luxury? Honey will also diminish the importation of sugar. Experience teaches us that a nation increases its riches by increasing its production and diminishing its importation. But what use is there of talking about the time when honey will be too abundant? In the United States bee-raising has made great progress. The rapid and abundant supply sent last year from California found the largest portion of the people unaccustomed to eating honey, but taste has now been formed, and the demand will henceforth be equal to the supply.

The United States are rightly accorded the front rank as the nation most advanced in apiculture. We have not attained any perfection in this science, but are profiting by the example and lessons of the Americans; and, in avoiding the mistakes which at first were made by them, benefit by their experience. The public interest is awakened. If the Government in taking the census of 1880 would add thereto the statistics of bee-keeping we could by next census trace, step by step, the progress made in the industry, and, at the same time, form an idea of the benefit accruing from the instruction given in Jacques Cartier School, and thus be able to speak with confidence and certainty of the benefit which doubtless has attended it.

### CURRANT CULTURE.

### BY ANNIE L. JACK.

No fruit garden is considered complete without its bushes of currants-red, white and black. They are generally placed in some out-of-the-way corner or as close as possible to a fence. in order to allow them as little space as possible. Grown in this manner the spurs are often mossy, the branches straggling, and it is not unusual in fruiting season to see the red and white fruit hanging upon leafless branches, while the whitish ribs are left to tell of the ravages of the caterpillar. On our fruit farm we have adopted a different method of cultivation, and our acre and a-half of currants form quite a field, being planted six feet by nine apart, so as to allow the work of keeping clean to be done by the aid of plow and cultivator. Of the varieties grown one-tenth is of Red Cherry and Versailles, with a few White Grape, and the rest a very good common kind of black currant. That is all we require in size and quality for market purposes in a favorable season. The reasons for our seeming partiality to the black currant are that it is less liable to be attacked by insect pests, brings better prices, and does not so quickly spoil in transit. In this way it has proved to us the most profitable and easily managed berry we have yet grown, and amply repays us for any extra care and culture.

This fruit is every year in greater demand for the city market, the black currant especially being used in many cases medicinally, either preserved or made into jclly, while the pressed juice is made up into a decoction called wine, which, without any pretension to that name, is a very soothing and useful remedy in cases of sore throat and slight colds. London says that the leaves of the black currant when dried are a good substitute for green tea; and I have known many English matrons in rural districts gather three or four of the leaves for the teapot, stating that it improved the flavor, making it equal to the best Hyson.

The currant is propagated in several ways, the most common being by cuttings of the ripe wood in autumn. It must be of the present season's growth and cut about six inches long, just at the base of a bud. These are tied in small burches and buried in the soil, with a covering of old boards or straw to prevent freezing and thawing during the winter. As regards manure it is a gross feeder, and will amply repay a rich soil. Wood ashes have proved with us one of the best fertilizing materials, containing many of the elements the plant requires, and keeping the soil from baking if so inclined, besides in a measure preventing insects finding lodgment near the roots.

A great drawback to the culture of the red and white currant is the troublesome insect known as the larva of the Magpie Moth (*Abraxis*), which feeds upon the tender leaves early in the season, and often a second brood is hatched before picking time. The moth is a dull nankeen yellow, with brownish bands on the wing, and the worm a dull yellow, covered with small black dots. White hellebore, boiled in water and applied in a diluted state, is the only sure remedy. The black currant is occasionally troubled with this pest, but not to any extent on our grounds.

In regard to securing the crop, we hire by the day, paying good hands 59c. each (without board), and as the members of our own household assist in the work, we can easily ascertain when the pickers are industrious. They use flat, open baskets for this purpose, are instructed to keep out all leaves and twigs, and to discard any that may have suffered sun scald. A good, steady worker picks about 13 gallons per day, and at night the berries are put into strawberry cases holding 17 gallons each. These are left open in a cool cellar, and in the morning filled quite level to make up for any shrinkage, the lids secured, and the cases are then ready for the first boat.

• As regards profits, we have not found the currant crop to average over \$150 per acre; but as our field one year suffered from a flood in spring, and the next from a summer's drought, we still hope for better things.

# GRAPE CULTURE.

### JAMES MIDDLETON.

The vinery I would recommend should be half-span roofed, the back wall of brick, as it is not subject to such great changes of heat and cold as a whole-span roof, and a greater diffusion of light than a lean-to house ; the border should not be made deeper than three feet, or rather less, nearly one foot above the surrounding ground. I do not approve of slaughter-house manure, which is too stimulating. The vine is a gross feeder, and for the first should grow slow to get a good constitution, not shooting up like a stalk of rhubarb. Good turf from an old pasture, well rotten dung, old lime rubbish, plenty of bones and old horns, should be used, as the vines will feed on them for many years. It must be well drained, otherwise all the rest is of no avail. With plants not more than three years old, and judicious management, there need be no trouble in growing good grapes. As to the varieties, every one can please his own taste, only remembering that Muscats and late growing kinds must not be put in a cold vinery. The greatest number should be of the Hamburgh kinds, and for a good bearer there is none better than the Mill Hill Hamburgh, which is my partiality, perhaps because I lived at that place in England.

In giving my own routine of culture at Mr. Lunn's. Montreal, I may state that the houses were three in number, two about forty feet each, and one one hundred and sixteen feet (before a piece of it was cut off for building on), eighteen feet wide. There were three rows of vines, the front one below the rafters. Some have an objection to three rows of vines, but I found no difficulty with them, having taken prize grapes off all the three rows. When I took charge of the vineries in the beginning of Octoler, 1853, the sight was not very encouraging, as there was not a green leaf nor a bunch of grapes fit for the table. The vines I should think were about eight years old, and just at their best; but, through bad management, were all covered with mildew, thrip, red spider, &c., &c. My predecessor (a German gardener) said they had the Cape of Good Hope vine disease. The first season I had only a moderate crop, and battled with sulphur until the silver watch in my pocket was the color of copper, but succeeded, and never after had a speck of mildew or red spider, and very little thrip. I always put a little sulphur along the front of the house, and sometimes at the roots. When the back wall was whitewashed, I put plenty of sulphur among the lime. I found sulphur at the roots of the white Sweet-water grape out of doors a great help to keep off mildew.

The vines were pruned on the spur system, and I kept them so, as I think, all things considered, that it is undoubtedly the best mode of pruning. The bunches may not be so large as some on the long-rod system, but the fruit can be more evenly distributed over the whole house. I don't think, after more than twenty years' pruning, that I have left a spur three inches long. To begin in the fall then, as soon as the frost has killed the leaves, prune the vines clear of any loose bark and brush them well with a mixture of fresh lime, soft soap (or rather whale oil soap, I like best), plenty of sulphur, soot water, and earth to make it the color of the vines. I used to get the washing done for a year or two in the spring, but there was so little time then that I changed to the fall and found it made no difference. Lay the vines down before frost, as otherwiseit would make them break. Do not cover them until they get some frost, as it sends down the sap and there is no bleeding in the spring. After this cover well with earth, and over all put a good cover of long stable-dung. I covered up well, as I have seen in some vineries the danger of not being covered well. I once tried three vines, one in each house, wrapped up in old soldiers' blankets. In the spring I thought all was well, but they died down to the ground, and the shoots that grew up never did well. The having to lay down the vines in this country is the worst thing about grape-growing ; they are so liable to break when old. I always kept a shoot or two growing from the bottom of some of the vines, and did not cut it down until they were all laid down; if there was a break, had it ready to replace; never had a blank, as I carried the shoot sometimes along in the ground to where it was wanted, past two or three rafters; never tied up a shoot to the rafter it grew at, as it would be more liable to break when laying down. We put fire to the first vinery the beginning of March, second vinery about the first of April. In the cold vinery I had a flue put in to fire in the fall, to keep the grapes after the frost came, and I must say so long as there was a little fire in the fall I had the best grapes in it-the wood was so well ripened, and the color of the grapes was so fine. After uncovering the vines I turned the dung a time or two to make it heat, and made it up in a hot-bed the whole length of the house ; I did the same with the three houses in succession. This helped to heat the house, break the buds, and held a great number of flower pots. The vines being left lying horizontally, every bud will break and the lower part of the rafter will be as well furnished as the highest. It requires two persons to tie them up when the buds are all started. When the vines are lying down, syringe them several times a day, and after they are tied up, until they are nearly in flower. That was all the syringing I ever gave them, unless once when the fruit was all formed, to wash off the flowers and loose fruit. I began very soon to disbud all shoots not required, stopped every fruit-bearing shoot at the second joint above the bunch; never left more than one bunch on a shoot; removed all the fruit not required as soon as I saw what to leave for a crop; stopped the laterals at the first joint, and every time they grew at the next joint, until the fruit was beginning to color; then cut the

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most of them clean off, as the leaves on the rest of the vine were so large they made plenty of shade. I am a great advocate of large leaves and plenty of them, as they are the lungs of the vine; of course the tendrils have to be all pinched off. Let the main shoot run as far as convenient, as that is a great help for the fruit in the ensuing season. When the berries are the size of peas, or rather sooner, I commenced to thin the bunches, my mode of thinning being rather different from that of many gardeners. I never thinned the bunch but once; before doing that, if it wanted spreading, I tied it up so that I saw just how many berries to leave. I always thinned severely. When I went (many years ago) as gardener from Scotland to England, a few days after I landed there was a vine with branches extending both ways just ready for thinning. I set to work and had one side nearly thinned when the gentleman and lady came in. He looked about a while, and then said he did not think thinning the grapes would do for England. My reply was that what way good for Scotland might do for England, but I would let the other side stand as it was, and we would see who was right. When the family came back from a long tour the grapes were nearly ripe; they both were in the stove, when the gentleman asked me what could be the reason the grapes on one side were so large and the others like currants. The lady burst out laughing and reminded her husband of what I had said. I think I was the first to thin grapes in Canada. For several years at the exhibitions my grapes were so much larger than others that the gardeners could not understand it until they caught me thinning.

Whenever the season got hot I gave air at the top shortly after the sun shone on the houses, and scarcely ever had a scorched leaf. I do not approve of bottom air, and never gave any. When there was time I sprinkled the floors and flues two or three times a day. Often the late vinery got very little syringing, as there was no time; all the manure the vines had was the short dung from the beds in the house. I never gave them any guano. I generally had a tub of pigeon manure water, which was sprinkled over the floors mostly every night (when the vines were growing), after the houses were shut up; not in any quantity for manure, but for the ammonia for the leaves, to make them large. I used to think the vines received nearly as much benefit from the leaves as the roots. At any rate the fruit swelled fast when the leaves grew large. I always gave water when the ground was dry; never kept the vines wet, and no water at all after the fruit was ripe. I did all the pruning, thinning, tying and most of the airing myself.

### GRAPE CULTURE.

### L. W. DECKER, MONTREAL.

For about twenty years I have been experimenting in Grape Culture, blending actual practice with the information I have been able to glean from leading articles by different authors upon the subject. Until a few years ago, however, I had made little progress, my ill-success being due to the fact that I had, until then, been unable to secure varieties which would ripen, one season with another, without too great artificial assistance.

Mr. Smith, of Philipsburg, in his very interesting letter in the Society's Report for last year, gives the names of nearly a score of varieties which he is convinced can be successfully grown in this Province. I have tried nost of the varieties quoted by Mr. Smith, but, I regret to say, with results which make it impossible for me to endorse his opinion. Mr. Smith's vineyard at Philipsburg is situate about fifty m'es south of Montreal, and in one of the most favored spots in which a grape vine could be placed, and be what may be called "out-door culture." It is hemmed in on the south and east by just enough of a mountain to break the force of the winds, and yet not so high as to exclude the sun later than eight or nine in the morning; and to the north and west by buildings and white-washed board fences. Add to this the fact that in that vicinity the Spring is at least a week earlier than on this Island, and localities east and north of us, and it will be seen that the conditions are largely different from those under which our "out-door culture" is pursued. Mr. Smith's success has been most marked, as every one who has had the pleasure of seeing his fruit, either in his vineyard or on exhibition, will readily admit.

Mr. Smith also quotes Mr. Bailey, of Plattsburg, N. Y., as being very successful in cultivating the varieties alluded to. I have visited Mr. Bailey's vineyard, and while it must be admitted that it is in no way sheltered from the winds, the fact must be taken into account that Plattsburg is further south than even Philipsburg. The Spring opens there at least ten days earlier, while the Fall is ten days later than with us. The varieties recommended by Mr. Smith are, I am aware, grown amongst us—in limited quantities—but the vines are usually set in some specially favored sunny spot about the premises—or, perhaps, near the hot-bed frames, where the glass, though no doubt inadvertently, is made available to force the fruit forward.

I am quite of Mr. Smith's opinion that grapes can be grown in open air in this locality, to as great extent and perfection, as in any locality within a limited distance to the south or west of us, but not in as great variety. The specimens shown here last September amply testified this, and could the fruit have been permitted to remain ten days or so longer on the vines, the exhibit would have been as fine, for its extent, as any I have ever seen.

Nearly all grapes color at least two weeks before they ripen, and with us are generally picked before they are ripe, to save them from the frost. For this reason they are deficient in the bloom on the fruit, which is the sign of its thorough ripeness. The last two seasons have been exceptional ones in this Province, and most varieties ripened in advance of the advent of frost.

In 1871 I planted at Decker Park, near Montreal, 120

vines-a portion of which were the first of my efforts at Grape Culture that could be considered successful. In the Spring of 1874, I removed the Champion, Delaware, Concord, Hartford and Adirondac vines to Riverside-a place purchased by me on the Ottawa River, between the Convent of the Sacred Heart and the village of Sault-au-Récollet. Some other quite popular varieties I did not consider worth the labor of removal. There were at Riverside, when the place came into my possession, some ten or a dozen vines, from which the former owner had, by dint of careful nursing-and covering with blankets on any appearance of frost-succeeded in getting a few bunches of grapes every Fall. There were two Sweetwaters, which I preserved, for the sake of having a variety The others I dug up. I have now some 400 vines in bearing, comprising some ten varieties; nearly all, however, being the Champion. I have visited grape-fields in all parts of the country West and South of us, and I can safely assert that, for the last three years, I have not seen a finer or more prolific crop than my own. In each of the years named I have had Champion Grapes on my table at the Montreal House in advance of those grown in Rochester and shipped to this market. Last season I picked the first fruit on the 26th of August, and on the 12th September-the date of the Horticultural Exhibition-the whole crop was so ripe that the stems were quite shrivelled. My remaining varieties were no riper than those of other exhibitors.

I subjoin a few hints upon the method of cultivation which may 1 wound useful to new workers in this field—of whom I trust the number will increase year by year.

I. THE PREPARATION OF THE SOIL.—This is a matter of great importance. Once done, however, it will last for the remainder of one's natural life—while the crop comes as regularly at every harvest as do those requiring annual preparation. A slight top-dressing when the growth ceases to be vigorous, and keeping the weeds subdued, are all that is required.

The cost of plants, to begin with, if they are bought, is a

heavy item; but after one year, a few vines will furnish cuttings sufficient to raise any number desired.

II. THE TRELLIS.—This is the next important item. The accompanying cut will show what I consider to be the best kind of trellis I have seen, for what it costs, and will also serve to illustrate the mode of training the vines.



[EXPLANATION.—aa. Posts; 6 feet high, 6 feet apart; bb. Cross bars cc. Wires; dd. Length of arm the first year; cc. Canes allowed to grow first year; gg. Showing where canes grown next season are cut at the fall pruning. The left hand canes being cut wholly away, and the right hand ones cut back to two buds; hb. Canes grown the season following. The shoot from the top bud should bear fruit—what sets on the other shoot should be rubbed off. The object of this is to have one-half the vine bear one year, and the other half the next year. The cane that bears this year should be cut clear away, and the other cut down to two buds. By this means alternate renewal of wood is secured.]

Any kind of posts will do that are strong enough.
Mine are made of 3x4 inch scantling, set in the ground between the vines, which are set six feet apart in the rows—the same space being allowed between the rows. The cross-bars are 1x4 inches, nailed one foot from the ground; the other six feet from the ground.

III. MANAGEMENT OF THE VINE .- After the vine is taken up in the spring, and the buds sufficiently started to indicate where the shoots are sure to grow, the arm of the vine should be stretched along the lower bar and tied. The first year, say three buds, and the second year two more, should be selected, at as nearly equal distances as practicable on the upper side of the arm; all the other buds should be rubbed off. When there is a bud missing on the upper side, an under bud may be trained to take its place. When the positions of the buds have been fixed, a one inch galvanized clout-nail should be driven into the cross bar, directly over each place where a shoet is to grow, and No. 20 galvanized wire stretched between the nails. As soon as the shoots have grown to be a little top heavy, they should be tied to the wire, care being taken not to tie them too tightly. Three or four bunches of fruit are all that should be allowed to grow on each cane the first two years; all others should be rubbed off. As the vine grows older, this number may be increased. Some of my vines were badly injured through permitting fifty or sixty bunches to grow on each the second year.

IV. WHEP TO PRUNE.—I believe this question is finally settled in favor of pruning in the Fall, after the leaves have fallen from the vine.

V. How TO PRUNE.—This is a question upon which there is so much difference of opinion that I am unable to answer it satisfactorily. Mr. Elliott, author of the "Western Fruit Growers' Guide," says on this point : "Let us say, first, that "summer pruning,—that is, cutting away of foliage after the "blossom has opened, is now counted, by the majority of "Vignerons, as an error; and the reason is that each leaf and "end of a shoot has a corresponding connection with the "spongioles, or feeding ends of the roots, and once the leaf

" or shoot connecting therewith is broken, the spongiole " rootlet, or feeding mouth, is affected—is closed from its " natural action ; as a consequence, rot and decay ensue, creat-" ing at the root of the vine a fungoid disease, which, if the " same system of summer pruning were persisted in, would " in a few years result in apparent outward disease of the " vine, and in rot and mildew of the fruit." During the three years that my vines were at Decker Park, I kept them pinched back to a perfect dwarf system, allowing only two upright canes to grow to a height of seven feet; constantly pinching off all laterals and tendrils. Now, if Mr. Elliott's theory were correct, the three years of summer pruning on my vines, before their removal from the Park, would have utterly ruined them. At their removal, which I attended to myself, I found the whole of the vines with a perfect mass of thrifty roots and rootlets, and free from the slightest appearance of rot or decay. As proof that they were in a healthy condition, I may add that all, save one, flourished and bore well; and to my surprise, as well as to that of many others who saw them, a number of the vines bore large quantities of perfect fruit the same season in which they were transplanted. Since I have adopted my present system of training on this trellis, I only pinch the tops of the shoots a few times in the early part of the season, keeping them all about an equal length. The laterals I also pinch back, as I am satisfied this results in throwing the growth more into the canes.

I feel it difficult, even with the limited experience I have to recount, to give more than a summary of the methods of dealing with grape culture, without trespassing too heavily upon the space allotted me. I am glad to observe that the grape fever is spreading in this Province as well as in the Province of Ontario, and the many are embarking in the enterprise. To those to whom it is a new business, I would say that they must expect to meet difficulties and drawbacks. Errors in treatment are sure to occur, such as rubbing off the wrong buds, or cutting vines in wrong places. But these mishaps are part of every man's experience, and should not be allowed to discourage one. Vigorous vines will stand any amount of abuse, and with a little time will outgrow defects brought on by bad training. A little perseverance and careful observation are all that is required to bring about a successful issue.

In my opinion, the only difficulty in the way of extensive and successful grape growing in this Province is the securing such varieties as will ripen regularly before they may be endangered by frost. We have already one variety, the Champion, and I have no doubt that, with the great progress which is being made by our neighbors across the line, we will presently have other varieties well adapted to our rapid and short summers. With varieties possessing as many good qualities as the Champion, there is no reason why grape growing should not become a leading feature in farming and market gardening; for I am satisfied that it would prove to be by far the best paying crop that can be raised. Most cultivators of the soil have grown Indian Corn, and know all about it. I have grown it myself in the Townships and on this Island for a quarter of a century, and I have no hesitation in saying that I can grow Champion grapes in any spot or place, and on any soil, where the ordinary twelve-rowed corn will grow and ripen.

Should anything I have written have a tendency to encourage grape-growing in the Province of Quebec, or be of service in training or pruning a grape vine, I shall be amply repaid for my trouble.

## NOTES ON GRAPES.

#### BY MISS ADA J. CONROY, AYLMER.

It is scarcely possible to draw up a proper report on grapes and grape vines, in the absence of notes and of very special observations; but by taxing memory, the following, my experience in this locality, may pass for what it is worth :--- The Isabella, although late, is always a favorite, especially in long, warm summers.

The Clinton gives a sugar, and although rather acid, makes a good, if not the best keeping grape for winter—also best for wine.

The Concord is very satisfactory, producing large and beautiful fruit, and does very well, both for table and for wine.

The Delaware, ever new, ever fine, ever the finest table grape growing.

The Iona, early, superb, fine, shy producer.

The Oporto, blue, large, large loose bunches, early enough and very satisfactory.

The Champion, very early, ripening about the 25th of August-juicy, and highly esteemed.

The Rebecca, early, fine, high flavor.

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The Hartford sustains its reputation for earliness, size and flavor.

Rogers 15, Agawan, grows well, large fruit, early as the Concord, and much esteemed.

The Martha, small but early and very sweet.

The Chasselas, very much esteemed for the table, large size, early, but unfortunately is subject to mildew, especially when the vine has become old.

The Rogers 4, is preferred to the Hartford in all respects.

The Meunier, black, fine bloom, grows too compactly, but is extremely sweet and very desirable.

The Adirondac does not succeed well here.

## GRAPE CULTURE.

#### JAMES MORGAN, MONTREAL.

Having previously written regarding soil, situation, planting, trellising, pruning and fruiting, I will confine my attention in this paper to noting the characteristics of each variety as these presented themselves during the past season, and especially with a view to profit. This year has been one of the most favorable that has come under my observation, not only for the growth of the vine, but for the ripening of the fruit and wood. The wood of the most tender varieties is thoroughly ripened, and, therefore, in a most favorable state for bearing an abundant crop.

I. THE CREVELING, contrary to former experience, proved the most productive and remunerative. The bunches were large, shouldered and compact; in no case could they be called straggling. The berry was medium in size, and richly colored. It ripened fully, and readily brought from 15 to 20 cents retail in the Montreal market. The vine, being hardy, requires but a slight covering.

II. THE HARTFORD PROLIFIC ranked high in productiveness. On account, however, of the foxy flavor and liability to drop the berry it is not a favorite with the retail merchant. The price of Montreal-grown berries was 10 cents per lb. This vine is a most rampant grower and abundant bearer. Severe pruning and thinning of the fruit are necessary.

III. THE DELAWARE is the most delicately flavored and, perhaps, the most popular of out-door grapes. The transparent redness, and also the compactness of the bunch will always make it a favorite; while its good shipping and keeping qualities render it profitable to the merchant. Imported berries sold from  $12\frac{1}{2}$  to 15 cents; Montreal berries 15 to 20 cents. This vine requires a very rich soil; it is a slow grower but hardy.

IV. THE ADIRONDAC, though bearing bountifully, did not arrive at the perfection of former years. A number of the bunches ripened in part only; some of the berries remained green, and many of those that colored were tasteless. Probably the vine was allowed to over-bear; the wood, not being thoroughly ripened last season, may have been unable to supply the requisite amount of nourishment. The vine is tender; it requires more protection than any other variety I have planted. It is not the intention of the writer to discourage those who intend planting this vine, but rather to warn them against trespassing on the grounds on which he has illegally trodden. This vine is well worthy of a trial; the berry is finely flavored, and meets with a ready sale.

V. THE SWEET-WATER is the most prolific of out-door white grapes. It ripens early, and is much sought after by the fruit dealers. It sells readily to dealers at 10 cents per lb. The flavor is watery. It is more esteemed for the color than the quality; keeps well. Its great enemy is the thrip.

VI. THE REBECCA is very desirable for ornamental gardening, being renowned for its rich green deeply indented foliage. Bunch small; berry medium sized; color green; finely flavored; keeps well. This vine has not been productive; not more than four pounds of fruit have been cut any one year.

VII. THE CONCORD ripened this year for the first time. It cannot be recommended for cultivation as far north as Montreal. The bunch is medium, shouldered, richly covered with bloom, and markets well; flavor slightly acid, melting and juicy; demand fair. The vine is hardy, very productive and requires little pruning.

VIII. THE CHAMPION is said to be one of the best of our early grapes. Mr. Decker, of Sault Recollet, says that his vines, were over-loaded, that the fruit ripened early in September, and sold well. Having planted three of these vines last season I h pe to report personal experience in a year or two.

IX. ROGERS' HYBRIDS are not to be surpassed in flavor, approximating closely to in-door grapes.

Our Fruit Association being now fairly organized, it is advisable that all interested in the work should report at once the appearance of any insect, enemy or disease, in order that steps may be taken for their extirpation or suppression. The Phylloxera Vastatrix has not, to my knowledge, made any depredations in this locality. The thrip has proved a greater pest, especially in sheltered positions. The varieties of grapes grown in the open air, but usually classed among in-door varieties, are most subject to the ravages of this insect.

Mildew has caused me considerable loss every year. Grape rot, which has been a source of very great loss to our neighbors across the line, has not, so far, been heard of in the Province of Quebec.

### AMATEUR GRAPE CULTURE.

H. S. LOMAS, POINT ST. CHARLES.

Four years ago I purchased one dozen large two year old vines, namely : - Six Croton, two Concord, two Hartford Prolific and two Salem, and received them with some other plants, in splendid condition. I prepared a good trench about three feet deep and three feet wide, into the bottom of which I put two barrels of oyster shells, covered with about two loads of yard rubbish of every description, which I covered with some good earth, about six inches deep, and on which I also put two barrels of old bones which I had been saving for the purpose. These I covered with six inches more of earth, mixed with some good rotten hot-bed manure. I now set my vines about six feet apart, taking care to spread the roots evenly and regularly, and covered up with good rich soil, and raised about six inches higher than the ground level to allow for settling. As the season advanced, my vines began to show well, and I let them grow at will, in order to strengthen the roots. In the fall I cut off all the unripe wood, and also such shoots as I thought would not be required in the spring. In the fall I covered with earth and long litter.

The next spring, about the middle of April, I uncovered my vines, and after a few days' drying, I washed them with sulphur and soft soap, and tied them up to an horizontal trellis which I made with posts about twelve feet apart, of scantlings pierced through the middle, through which I drove some

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galvanized wire, about eight inches apart and eight feet high. I now tied up my canes about four feet from each vine, fan fashion, and this season they did remarkably well, making splendid wood, and on the Croton vines I had a few bunches. of grapes, which ripened well. In the fall I cut down the canes to about five feet high, and laid them down as last fall ; the next season my treatment was the same as the preceding, and the crop of grapes was extra fine; but in the fall I had convincing proof that I had cropped too heavily, and lost more grapes than I should have taken off in spring ; however, I cut back my canes, and laid them down as before, using good old horse manure on top of the winter covering earth; it serves for mulching in spring. Last summer I had a splendid crop of grapes, of four sorts, which were the admiration of every one who saw them, especially the Salem; and I feel satisfied that any one who wishes to raise a few vines in the vicinity of Montreal will meet with success, if he carries out this arrangement in anyway like the foregoing. The chief essentials are, in my opinion, proper site, good drainage, good strong plants, judicious pruning in fall; above all, do not crop too heavily, and success is certain; and I should be happy at any time to give further verbal information to any amateur who may wish for it, by calling on me.

# CULTURE OF THE GRAPE UNDER GLASS.

#### BY MICHAEL GORMAN.

#### I.-THE LOCATION OF THE VINERY,

as with all glass structures, should be, whenever practicable, in a situation sheltered from the north and west, and if the ground is gently sloping towards the south-east, so much the better. Of the construction of the vinery I would simply say that for early forcing, or when artificial heat is used, a lean-to or one-sided house is preferable; while for a cold grapery or a

house not artificially heated, a span-roof is the best. The former may be from 16 to 18 feet wide, and of any desired length which will allow of three rows of vines to be planted 18 feet high. This will give a length of rafter of from 20 to 24 feet. When the span roof for the cold vinery is used, it may be 25 feet wide. This will give a rafter of about 15 feet on each side. The excavation for the bed should be made 4 feet deep, and the length and breadth of the house, if a lean-to, 15 feet outside; if a span roof, the same distance on each side. Above all, it is indispensable that this excavation should be thoroughly drained. It may be so formed that the bottom slopes gradually to the front,-say one foot in twenty-and then a drain should be so placed as to carry off all surplus rains that may fall on the roof and border. A layer of stones should then be placed all over the excavation, the largest in the bottom, finished on the top with lime, rubbish, oyster shells or crushed bones, the whole about one foot thick. This, if properly done, will prevent the bed from ever getting foul or sodden at the bottom, which is the main feature of all wellmade vine borders. Some finish the bottom with a layer of cement all over the stones in order to prevent the roots from getting into the cold subscil, in which case the excavation is not required so deep. I prefer the former practice, having tried it on several occasions with very good results. When the bottom is formed after the manner described, a layer of good fresh turf from four to six inches thick should be placed grass-side down all over the bottom. This prevents the soil from being washed down among the stones, and also keeps the whole bed in a good healthy condition. This, in my opinion, is the most important part of the work, for if not properly attended to now, it cannot be remedied hereafter. The soil which forms the be where the vines are planted should be the top sod taken from an old pasture, not more than six inches deep, three parts turf to one part of thoroughly decomposed stable manure. The pasture from which the turf is taken, if it should be a heavy or adhesive loam, would be much benefited by a mixture of some loose material, such as lime

rubbish, street scrapings or charcoal, say one load in five or six. Should it be of a sandy or shaly nature, no such material will be required. If the whole could be prepared one year previous to using, giving it a few turnings during summer, it would be better. However, this is not indispensable. I have seen it used fresh to answer as well, providing the manure is thoroughly decomposed. The bed may be now filled up to the desired level, allowing five or six inches for shrinkage. It must be tramped down firmly but not solidly, taking care never to attempt it in wet weather.

#### II.-PLANTING THE VINE.

As amateurs or beginners very commonly desire to procure vines that are two or three years old, to such I would recommend a one-year-old, well-ripened vine as likely to answer the purpose better. However, a two-year-old, wellgrown vine will answer equally well, and perhaps better, in more experienced hands. The best time to plant is about the middle of May, or just when the buds are beginning to start If kept in a cool place all winter, it is best to shake off the soil from the ball, spreading out the roots in a horizontal direction, the distance to be about three feet apart, or one under each rafter, pressing the soil gently round the roots and after giving the whole a good watering.

#### III.-TRAINING THE VINE.

Strong galvanized wire may be run either horizontally fifteen inches from the glass, or three to each rafter lengthwise, the vine to be trained up the centre, while the fruit is tied in at each side. The treatment of the vines the first year is quite simple, presuming that they have been cut back in the fall. If not, it is best to rub off all the buds to two or three at the base, selecting the strongest, which is trained up the centre wire, to become the future bearing vine. The knife is not to be used at this season. As this vine will throw out laterals or side shoots, they should be pinched off at the first joint until it reaches the top of the house, which it will do the first year with ordinary success. In the fall, or as soon as the leaves drop off, this cane may be cut back to three or four eyes from where it started in spring previous to being laid down for winter. The best covering for the vine is either dry earth or sand, with a mulching of leaves or other litter all over the bed. The treatment the second year is similar to the first with this exception : that at pruning it may be cut three or four feet from the ground. The third year, if all has gone well, the vines will commence the show fruit, which should be cut away, leaving from four to six bunches on each vine. The fourth year, and after a fair crop may be taken, regulating the number of bunches according to the strength of the vine.

## IV .- TRAINING AND SUMMER PRUNING.

In these few remarks I will confine myself to the spur system. Presuming the vine has reached its fourth season and has been cut back to ten or twelve feet from the ground, the cane is allowed to spur or branch at each joint or eye. A shoot from the upper part of the cane is allowed to run to the top of the house. The side shoots, which are to bear the fruit, may be shortened to one joint above the bunch intended to be left just as the bunch is formed. Strong vines will often show two or three bunches on each shoot, but those desirous of fine fruit will content themselves with one. In no case, however, should there be allowed more than two bunches on a shoot. All laterals which grow below the bunch should be rubbed off, while those which grow by and above the bunch must be left and shortened to one joint. When the laterals have again made a few leaves, they may be shortened in the same way, and so continued throughout the season.

## V.-THINNING THE GRAPES.

This should be done while the berries are no larger than peas, for if left until the bunches are crowded, the work is not only much slower, but the berries are more apt to get bruised by the operation. The general rule in thinning is that, as the berries are formed generally in sets of three, two may be safely cut. In thinning large bunches, however, it is sometimes necessary to cut entirely from the centre many of the sets alluded to Large bunches of some of the loose-growing varieties will be much benefited by having their shoulders tied up to the wires. This gives opportunity for the fuller development of the fruit. Plenty of air must be given on all 'fevorable opportunities. The best way is to ventilate from the top until the fruit is fully grown, when it also may be given at the bottom. Cold draughts should be avoided.

As the vine delights in a moist atmosphere, a plentiful supply of water of the same temperature as the house must be given during the whole period of its growth, until the fruit commences to color, except at the time of flowering, when it must be discontinued, as a dry atmosphere is best suited to the setting of the fruit. Use the syringe freely every evening before closing, except in damp or wet weather. Among varieties best suited in a vinery where forty vines are to be planted, and where a little artificial heat is used in spring, I would recommend the following varieties: 30 Black Hamburgh, 2 Golden Hamburgh, 2 Foster's Seedling, 2 Buckland Sweetwater, 1 White Frontignan, 1 Black Alicant, 1 White Nice, 1 Canon Hall Muscat; the last named in warmest end.

# CULTURE OF THE CALCEOLARIA.

#### BY MICHAEL GORMAN.

The Calceolaria, as a spring-blooming plant, deserves special attention, for when properly treated it never fails to attract and to excite pleasure in the mind of every lover of flowers, by the brilliancy of its colors, profusion of bloom, and extensive variety. The constitution of the plant at its first period of growth is rather delicate. However, as soon as it once gets fairly started, it grows as freely as any other plant, providing it is properly attended to—save seed from the most distinctly marked and best colored varieties of neat habit. The best means of obtaining this object is to allow the plants to remain in the green-house to perfect their seed. To this end the

plant should be shaded from intense sun, and the seed gathered in three or four days after the petals decay. The plants are then worthless and may be thrown away. Sow the seed in shallow pans of well-drained loam and silver sand in a shady situation protected from sun and rain. This should be done about the last week in August or first in September. As soon as the plants are sufficiently large to handle, they may be pricked off into boxes of the same compost, where they are to remain till the 1st December. They should be then potted in three-inch pots in turfy loam sand, and some well rotted cow manure, and placed on the shelves near the glass. When the roots begin to appear at the bottom, they should be again shifted into six-inch pots, and in four or five weeks, if properly attended to, they will need their last shifting in pots sixteen inches in diameter in the same compost as before. As they progress they should be frequently syringed, and watered with guano in solution. As the green fly is likely to make its appearance, fumigating with tobacco must be attended to ; it should be applied weak but often, otherwise there is danger of injuring the leaves which, to preserve well, is one of the chief objects in plant growing. In raising calceolarias, one desirable object is to prevent them from being drawn, which will be the case if not kept near the glass and frequently turned to keep them in proper shape. As soon as they commence to throw up their flower stalks, they should be neatly tied out, in order to keep the flowers from getting crowded; also to give the whole a tidy and uniform appearance. I have grown calceolarias after the manner described for a number of years with scarce ever a failure, sometimes with heads of lovely flowers from two to three feet in diameter.

# CULTIVATION OF THE MUSHROOM.

## AGARICUS EDULIS (Cryptogams).

# BY E. CAUCHOIS, SPENCER WOOD, QUEBEC.

The Mushroom can be cultivated in various ways; either in the open air or in a dark and subterraneous cellar. The best way is, however, in a cellar or an underground place, when the cultivation can, in all seasons of the year, continue. I will only speak of the last mentioned way. The modus operandi is as follows: Take good horse manure, not too full of straw, and lay out in banks of optional width and length, from four to five feet deep, being careful to toss it minutely with a manure fork, so as to eliminate from it large pieces of straw which are not saturated with urine, as well as hay and other foreign bodies which are noxious to the growth of mushrooms. This bed of manure thus prepared must be well trodden so as to be one compact mass. If it is summer and the weather be dry and hot, the mass must be well moistened; if it is winter or in cool weather, this is quite unnecessary. The manure to be in a proper condition must be neither too dry nor too moist. Ten days afterwards, when the manure is in a good state of heat and has acquired a whitish color, internally as well as externally, the whole bed must be reworked, care being, however, taken to place in the interior of the heap that which formed its covering and sides, for all parts of the heap must heat in an equal degree.

The bed once re-made in the same spot must again remain undisturbed for eight or ten days, at the end of which period it will heat as much as the first time; again it has to be reworked for the last time, and six days later, the manure has required all the properties necessary. One can find out by manipulation whether or not the manure has reached a proper degree of heat; if it is homogeneous and feels soft; if its color is brown, and if its smell denotes that there is vegetation in it, then it is ready.

#### CONSTRUCTION AND TREATMENT OF MUSHROOM BEDS.

The manure having reached a proper degree of fermentation, it is time to finally build the bed, which must be from two to two and a half feet wide and two feet high, narrowing it in such a manner as to give it a convex shape towards the top. The sides must be gently beaten so as to make it solid, with a spade or a shovel; the bed must then be raked either with the hand or with a manure-fork, raking downward.

After a few days, the bed having attained a heat of 60° to 65° Reaumur, which can be judged by the insertion of a thermometer, then is the time to plant, i. e., to introduce the mushroom-spawn, which is to be had of seedsmen and sometimes under melon-beds. It is then found in the shape of cakes of manure, streaked with whitish filamentous sports, resembling felt, which constitute or go to form the mushroom. The best spawn is the virgin spawn, coming from beds which have so far not produced any mushrooms. If the bed be set up against a wall or palisade, it will be sufficient to plant the spawn in two lines; if the bed stand isolated or in a roundish form, it will be necessary to plant three or four, which is done by making small holes three or four inches deep with the finger : these are filled with spawn and at once covered with manure. The holes must be one foot distant from each other in the lines, which are to be six inches from the ground; the first line six inches from it, and the second eight inches higher, in a diagonal form.

After some days, the beds must be inspected in order to see if the spawn has taken, which is easily seen by the filaments of spawn which have spread through the bed. If the spawn has turned black, it must be removed and fresh spawn planted. When the spawn has taken root and has invaded the whole of the upper part of the bed, the bed must be well beaten together with the hand; then cover the whole of the surface of the bed with finely-sifted mould. It is necessary every ten or fifteen days to slightly water the bed and fill up with fine mould the holes left after pulling out the mushrooms. A bed

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will produce mushroom for three and a half to five months if well attended to.

The above method is the one I have always employed and it has given me satisfactory results.

## CUT FLOWERS FOR WINTER.

#### BY JNO. D. DOIG, QUEBEC.

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I shall treat this subject entirely from a commercial point of view—that is, I shall enquire how to get the largest returns from the least expenditure. This I find easiest accomplished by growing the plants on the bedding or planting-out system both out and inside. To secure this the construction of the house is of no small importance, as it is much better to build the house to suit the plants than try to make plants accommodate themselves to a defective house. A greenhouse for this purpose ought to be so arranged as to admit of one good bed in the centre, from six to eight feet wide, with a convenient path all round. If a span-roofed house, use a shelf three feet wide front and back, (underneath which the heating apparatus may be placed, whether smoke-stack or pipes) which will bring the plants near the glass, convenient for watering, planting, cutting the flowers, etc., etc.

With regard to soils for potting, I have come to the conclusion that there is not so much in the mixture as some writers would make us believe. I find well rotted sods from a loamy pasture, and well decomposed manure, with about onethird sharp sand, to answer all purposes—the sods cut during spring or summer, two inches thick; a layer of manure two inches thick between the two sods, and so on. The whole built up square; the sand may be added then or when required for potting. This is cut off with a spade and chopped up (not too fine, about the size of walnuts) and unless for seeds no other mixture is used. Among winter blooming plants, such as require a temperature of from 50° to 60°, the first and most important I consider to be the Tea Rose. There are a great many varieties of Tea Roses; but the most profitable are Safrano, Orange Yellow, Isabella Sprunt, Canary Yellow, Bon Silene, Carmine, and Bella White. These are best grown in beds, but may also be grown in pots.

The bed should be two and a half feet deep, with six inches of rough material in the bottom to secure drainage; two feet of the compost from the heap recommended above. Young plants about one year old grown in pots are best. August is the best time to plant. Plant firmly, give a thorough watering when planted, and shade from a strong sun until the plants start growing, with a mean temperature of from 50° to 60°, with 15° higher and plenty of air in fine weather, syringing night and morning. Paint the pipes of the flue with a mixture of lime and sulphur to keep down red spiders. Fumigate once a week for green flies, and keep a moist atmosphere day and night by sprinkling the paths and pipes with water. With this treatment the roses will give a continuous supply of cut flowers all through the winter months. Little more is required until spring begins to open and the weather gets warmer-say in April, when the plants must be allowed to dry gradually by withholding water and giving more air to enable them to ripen their wood. By the middle or end of May, if the sashes cannot be removed altogether, give all the air possible day and night, and shade the house by whitewashing the glass with a mixture of slacked lime and sour milk. By the 1st of August the plants will have had two months of comparative rest, when they may be pruned pretty close, and started by giving the bed a thorough drenching, and partly shutting up at nights, and on the first appearance of frost, a little fire at night will keep up the temperature and prevent mildew.

We may now take the Bowvardias, as the temperature of the rose house will suit them well. They are propagated by pieces of the roots in April. When the plants are two or three inches high, they are potted in two or three inch pots and planted out in the open ground from ten to twelve inches apart in May. Any rich garden soil will suit them. Examine them every two weeks and nip out the tops to make bushy plants. By September they ought to be lifted carefully and potted, and placed where they can have plenty of water and shade for a few days. After which they ought to have all the light and air possible; but on the first appearance of frost, they had better be removed to their winter quarters, the side shelf of the rose house or at any place with like temperature. The varieties most in use are Bowvardia Elegans, Carmine, Davidsoni White, the Bride— a very delicate Pink—and Levantha Scarlet.

Then comes the Tuberose. This requires the warmest corner of the rose house, as a temperature of  $65^{\circ}$  will suit it better than  $60^{\circ}$ . The cultivation of it is so easy that there is scarcely anything to be written on the subject; the principal point being to secure sound bulbs that are full and firm at the crown. Start them in a bottom heat of  $15^{\circ}$  in January, if for flowering in May in the house, and if for planting outside, start in May and plant out in June.

Of plants that require a temperature of from  $45^{\circ}$  to  $55^{\circ}$ , the most important is the Carnation. It is easily cultivated if propagated from October to April, and as the plant is comparatively hardy, may be planted out as soon as cabbage or lettuce, or any other plant of that nature. Keep the plants pinched back to make them stocky. If the soil is at all light or free, so that they will not lift with good balls, they had better be potted for two or three weeks before planting in the bed for flowering; but if the soil is stiff or wet, they may be removed to the bed at once. As those require a lower temperature, and necessarily another house, sulphuring the pipes and fumigating once a week apply here. As to the rose house, plenty of air and a temperature of from  $45^{\circ}$  to  $55^{\circ}$ will grow and flower Carnations.

We now arrive at the Violet. Separate the old plants to

one crown, and plant out as soon as the ground is free from frost. Nothing more is required until September, when they ought to be thinned out to six or eight crowns (of course leaving the strongest), all the runners pinched off, and about the last week in September, removed to the greenhouse. The front shelf of the pink house will suit from six to eight inches of the soil recommended above; keep all runners picked off until the plants show flower. Neapolitan Light Blue, Marie Louise Dark Blue, I consider the most profitable.

The Double White Primrose is next on my list in cool plants for winter flowering. It may be propagated either by division of the roots or by cutting off the side shoots in March. It requires shade during the summer months, and ought always to be grown in pots; the same temperature recommended for Carnations being suitable.

I do not consider the Camellia a profitable plant to grow for cut flowers, unless grown on a large scale, and a house set apart specially for hardwooded plants. Where the Camellia can be planted out, the labor connected with it becomes much less, and the flowers are finer and more numerous.

Azaleas pay to grow, but their season of flowering is so short that unless there is a large collection there is not much profit.

Stevias and Eupatoriums, of the different varieties, are very useful in winter, although there is nothing particular in themselves. Mixed with other flowers they are extremely pretty, and by growing the different varieties can be had in flower pretty much all winter. They are very easily propagated and had better always be grown in pots.

The Chrysanthemum I consider one of our best fall flowers, while, by judicious management during the summer months, may be had in flower at Christmas, propagated in early spring so that the plants may be established in four inch pots by the first of May. The earliest varieties selected and planted by themselves are not pinched later than August 1st. The later varieties by themselves, and pinched until the end of August, will give the desired result, provided the necessary temperature can be maintained. After the plants are housed if they can be kept rather dry, and from 6° to 10° above freezing, they will not mildew and will keep for months.

There are also many of our hardy shrubs and herbaceous plants adapted for forcing for flowers in winter, but as my space is limited, I will only give the names of a few: Dutzie Gracilis, Spiræa Japonica, Lily of the Valley, Diletra Spectabilis and others. These are some of the best; but in fact all our early flowering hardy plants can be forced. Many of them, however, take up too much space for the small amount of flowers they give; so they are not profitable by lifting them in autumn and leaving them out of doors until they get thoroughly frozen. This I consider the most important point in forcing hardy plants the first year. They may be placed in heat and flowered any time during the winter when required.

The growing of the single Primrose and Cineraria have been very much simplified within a few years, or since the New York and Boston florists commenced to think for themselves, and not trust so much to English periodicals, which will not suit this side of the Atlantic. Instead of sowing the seeds in the spring and dragging the young plants all through our hot summer months, sow in August, and by the time the weather begins to get cool, your plants will be ready to pot, and by careful shifting, not allowing the plants to get pot bound or dry, you will have cleaner and better plants and in flower as early as if sown in March.

Smilax is the most important of all. It is easily cultivated; the seed sown in a bottom heat of 100° will come up in from two to three weeks. Pot off when large enough to hand'e in three inch pots in compost recommended above. When the plants have got well under way, and when beginning to send up strong sprouts, plant in a bed or box twelve inches deep (same compost), and when they will have head room of at least four feet string up at once, as it is much easier done than planting them after the plants are started; and when once the young points are broken, that is the last of it. This requires a temperature of from 50° to 60° with plenty of moisture, and by giving the crowns two months' rest in summer, you may have three crops during winter. I consider this one of our most profitable crops.

In a short paper of this kind, it is impossible to enter into all the minute details of the different plants; and I do not doubt I have omitted many things that ought to have been written here, but I hope what I have said may benefit some one, and as all the plants named, and many more, have been and are successfully grown here, any one wishing further information on any of the above subject, I shall be glad to assist as far as is in my power.

I cannot conclude this article without referring to a point that strikes me as very singular. Namely: The necessity of importing cut-flowers from the States. It is certainly not the climate that is to blame, as the summer is in many respects better adapted to the growth and preparation of the plants for flowers in winter, being cooler and more moist, and the Province of Quebec, especially, being far removed from the sea shore, is in a great measure exempt from that tendency to mildew which is the terror of the florist and gardener on the Atlantic seaboard. Nor is it the winter, as that is in every respect as good for the purpose as the winters either in New York or Boston. By comparing a record kept by me for three successive years, within a few miles of Boston, with Vennor's Almanac, I find the majority of clear, brilliant days considerably in favor of Canada. Those brilliant days are what gives us our flowers, especially roses; they will not bloom without sun and light, and one great mistake, I think, is the idea of double glass in a warm house. There is no necessity for double glass, and it certainly does a great deal of harm. It looks to me very much like putting the light under a bushel, to build a glass-house to give plants light, and then place double glass between those plants and the light; the sun cannot penetrate from the outside, and the heat from the inside cannot thaw the outside; but remove one thickness of glass and the artificial heat and the sun together will very soon

clear the ice, and instead of having a dull, close, damp house, you will have to give a little air. I do not say every house should be stripped of double glass. A house with double glass is a benefit to some plants, as it gives them the amount of shade required. But all houses to grow plants for cut-flowers for winter, that require a temperature of over 50°, should have heating surface of one square foot to three square feet of glass; and single glass in the roof. I do not mean the miserable imitation wou generally see, but the best of English or German glass. The cost may be a little more at first, but before three vears it will be the cheapest.

I know this will seem strange to some who have considered the double glass the only protection against freezing, but I have proved it, and that with only very ordinary glass. I do not think there are 3° difference between the temperature of two houses, one with double glass and one with single, all other connections being the same in moderate weather ; and certainly there is not in cold weather, because I hold that after the thermometer goes below zero outside, 10° more make very little difference. By that every lap in the glass and crack in the wood is closed, and with the temperature outside at zero, the temperature inside at 60°, every degree more of frost puts one more layer of hoar frost on the glass, and consequently a little more protection to the inside of the house. But this any one can certify for himself who has a green-house. Take the two conditions I have stated, zero outside, 60° inside, and see how little more fire is required if the outside thermometer falls 45° below zero.

But even with houses with less heating capacity than recommended, more may be protected in cold weather by light canvass or cotton cloth on rollers, that may be let down inside the house at night, and will cost less than double glass and admit light and sun when required. What we want is more enterprise and capital in the business men who will take an interest in it, and combine profit with pleasure, and just so soon as we get this, so soon will we create a taste and cause a demand for cut-flowers and plants.

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### FLOWER CULTURE.

#### BY MRS. GEORGE C. DYER.

The success of the flower garden depends very much on energy and care at the early part of the season, in properly preparing the ground, soil, selection, and the early starting of the seeds.

A very pretty garden is obtained by putting in a few clusters of sweet peas the first thing in spring, and sowing, in a section of the hot bed, a few seeds of flowers that will not bear transplanting.

I also put in pots or boxes in the hot bed, small seeds which take a long time to germinate, as well as slips of Geraniums and Fuchsias, to get them well started, so that when the garden is in order the plants are much advanced, ready to transplant, and can be more readily grouped to suit the taste. I find that a very pleasant combination is produced by setting the annuals among the Tulips. By continuing this process of starting plants in boxes, one may have new plants all through the season, to take the place of those that are out of bloom.

During the first fifteen years of a long experience in the cultivation of the Tulip, I have kept my stock of bulbs good from those first procured; they increased very little more than this, although I took out of the ground, and dried the bulbs in the usual way, with much care. For the last few years, however, there has been much improvement in the amount of increase, as well as general growth and beauty, and I attribute this very pleasant change to the large amount of sand which we have mixed with the original clay soil of our garden. The one on the opposite side of the street, where the clay still predominates, has been replenished from my stock of Tulips every autumn, for the past eight or ten years.

I find it quite impossible to cultivate Stocks successfully,

except the Ten Week variety, and these I do not transplant until the tulip fly is gone, as they take the leaves as fast as they appear.

I believe that the only way we can grow Carnations and Verbenas, is by using the cold frame for protection in winter. With Roses I have had much satisfaction and good success. I lay them down each autumn, and cover them with boughs of evergreens, which catch and hold the snow from blowing off, and make a good winter covering, so that they come out looking finely in the spring, when the boughs are removed.

During summer I keep the slugs from them by using a garden syringe to shower the bushes with strong soap suds, which I find is equally as effective made with common soft soap as with whale oil soap.

#### SEA KALE.

#### BY RICHARD SPRIGINGS,

Sea Kale (*Crambe maritima*) is a native of Britain, found growing on the sea shore, is much used in Europe, and also in some localities in America, and is held in high esteem as a delicious vegetable, and very valuable in all scorbutic diseases.

The blanched shoots and the midribs of the leaves are the parts eaten, and when ready for food are cooked and eaten like asparagus, with the advantage that the whole is edible. It is preferable to use the blanched shoots only, for when exposed to the weather, the leaves become bitter.

The cultivation of Sea Kale is much neglected in Canada, which is greatly to be regretted, as it is readily cultivated, and perfectly hardy. It may be grown from seed, which should be sown in April, in drills a foot apart, and about two inches deep, and not too thick. By the next spring the plants should be sufficiently strong to transplant, and, if thought advisable, some can be left about one foot apart to force, or subsequent removal to a cellar.

The best plan for growing Sea Kale is to plant it in hills, about three feet apart, and three in each hill about nine inches apart, to form a triangle, and when sufficiently strong, which will probably be the first spring after planting, forcing can be commenced, which is done by covering each hill of plants with a sea kale pot, and cover around the pots sufficient fermenting material, as horse manure, to raise the temperature of the bed to about 60°.

In five or six weeks the pots will be full of the plant, the growth of which can be examined by opening the small top covers. When the crop is cut, the forcing material must be cleared off, and the plants given every chance to gain strength for the next season.

Sea Kale being a maritime plant, it is advisable to give a moderate top-dressing of salt in the summer, which will help it much. Plenty of manure should also be used in preparing the soil for the reception of the plants.

The proper time to commence forcing is immediately after the frost is out of the ground in the spring.

It can also be grown for winter use in warm, dark cellars, and a supply may be had during winter by planting strong roots, closely together, in the cellar before frost.

It may also be forced and blanched under the staging of greenhouses.

The plants for forcing are taken up in the autumn, previous to frost, and kept cool and dry till the time for forcing, for which purpose an annual supply must be provided.

Sea Kale pots are manufactured in Britain and the United States, and are provided with a small cover on the top, to enable the grower to examine the growth of the plants, and if a few were procured for patterns, any Canadian flower pot manufacturer would be glad to supply them, as they are much better than wooden boxes for the growth of the plant. It can also be grown in wooden boxes, either small square ones, or from twelve to twenty feet long, but care must be taken to keep the manure gases from injuring it.

## THE MIGNONETTE.

#### BY RICHARD SPRIGINGS.

Mignonette (*Reseda Odorata*), a well-known and universal favorite annual plant, is a native of Egypt, and was introduced about the year 1752, and immediately became a great favorite with all lovers of flowers, and it is now cultivated for both winter and summer bouquets.

For winter flowering it should be sown in pots about the end of August and plunged in earth in a cold frame. The plants should then be carefully thinned out, leaving five or six in each pot. It is advisable to sow at two or three different times in the autumn to insure success, and it thrives best in pots that are not too large. The sand used in the compost should be coarse, approaching the gravelly.

Mignonette for summer flowering in the garden must be sown several times during the summer to insure a constant supply.

There are now several strong growing varieties of Mignonette that can be trained up to small trees, which is done by taking the strongest looking plants and potting one in each pot and keeping the side-shoots pinched off to the height you choose; also keep all the flowers pinched off until you have the tree formed, after which it will be almost perennial, and flower for a number of years.

## GARDENING AND GARDENERS.

#### BY COL. RHODES, QUEBEC.

I had great pleasure in reading the report of the Montreal Agricultural and Horticultural Society for the year 1876, and derived so much instruction from the perusal of their correspondents' letters that it would appear to be disrespectful, if not discouraging to the managers of the Society, to neglect furnishing them with some material for the years 1877-8.

In these days of a scarcity of work—and very low wages at that-with half of a man's investments paying no interest, gardeners may be sure that unless they can get the largest amount of return for the smallest outlay, somebody has to be ruined, v'en the workman may become an independent gentleman without income and, worse than all, nobody requiring his services. Economy is therefore forced on the profession of gardening. The Frenchman from France appears to me to study this point of economy the best. I know a gardener of this description who is a very superior man in his profession and a gentleman in all respects. His employer wanted rosebuds, asparagus, rhubarb and chicory for winter to be equal to Colonel Rhodes'. The gardener immediately looked around, got an old stove and pipes, surrounded the latter with clinkers about one foot in all directions, got a few boards, used his hotbed sashes, and, at an expense of fourteen dollars, made a capital house-ridge and furrow roof. He then made some straw mats to cover the glass in very cold weather, and has been keeping up a supply of the above articles all winter. The house will now be used for raising seeds and other spring The fuel is chips of wood, cut small, with bark and work. sawdust. The general result is excellent. The roots are grown under the benches and the roses on them; the seeds grow in trays in the upper portion of the house. I may also add that rabbits are kept and sell rapidly. They live shut up in boxes.

I hear sometimes of a difficulty in growing roses, amounting to an impossibility in many cases, when everybody gets blamed except the guilty party. The truth is that the rose loves the sun and a clear atmosphere. It will not grow in Canada in winter out of doors on account of our low temperature ; but when that is once removed by natural or artificial means, we have a splendid climate for roses. I have sometimes seen, in the upper regions of a greenhouse, roses growing in great perfection, such as Lamarque, Marshal Niel and others. We have ourselves found roses do better behind single glass than double; and we are here under an impression that so long as we can get sun we can grow roses as well as all kinds of flow-The Laurentides, being so far removed from the vapors ers. of the Atlantic coast, make a better climate in winter for roses. because there are more sunny days and more ventilation in any given month. It is very difficult to grow roses at the outlets of rivers on the Atlantic coast, as there are many days when no ventilation can be attempted. The fact is that those gardeners who say "it cannot be done" have let the wood of their rose trees get into a diseased state, or they have not rested them in summer. Let them take a dose of Yankee gardening, and they can soon sell roses as cheap in Montreal as they can in New York. In Quebec we never charge more than ten cents for a made-up rose button-hole.

The proportion of sunny days in winter as compared with Boston is per month as 14 to 9. Consequently, Canada is a better climate for a glass-house when sunlight is absolutely necessary for the growth of such a flower as the rose. It is wonderful how the growth of flowers has increased in the United States, and all because the class of men, who come up to the English idea of a country gentleman, take interest and promote by their means and example the trade of gardening. Let me, therefore, recommend horticulturists to welcome all recruits into the profession, especially those of education. The market will always buy the flowers, and a great many more than the workman can produce; but a man cannot excel in their manufacture—that is, the making of crosses, wreaths, bouquets, &c.—unless he is a workman of taste. He must have many of the qualities of the artist, besides being a person fit to associate with gentlemen and ladies. I know of no profession where the children of Adam may claim a common descent and carry out the best features of this world's life than amongst gardeners. All the professions are seen in their best form when they are in their gardens or their green-houses. Consequently, the nearer we approach to the typical country gentleman, the better; and the laborers have to remember that there is as much virtue in the cottage as in the palace, and in America there is no impediment in any man's way except those created by himself, which can only be overcome by a very unusual amount of talent, which again cannot belong to the crowd.

We can all see that Canada is a beautiful country, and we can feel that Canada is a plendid climate. The clear north wind and bright sun of our Canadian winters are conducive to the growth of the best form of Englishman, with his emblematic rosebud and his honest, ruddy and sun-burnt appearance.

The gentlemen horticulturists of Canada must remember that they are learning and teaching the secrets of nature to the future fathers of our country, who will be run down in the race of competition unless they meet a successful experiment in Boston by a more successful one in Montreal. It is in this way that the world progresses, and it is in this way that Canada will become a great Dominion. We have plenty of land and a healthy climate. All we want are the men, whom we can rear and are educating and who must be a success. The time has however arrived to "be up and doing," and the Montreal Horticultural Society appears to me to be in accordance with the times and in sympathy with the ambitions of the great seaport of the St. Lawrence.

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# FLOWERS IN OUR DWELLINGS.

### RY S. J. LYMAN.

Why do plants not thrive in the windows of our dwellings ? is the question of many disappointed housekeepers having in vain tried year after year the cultivation of flowers to impart their beauty and fragrance to the drawing-room. Sometimes the florist is charged with improper cultivation, but generally the fault is ascribed to "abominable gas." Indeed many have discontinued using it on account of its imagined injurious effect upon plants, but have found that they do not thrive better with other artificial light. It may be most convenient to dispose of the gas theory of destruction here. In impure gas, the element eliminated, which might prove injurious to the growth of plants, is sulphurous acid gas. If this was eliminated in sufficient quantity to injure plants, it would also destroy animal life, at least it would prove highly injurious. The burning of a few sulphur matches would produce more injury than the burning of three bat-wing jets. If our gas was so impure as to injure plant or animal life, it is only necessary to lodge a complaint with the inspector of gas, and it would immediately be remedied. There are many greenhouses lighted with gas, which is kept burning for hours. One in New York has over a hundred burners, and yet no injury has been perceived hitherto. There is no doubt that gas charged with the noxious sulphurous acid gas, or sulphuretted hydrogen, would be injurious to vegetable and animal life, but Montreal gas is very free from both. What, then, is the cause of the withering of flowers when carefully tended and watered? To well answer the question, let us consider the condition of the plant itself, and its relation to external atmosphere and the inner air of the house. The plant, whether Rose, Pelargonium or Heliotrope, is brought from the moist, warm air of a greenhouse, and placed in a sunny window; notwithstanding the utmost care, it soon withers, its leaves decay, and the plant is destroyed. If we

examine the pot, we find the inner surface lined with fibres of the plant, which bind the earth firmly in a mass, as if moulded in the pot. What has effected this change so quickly in this flourishing plant ? The house is heated by a furnace, or by steam, or by hot water, or by a base burner in the passage. In either instance the process of diffusing heat is the same. The external air finds entrance by doors or cracks, or by flues, and rushes toward the heating surface, whether of steam or stove or furnace; it then ascends or diffuses itself in the apartment, where it impinges on the ceiling and rolls toward the upper part of the cold window; here it cools and passes rapidly down over the pots of flowers, drying them up quicker than could the Sahara sand wind. The cool air falls upon the floor and rolls along till it reaches the ascending current. uniting with which, it is again carried to the window to pass over the plants again, and so the work of drying goes on all day and night. To illustrate the currents of air, place eider down over the flue, and watch its progress through the air to and from the window. The effect upon the leaves is to dry them up, and cause them to fall; upon the porous pot to cause a rapid evaporation, to supply which, all moisture is drawn from the earth, hence the fibres seek the inner surface of the pot for moisture, and this they speedily cover. The porous pot soon withdraws all moisture from the fibres, and they become "burned," insuring the rapid destruction of the plant. Another effect is the drying of the earth, so that the plant derives no moisture. Such is the condition of the plant. If we examine the external atmosphere, supposing the temperature at 10° below zero, we find that all moisture is frozen out of it, and is deposited as "frost" on all conductors of heat. To show the extreme dryness of winter air at a low temperature, the most delicately polished metal exposed out doors remains untarnished. This frost-dried air enters our dwellings and is further rendered more capable of absorbing meisture by contact with the heated surfaces, and rushes up to the flower windows, sucking every trace of moisture out of leaves, earth and pots. Some plants, like the German and

English Ivy, the Madeira Vine, Geraniums, Cacti, can withstand the fearful trial to plant life, but generally plants cannot live under such circumstances. Before alluding to the remedy, we will notice its effect upon animal life. While the dry heat is not in itself so destructive to animal as to plant life, yet it renders the condition of the air of dwellings most unwholesome and injurious to health, especially that of children. Man is capable of enduring, without suffering, a high degree of dry heat, as is witnessed in the Turkish bath, where the calidarium often rises to 200° Faht., and Fire Kings have endured 400° Faht. with little inconvenience. This dry heat produces an electrical condition of the atmosphere, which is illustrated in the common experiment of lighting the gas with one's fingers after shuffling over a carpet. The effects upon the carpet are to set free, to float in the air the minute woollen fibres of the carpet, which, though invisible, may be observed by holding a moist microscopic slide near the floor, and placing it in the instrument. One can easily imagine the effect upon a person with delicate lungs, of inhaling all day this dust of carpet fibre. If we could see it, we should find the children playing on the carpet surrounded with wool dust which they were inhaling. Passing from the drawing room, we find the passages filled with another kind of dust arising from earth and sand brought by feet from the street. This under the microscope appears as silica crystals and organic matter. In the sleeping apartment, the air is filled with dust resembling feathers or broken hair; this we breathe in sleeping, and only some fortunate current of air prevents us from suffering seriously. "Dust thou art" can be written upon any part of the dwelling, notwithstanding the utmost diligence of the housekeeper. Not only is this frost and heat dried air laden with dust highly irritable to the lungs, causing varieties of pulmonary disease to adults, and coughs and catarrh to children, it also causes irritation to the skin, chafing of the hands and face. Men who, for the most part, are frequently out of doors, do not suffer; but women confined to the house suffer in their complexion, hence the striking contrast in the

rosy faces of those who live in the Maritime Provinces, where the air is always moist, to the pale faces of those who live in the dried atmosphere of Canadian houses. It requires a whole summer of sea-side and country air to restore the health and bloom lost during the winter in our air-dried houses.

Furniture, wainscoting, floors, even of seasoned timber suffer much from the dry air.

Various trades lose much from drying up of goods in the winter.

Sugar loses 2 per cent. in	24 hours in a	n atmospher	re of 65° F.
Oatmeal loses $\frac{1}{2}$ per cent.	**	"	"
Flour loses <sup>3</sup> / <sub>4</sub> per cent.	66	"	
Crackers lose 3 per cent.	"	**	"
Bread loses 3 per cent.	"	66	"
Ham loses 3 per cent.	"	**	"
Tea loses 1 per cent.	"	**	"
Tobacco loses 11 per cent.		"	"
Crackers lose 3 per cent. Bread loses 3 per cent. Ham loses 3 per cent. Tea loses 1 per cent. Tobacco loses $1\frac{1}{2}$ per cent.	« « « «	60 60 60 60 60	66 66 66 66 66

Beef loses 30 per cent. in an atmosphere of 200° in 24 hours.

Leather loses from one to five per cent., depending much upon the quality and quantity of oil with which it is prepared.

All kinds of nuts, fruits, gelatines, spices, &c., lose considerably. No fruit can be kept in this dry atmosphere. The skin becomes shrivelled, the moisture escapes and with it the flavor. Another danger is, fermentation sets in and the fruit decays. The secret of the successful preservation of fruit is uniform temperature, as near freezing as possible. Wrapping up of fruit in paper protects it from changes. For fruit stores it would be desirable to have dummy fruit for "show," and keep the merchantable fruit in a room by itself with the temperature regulated by a thermometer. Fruit may be preserved in one of Prowse's New Refrigerators for a year, simply on the principle of uniform degree of heat and moisture. Captain Barnaby in his "Ride to Khiva" alludes to melons at Christmas which had been preserved on this principle, and Mr. Arnold in his "Caravan," confirms Captain Barnaby's statement, and says he was furnished in Teheran delicious melons in February. These were preserved in niches in the stone walls of the houses.

Exemption from these two evils is accomplished by allowing the fresh heated air to pass over a surface of water, and the egress of the vitiated air from the top of the apartment where it rises charged with effluvia and odors.

Furriers are the greatest sufferers from dry air, as the ends of the long furs become bent and broken and the furs soon have the appearance of "shop-keepers."

The nap upon woollens and upon mixed fabrics is raised by dry heat, and all the ends and folds of cloth exposed are injured.

All kinds of silk fabrics are quickly destroyed by dry heat, and a bundle of silk threads illustrates well the effects of electricity by simply holding one end in the hand over a current of hot air.

So quickly does tobacco absorb moisture from the air that, cut into fibres, it forms an excellent barometer, indicating approach of rain by the moisture.

When we consider that the art of the manufacturer is directed most intently to the profit derived from adding to the weight of merchandise by moisture, as in lard, butter, crushed sugar, bread, tobacco, leather, &c., and that the dry atmosphere of the retail store is every moment depriving the goods of weight, we can easily imagine why so many carry on the grocery trade at a loss, and that the only real profit is in wines and spirits. A good hygrometer would be as true a test of profits as the balance-sheet.

So far, if the above statements are correct, and the experience of every reader will confirm some of them, it appears that the dry heated air of our houses whether by steam, hot air, hot water or base burner stove is destructive to vegetable life, injurious to animal life, and causes a serious loss to the shop-keeper.

It is self-evident that to restore dry air to its natural condition is to moisten it. This seems at first sight an impossibility, for accurate calculation shows that to restore the air of

a house 27 feet front, 45 depth, and three stories high, would require 16 square feet of evaporating surface to give the moisture of the summer air. The quantity of water usually placed upon a stove to supply the moisture holds the same relation to the quantity required that a child's thimble does to a stable bucket. In fact, generally the evaporating pots on the stove are, from not being cleaned and having the accumulated deposits from gallons of water, more injurious than if there were no water. It would save human suffering, if not life; it would give us vigorous plants; it would save housekeeper's work, if the halls of houses or parlors were converted into drying rooms for the laundry. It would be a great improvement if the kitchen stove with its boilers were in the hall. Since these objects cannot be accomplished, and these modes of giving a healthy atmosphere must be monopolized by the poor, let us consider the next best method. On all furnaces may be placed shallow pans. If this cannot be accomplished, then an iron pipe, running through the furnace, should connect with an evaporating tank. The same system may be pursued in regard to base burners; a tin tank alongside the stove or at a distance may be kept boiling by this method.

A very good system of evaporation is to suspend the end of a cloth in water. Capillary attraction causes rapid evaporation. A single sheet hung over Gould's radiator, with ends in water, will evaporate three gallons per day. Water over flues, wet cloths or sponges or porous stone around flues, will give a good degree of moisture. Moisture may be sent in the air of our dwellings until it freezes on the windows. This will indicate the requisite degree of humidity.

In alluding to the injurious effects of "dried air," it must be observed that dry air *per se* is not necessarily detrimental to health. The two extremes should be guarded against. An excessively dry air which shall carry with it the dust of carpets, &c., to inhale with every breath, causing irritation of the lungs, and a moist air which shall prove favorable to the propagation of spores of disease—or hold in solution the exuded and exhaled vapors of the human body. In regard to plants, if after all these precautions they do not thrive, arrange a paper curtain to protect the plants from the draft of the hot air. Pots of flowers should be planted in zinc trays with wet moss or sand around them. These precautions will secure a healthy atmosphere, not only for children but for plants. Self-interest should induce tradesmen to look after the condition of the atmosphere, which has so much to do with the profit and loss on the goods affected by it. So far, we have spoken of the necessity of a good atmosphere for the safety of our lives and property. There is still another aspect, a summer-like atmosphere in our dwelling will contribute to our corniort and enjoyment.

# ON THE MIGRATION OF PLANTS FROM EUROPE TO AMERICA, WITH AN ATTEMPT TO EXPLAIN CERTAIN PHENOMENA CONNECTED THEREWITH.

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Underneath the great wave of human emigration from the so-called Old to the so-called New World, underneath the noisy busy surface tide that has swept Eastward from the shores of Europe to those of America during the last two hundred years, there has existed another and a less conspicuous wave, another and a less prominent tide of emigration. Westward in its direction, like the former, it has silently accomplished results that seldom strike the superficial eye, but yet are scarcely less in magnitude than those which have followed the advent of the white man to the shores of America.

I allude to that slow and noiseless immigration of European plants which has been going on for many years, and which probably commenced when the first European vessel touched our shores. Side by side with the displacement of the ed man by the white man has gone on the displacement of
the red man's vegetable companions by plants which accompanied the white man from his trans-Atlantic home. Not more completely have the children of the Pilgrim Fathers made themselves at home on the banks of the Charles and the Neponset, not more completely have the successors of Champlain and Jacques Cartier established themselves along the St. Lawrence, not more completely have the descendants of the aristocratic colonists of Maryland and Virginia appropriated the shores of the Chesapeake, than have the homely weeds of England and France made themselves at home in the New World; established themselves on its soil, appropriated its fields, its gardens and its waysides. Nor have the older States alone been seized by these European invaders. The stream has flowed beyond them, and as no village or hamlet in the West is without its population of European descent, so too it is never without its plant population of European weeds. To the American born and reared among them, these things have none of the significance which they possess to him who comes across the Atlantic, conversant with the Flora of Europe, and anticipating a complete change of plant life as well as of place and scene after voyaging 3,000 miles. And yet I scarcely know which strikes the thoughtful stranger most, the resemblance or the difference between the Old which he has left or the New to which he has come. Differences, of course, there are, many and great, but in the face of the fact that the new country with its millions of inhabitants is using the same language and laws and customs as the old country he has so lately left, they are less striking. The same is true of the American Flora. The writer will never forget the impression made on his own mind when soon after landing in America he set to work upon the Botany of his new home. The summer, with its floral treasures, had gone by and the brilliant New England foliage told that winter was rapidly approaching. In the woods and shrubberies the falling leaves revealed new types of tree-life mingled with old forms wellknown in England. But on the ground, in the fields, along the waysides and fences were many well-known plants. Old

acquaintances, friends and foes both, which he had years before learned to know-sometimes to cherish and often to uproot-when a boy in the old country. So far was the Flora from being totally new that sometimes he was puzzled to know whether, on a given space, there were more strange or familiar forms around him. This result was quite unexpected and opened before him a new and very interesting field of observation and investigation, which has continued ever since to occupy at intervals his attention. The fact here mentioned -this migration of European plants into America-became all the more striking when, after a longer residence in this country, and a further study of its Flora, he looked back to his earlier botanical studies in Europe and observed that this vegetable migration is almost entirely in one direction. In the midst of this rich Flora, aliens by origin, but naturalized by the letters patent of time, he looked back to his old home and tried, but almost in vain, to recall American forms of plant life naturalized there. Scarcely a solitary specimen could be found to which the Old World, always chary of conferring its citizenship upon foreigners, could be said to have given the rights of home. Whence comes this striking difference? Why is the Western World so hospitable and the Eastern so inhospitable to vegetable strangers? Is it that these Western strangers do not claim naturalization? Do they feel their inability to make way against the crowded life of the East, and therefore fail in the intenser struggle for existence which marks newer and more highly developed Europe? The full answer to this question is at present impossible, and the writer desires this paper to be considered merely suggestive. Facts must be gathered before conclusions can be drawn. The field is so vast and the need of patient and continuous observation so great that many years may pass ere a solution of the problem can be reached. "The harvest is plenteous but the laborers are few."

A few illustrations will show the kind of facts to which this paper is intended to call attention, and the writer's purpose will be fully served if its perusal should incite any who are familiar with European botany to note the occurrence of European species in different localities, and especially if it should lead any to enquire as to the cause which prevents the naturalization of others that can only be raised here under cultivation.

The careful observer will notice foreign plants in all stages of naturalization. Some are at present only cultivated infields or gardens, others have escaped from the domain of the plough and the spade, and are maintaining a precarious existence among conditions not altogether congenial, and are liable to extermination at any time, by an unfavorable season. Others have a stronger hold and occupy the fence corner or the wayside while a number, bolder and hardier, have emerged from these sheltering nooks, and have begun an independent career among the indigenous vegetation, hoping, often in vain, to hold their own against the aborigines of the land. Not a few, more hardy still, or more adaptable in their nature, have altogether cut themselves loose from the cultivated field and the domain of man, have ventured out into open conflict with the denizens of the soil, and emerged victorious from the struggle. By crowding upon them, by stifling them, by appropriating their food, they have succeeded in ousting their antagonists, the rightful heirs, as by similar practices the White Man has ousted the Red Man from his ancestral land, and both now occupy the country often to the exclusion of all save the hardiest of the native tribes.

For example, the Scarlet Poppy (*Papaver dubium*), a weed so common in England that many a wheat field appears one sheet of glowing red when it is in full flower, must have come over to America many times in seed wheat, and is occasionally met with here in the fields. Yet outside of these, it has never to our knowledge succeeded in propagating itself. It is quite scarce in America. The Giant Elecampane (*Inula helenium*), the Horseheal and Scabwort of the leech, so renowned among the old herbalists as a remedy in complaints of the chest, is but scantily diffused. The writer has met with it in the East near

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Boston and in the Island of Montreal, and it is abundant in the West in some parts of Ohio and Indiana.

The English Groundsel (Senecio vulgaris), a favorite with the keepers of canary birds, but by no means in equal liking of the English gardener, has failed to establish itself in America. A few specimens may occasionally be met with near gardens, but it shows here none of that reproductive power that makes it in England one of the earliest weeds in the spring, and the latest in the fall.

The Salsify, or Vegetable Oyster (*Tragopogon porrifolius*), a native of the Mediterranean region, but established in a few places in the south of England, whence it was probably imported, is most likely of late introduction, and still on trial, not having found a place in Professor Gray's Manual of the American Flora. The writer has only found it once near St. Catharines in Ontario, in considerable quantities, flowering and apparently bringing its seed to perfection.

The Henbane, a dangerous narcotic (Hyoscyumus niger), is sparingly diffused in some places. It may be found in tolerable abundance on Fletcher's Field, near Montreal, showing the same predilection as in England for dunghills and heaps of old bricks and mortar.

The Thorn Apple (*Datura stramonium*), a native of Asia and Europe, where it extends as far north as Sweden, is scantily met with in England, having escaped from gardens, where it prefers similar spots to those chosen by the Henbane. But it has been introduced into this country where, under a new name, "Jamestown (Jimson) Weed," it is only too well known. The American name seems to indicate that it was introduced or first noticed as a nuisance in the neighborhood of Jamestown, Virginia.

The Common Hemp (Cannabis sativa), so valuable for its fibre, a native of the Caucasus and of the mountains of Northern India, only known in Western Europe in cultivation, and doubtless early brought here for economic purposes, has run completely wild, and may now be found in waste land near human dwellings, from the streets of Montreal and Boston to the west of Ohio, and probably farther still.

The Grape Hyacinth (*Muscari botryoides*), and the Star of Bethlehem (*Ornithogalum umbellatum*), both common English garden fowers, may be occasionally found in the vicinity of Montreal, as if longing, yet fearing, to strike for freedom from the control of man in their new country.

The Corn Cockle (Lychnis githago), so mischievous in English wheat fields, is tolerably common here in similar places, but has not succeeded in establishing itself outside of the protection of man. The same may, in the northern districts, be said of the common Red Clover (Trifolium pratense). In spite of its deep tap root and rank growth, it is unable to bear the cold, and an occasional severe winter will exterminate it if unprotected even in cultivated fields. Its near relative, however, the White Clover (Trifolium repens), was introduced in early days, and called by the Indians "White Man's Foot." Longfellow sings in the story of Hiawatha:

> "Wheresoe'er they tread, beneath them Springs a flower unknown among us— Springs the White Man's Foot in blossom."

This is much more hardy and seldom yields except to the severest frosts. It overruns field and wayside, fence-corner and common, holding its own against even the aborigines, and strangling them out by its tangled perennial roots. Early in the spring it secures such headway that larger and coarser plants are compelled to give way. Its flowers afford the honey bee so rich a harvest that its seeds are surely fertilized, and this double method of reproduction by root and by seed gives it such an advantage in the struggle for existence that it has spread rapidly over the country, and many an American common is as white with its flowers as is an English lawn with daisies. It is worthy of notice that similar results have attended the introduction of this plant into New Zealand. There also it has run wild, and is said to be pushing out some of the native species, among others the hard and stiff New Zealand flax (Phormium tenax), which is said to be unable to hold its ground against the strangling roots of the White Clover.

The English Buttercup (*Ranunculus acris*), beloved of English children and poets, especially of the school of Wordsworth, has overrun the north-east, and the writer has met with it even in the Canadian backwoods, where only a trail through the bush existed, carried doubtless in the hay taken thither to feed the horses and oxen of the lumbermen when driving logs in a Canadian winter.

The Barberry (*Berberis vulgaris*), with its graceful drooping stems and pendant racemes of bright yellow flowers and scarlet fruit, followed the pilgrims to Flymouth Rock, and like them has struck its roots deep in the bleak hills of New England, until now it is far more common in the neighborhood of Boston than in any part of England with which the writer is acquainted.

Every one who has owned or worked a garden in America has made the acquaintance of the ubiquitous Purslane (Portulaca oleracea), so fondly mentioned by the author of "My Summer in a Garden" as "pusley," one of his pets which stuck to him so closely that he could not get rid of it. This, the only valuable (start not, American gardener, it is even so,) plant of its order, is cultivated as a salad and pot-herb; but, transplanted into our soil and under our skies, it has squatted on the land until nothing save constant watchfulness and hoe can prevent its complete monopoly of the garden. It occupies here the place of the sow-thistle in England. Both break off at the surface of the ground as soon as an attempt is made to pull them up, and when the gardener's back is turned both send out a new crop of leaves, flowers and seed, to punish him for his assault. The writer would like to suggest to the Horticultural Society of Montreal the desirability of offering a prize for the best illustrated essay on the means of turning this European immigrant to account in the Canadian and American kitchens. Possibly the surest way of getting rid of it would be to make it useful. Useful plants are seldom so abundant as to be a nuisance.

The Common Water Cress (Nasturtium vulgare)—when, how, and by whom introduced we know not—is now so abundant in some places that one is almost tempted to look upon it as a native. Many of the streams of New York and of South-Western Ohio are as thickly set with it as are any of the water-courses in old England.

The Common Parsnip (*Pastinaca sativa*) has run wild in America in fence-corners and along railway banks near Montreal and other places.

The Hemlock (*Conium maculatum*), of Socratic infamy, has taken possession of certain spots, as it does in Europe. The writer has seen acres of it along the banks of the White River at Richmond, in Indiana.

The Ox-Eye Daisy, or White Weed of New York (Chrysanthemum leucanthemum), has crossed the Atlantic with hay-seed and so completely monopolized many of the meadows in the Eastern States that they more resemble snowfields than hayfields when the plant is in blossom. It is slowly spreading west and south, and last summer the writer found it in Ohio close to the State line of Indiana, appearing in full vigor and of large size.

The Tansy (Tanacetum vulgare), valued by herbalists as a tonic, is not uncommon. The crimped variety (crispum) grows near Montreal.

The Chicory (Cichorium intybus), with its stiff stem and lovely but evanescent azure blue flowers, wild in England and well known to manufacturers of coffee (the genuine article !) is now one of the wild flowers of the Island.

The Great Mullein, or Flannel plant (Verbascum thapsus), common in waste ground in Europe and Asia, is more common here than in England in similar situations, but never so far as the writer is aware on ground that is truly wild.

The Yellow Toadflax, or "butter and eggs" (*Linaria vul*garis), has been introduced with crops, and now shows its twotinted blossoms in gardens and on waysides, and once in is with difficulty eradicated.

The Catmint or Catnip (Nepeta cataria), a native of England

and southern Europe, is now as common in America. The Burdock (Arctium lappa) is another importation from the Old World, "who left his country for his country's good," and has proved like many others who did the same no blessing to his adopted land. Moreover, he has left so many of his kith and kin behind him that his absence is not noticed. Every boy knows the hooked burs or seed vessels of this plant, which cling so closely to the clothes of men, the fleeces of sheep, and the manes of horses that its rapid extension is inevitable.

The Great Celandine (Chelidonium majus), with its bright yellow flowers and orange juice, may be found on the eastern seaboard and near dwellings in the inland States.

The Shepherd's Purse (Capsella bursa pastoris), a common weed in England, is common in Canada and the States.

The Bladder Campion (Silene inflata) spreads its white petals by the roadside, while its little congener, the Mouse Ear (Cerastium vulgatum), grows ensconced, as in Europe, in gardens and in fields.

Our list is long enough, but a few remain too common to be completely omitted. Every street and road in many parts of the country is covered with a soft summer-green carpet of the little insignificant Knot-grass (*Polygonun aviculare*). It forms a substitute for grass where grass cannot find a foot-hold and keeps its ground in defiance of dust and traffic and heat.

Not a few of the European grasses, too, imported for meadows, have escaped from cultivation and succeeded in establishing themselves more or less firmly as occupants of the soil. The little Annual Meadow grass (*Poa annua*), the Timothy (*Phleum pratense*), the Fox-tail (*Alopecurus pratensis*), the Redtop (*Agrostis vulgaris*), the White Bent (*Agrostis alba*) have become perfectly wild in different places. The Cocksfoot (*Dactylis glomerata*), the Couch or Quick grass (*Triticum repens*) have been less successful. The former apparently dislikes the hot sun of America and only does well in the shade. The so-called Blue Grass, more properly the June Grass (*Poa pratensis*), of the famous Kentucky pastures, has almost monopolized the ground in many places, and the Chess or Cheat (Bromus secalinus) constantly cheats the American farmer into a more than Darwinian belief in the transformation of species, not, by the way, upward but downward. The Purple Finger Grass (Panicum sanguineum), an immigrant from Southern Europe, found but not native in England, may be gathered by the wayside in the Eastern and Midland States. Finally, in some parts of the country the hay betrays to the European by its scent the presence of the Sweet Spring Grass (Anthoxanthum odoratum), so well known as giving much of the finest of the fragrance to an English hayfield.

In thus noting instances of vegetable immigration from Europe to America, another side of the question must not be overlooked. Many common English plants have totally failed to secure a toothold here. The seed of the English Daisy must have come over in almost every case of grass-seed that has been imported; yet it has not become naturalized in America. The only instance with which the writer is acquainted of its lasting for several years in a lawn, as in England, occurred in the immediate vicinity of Montreal, and was communicated to him by a friend in that city. It would therefore appear that the heat of summer rather than the cold of winter is the barrier to the establishment in the New World of the "wee modest crimson tipped flower," so familiar to every British eye. Equally "conspicuous by their absence" are the Primrose and the Cowslip, the flowers of childhood in the Old Country. Many other instances of this kind might be adduced, but the converse side of the problem new claims attention.

It is singular that while so many European species have forced their way into possession of the American soil, the cases of counter-migration are exceedingly few—so few that they may be counted on the fingers. It appears as if some invisible barrier existed preventing passage Eastward, though allowing it Westward. One or two species may be named which, as exceptions, bring the general truth of this statement into stronger light. The Canadian Fleabane (Erigeron Canadensis), a native of North America, "is now established in nearly all temperate and hot countries, and occasionally appears so in England."\* The Annual Fleabane (Erigeron annuus), though not in England, has become wild in some parts of Europe. Add to these two the so-called "Water Thyme" (Elodea Canadensis), and we have all the conspicuous examples with which the writer is acquainted of the Eastward migration of American plants to Europe and their naturalization there. The last named plant was first observed about 1847 in the northern and midland counties of England and the South of Scotland, in Yorkshire, Leicestershire and near Berwick and Edinburgh.\* How it was introduced is not known. Thence it spread until in about ten years many of the slower streams were almost clogged with it, and the writer well recollects that it was then difficult to row on the upper and middle Thames in consequence of the accumulation of this weed. Fears were even entertained that it would form a serious impediment to inland navigation. But in a short time the evil diminished, and after a few years, though still present, the quantity in the rivers became insignificant, and no inconvenience is now caused by its presence.

Such facts naturally suggest the question : Why are these things so? What invisible door bars the passage of the American Flora to Europe, but admits the free passage of the European Flora to America ? One reply will naturally occur. Seed is mainly brought from Europe to America, and thereby a favorable chance is afforded for introducing the seeds of European weeds. This is so; and to this cause, doubtless, is due the immense number of introduced plants. But, if European seed is largely brought to America, American crops go much more largely to Europe ; and it would be absurd to suppose that any crop gathered from the half cleared and weedy fields of this country could be sent thither without, at the same time, sending in abundance the seeds of our native weeds. All the ill weeds that grow in Canada or the States must, ere now, have been many times exported to the Mother Country. Yet they do not appear. It may be replied that the greater

\*Bentham's Handbook of the British Flora.

part of the corn crops are destined for the mill and not for the land, and that in this way their chances of propagation are largely diminished. Making all due allowance for this, should we not look for a rank crop of American weeds springing up around the mills from the cleanings and the waste ? Yet such is not the case. With all the millions of bushels, moreover, that go to England for feeding purposes, and are never ground, there is the same result. The weeds no more take root and run wild than do the wheat and maize among which they cross the Atlantic. And when, in addition to this, we consider that there has been for two centuries an organized and regular introduction of American wild plants into European botanic and flower gardens, might we not reasonably expect to see at least a few of them, or of others which must have accidentally accompanied them, spreading outside of the limits of these gardens, and becoming naturalized in Europe. Yet nothing of the kind has occurred. Neither the rank and abundant Ragweed (Ambrosia), nor the widely diffused Golden Rods (Solidago), nor the Protean Asters (Aster), nor the wayside Pepper Grasses (Lepidum), nor the prolific Sumachs (Rhus), nor the clinging Burr-Marigolds (Bidens), nor the ubiquitous and striking Milkweeds (Asclepias), have succeeded in naturalizing themselves in England. Even where a genus contains species on both sides of the Atlantic, as is the case with the Houndstongue (Cynoglossum), we find that the English species-the common Houndstongue (C. vulgare)-has migrated westward, and become so common near Montreal and almost everywhere in the Eastern and Midland States, that Prof. Gray can term it "a familiar and troublesome weed;" while at the same time, the common American species, or Beggar-lice Houndstongue (C. Morisoni), which the same writer brands as "a common and vile weed," is completely unknown in England.

Some may be inclined to urge that the comparatively cool English summer may not afford sufficient heat to perfect and ripen the seed, which the fiercer sun and continental climate of Eastern America can easily mature. This may account for the inability of some American species to sustain themselves in England, but it is evidently far from sufficient to solve the whole problem. Many of these plants can perpetuate themselves in the short, cool summer of New England and Lower Canada, and we might therefore reasonably expect, even if want of summer heat excluded them from England, that they would find a congenial climate somewhere in the warmer countries of Southern Europe. But not in England only, but throughout Europe, the absence of American species is remarkable. Differences of climate seems inufficient as the only or the chief factor in the solution of the problem, and we are compelled to look farther.

Nor, can it be urged as an objection that European weeds alone have come in. Without at present defining a weed, the reply is obvious that American weeds have not gained a foothold in Europe. It is not to be anticipated that large, conspicuous and slow-growing plants, such as forest trees or highly developed and cultivated forms, such as garden-flowers, will The former require too long a time to grow often run wild. and propagate themselves, and are subject to too many dangers, while the latter are only maintained at their high standing by constant and careful cultivation. It is only, therefore, among the smaller and more insignificant plants that the facts here detailed can be looked for, and accordingly of such our list altogether consists. It may be that the forest trees of Europe, or some of them, will one day grow wild here. But the life of a tree is so long, and its growth so slow, that the experiment can not be said to have been yet made. So far from planting and propagating European trees, men are bent in most parts of the country upon destroying their own. The present generation has not outgrown that insane hatred of trees which possessed the past, and was perhaps an almost unavoidable result of the severity of their struggle with the primeval forest. Timber is still contemptuously termed "lumber." No respect is felt for it, and consequently no European tree, if trying to run wild, would stand much chance of life during the attempt. A high authority on forest trees in this country has informed the writer that in his experience some

European species have grown better than the American species of the same genus—that the English beech and larch, for example, surpassed the native beech and the tamarack. Time alone can prove this point.

The comparison, therefore, must be made, and can only be made justly, between the weeds of the two continents, or plants which come very near them and may be called almost weeds. By the term "weed" we mean those plants to which the surroundings are so suitable that they increase and multiply, year after year, more rapidly than others by which they are surrounded. Entering into details, the soil affords them the nourishment they need ; the spring frosts do not kill them, or they bud and grow only when this danger has passed; they ripen their seed in quantity sufficient before the winter sets in; the heat of summer does not scorch them, nor the cold of winter destroy their roots or seeds; they are not so much injured by insects as to preclude their coming to maturity; while their flowers are sufficiently visited to ensure the fertilization of their seeds, or else they spread so rapidly by underground stems as to render seed unnecessary. Granted all these conditions, and we have weeds of the first order, while the failure of any one or more of them may reduce such a weed to the position of a very harmless and comparatively rare plant. In fact, the great abundance of a weed or wild flower in one year and its scarcity in another, is often due to its lacking one or more of these requisites. Weeds are the homely plants of a country, using the word in its true and original sense. A plant that is perfectly comfortable in its surroundings, if possessing considerable power of reproduction, becomes master of the situation, and is A WEED.

The weeds of different countries must therefore differ because their conditions differ. For the same reason the weeds of different ages must also differ. Climate changes as geological time passes by, and all plants are not able to adapt themselves to these changes. It is frequently the case that a man placed in new circumstances is quite unable to adjust himself to them. His nature is not sufficiently plastic. So with plants. A wide range in time or space, with changing conditions can only be enjoyed by a plant whose nature is plastic or capable of change. Place a weed of stiff or unyielding nature in less favorable conditions and it cannot adapt itself to them. It becomes unhealthy and lingers on, as it were, by sufferance among stronger neighbors—no longer a weed—or it speedily dies out. But a weed possessing a plastic nature—one capable of being moulded by and to its new surroundings ere long adapts itself, if the change is not too great or sudden, to its new situation, takes out a new lease of life, and continues in the strictest sense a weed.

Is it not possible that some such cause as this may lie underneath the facts we detailed in the earlier part of this paper? The true and full explanation of the transfer of European species to America should at the same time explain the absence of American species from Europe. But the partial causes already alluded to fail to do this. There is a residual effect for which they do not account. May it not be true that the plants of the European Flora possess more of this plasticity, are less unyielding in their constitution, can adapt themselves more readily to new surroundings, and thus secure their continuance in the New World? And may it not be the lack of this plasticity in the American Flora which incapacitates it for securing a foothold and obtaining a living in the different conditions of the New World? Under the care of the gardener they grow and embellish the gardens and conservatories of Europe, but without this care they speedily fail and die.

To point out the physiological basis of this property of plasticity is at present and will probably long remain impossible. But that such a property exists in both the animal and vegetable kingdoms is beyond a question. It is the secret of that variation which so strongly marks some species, while its absence is the cause of that fixedness which characterizes others. It is the secret of that quick response which some plants make to a change of conditions, and whereby they gain fresh vitality at the cost, it may be, of some slight modification of structure. Its absence, on the contrary, causes that indifference or resistance which characterizes others, and which is almost always followed sooner or later by the extinction of the resisting species.

Though, however, the indication of the exact physiological basis of this plasticity of constitution is as yet beyond our reach, it seems possible to point out one fact which not improbably has had some share in reducing the plasticity of the American Flora. To approach a single short step nearer to the object of our quest, when that object is at present unattainable, is so much ground gained. We are all familiar with the effects of habit upon ourselves. We all know how easy habitual actions become; how strong is the tendency to perform them when the conditions recur under which they are usually performed, and how unwillingly we deviate from our daily course after following it for years. To this one fact-the power of habit-is due the uncomfortable, unsettled state of most men who make some great change in their outward surroundings late in life. Few who emigrate in old age ever become quite reconciled to their new home. The habits of many years have so moulded them in body and mind, and set them so firmly in their mould, that the plasticity they may have once possessed is gone, as bricks dried and burnt have lost the pliancy they possessed when in the form of clay. Of the physiological cause of this fact we know nothing, but the fact no one can doubt. Experience shows us that habit is no less powerful in plants than in animals. What a plant has been in the habit of doing that it will incline to do again. The physical organization of the plant, acted upon by the conditions that surround it, produces its habit. The longer these remain unchanged the longer do its habits continue, and the longer its habits continue the more firmly. we must infer, do they become engrained in its physiological structure. Thus do habit and organization act and re-act on each other. Each may be changed, but all such changes are slow, and we may easily, in view of these facts, believe that after many years or ages of unchanged conditions a plant may become (as many an old

man becomes) so firmly set in its habits, so rigid in its nature, as to resist módifying influences with all the energy it possesses, and rather die than change. This is what we mean by losing its plasticity. A plant accustomed in the climate of England to occupy two months in perfecting its seed may, if suddenly removed to another country, continue its former practice or it may not. In the former case if the new climate does not afford the time required, the seed is not ripened and the species fails. If, however, the plant can adapt itself to the shorter season, and ripen its seed earlier, it may survive. But for this result a high degree of plasticity is needed. On the other hand if the change of climate be made more slowly, the habits and organization of the plant may keep pace with it, and with even less plasticity than in the former case, the species may survive.

We may advance at least one step farther. If these views on the relation of habit and organization to time be correct, have we not a possible, though at present, a rude gauge for both ? If the strength of habit increases with time, may we not roughly measure that strength by the length of time during which the habit has prevailed? And further, if the plasticity of plant-nature diminishes and its rigidity increases. with the duration of a habit, may not this duration in like manner be employed to some extent as a gauge of rigidity; that is of want of pla ticity? We stand here on new and difficult ground, and any deduction must be tested severely before reliance can be placed upon it. The confines of geology and botany, the place where the two sciences march together, is almost unknown territory over which science is just beginning; to extend its conquests. The tracing of earth's existing flowers. into her past, the genealogy of plants, is a subject closely connected with that other subject-the descent of species-which now so sorely divides the leaders in natural science. Nevertheless, we propose in the concluding portion of this paper to grope out into this unknown land where the light is so dim, and try to feel our way along the clue indicated above, in the hope of finding some link that may connect the apparently

inconsistent facts we are attempting to reconcile—the abundant westward migration of plants from Europe, and their scanty eastward migration from America.

Have we then, at the outset, any reason to believe that the North American Flora possesses less plasticity than the European? Let us apply the gauge just mentioned and see the result-the gauge of time. We are in the habit of calling America "The New World." Botanically and also, we may add, zoologically speaking, America is the older and Europe the younger. Europe passed ages ago through the stages of plant life which America exhibits to-day. The trees and plants of America, like most of her native animals, belong to old-fashioned, antiquated types-types that have passed away from European life, and now lie entombed beneath its surface in the records of geology. If we turn for a moment and consult these buried registers of births and deaths, we find that in ages past the existing families of America were living in Europe. Name after name may be turned up, long unknown and long forgotten where once it lived in the Eastern world, but faithfully recorded in these volumes and yet surviving through American relatives in the West. The woods of Europe once contained trees identical with those now growing in the forests of North America. The miocene formations of Switzerland have yielded to the labor of Prof. Heer, of Zurich, a rich harvest of fossil plants amounting to at least 900 species. The descriptions and illustrations of these may be found in his great work on the Tertiary Flora of Switzerland (1855-59). These tertiary beds lie in the great valley between the Jura Mountains and the Alps, and bear the name of the Molasse. From other parts of Europe also, and from high northern regions, similar fossil remains have been brought to light, and our knowledge of the European Tertiary Flora, though still very fragmentary, is in a condition to admit of fair comparison with the existing Floras of the world.

Space will not allow a minute enumeration of examples. Nor is it necessary for the purpose of establishing the assertion made above concerning the relationship of the living plants of America to the fossil tertiary plants of Europe. A few illustrations of the better known forms will suffice. Among the relics obtained from the beds at Oeningen are the leaves of a maple tree with flowers and seed. Europe possesses several maples, but these fossils resemble none of them, while they can scarcely be distinguished from the common Red Maple (Acer rubrum) of North America. Europe also possesses her Plane-tree (Platanus orientalis), the favorite shade tree in the parks of London. But the fossil plane of Oeningen is not identical with this. It much more closely resembles the Western Plane or Button-wood (P. occidentalis) of America. The Miocene Vine of Oeningen is of an American type, and very closely allied to the Muscadine or Southern Fox Grape of Maryland and Kentucky. A Fan Palm (Sabal major) has been found in the Swiss Miocene. It belongs to a genus now known only in America, and found in the Southern States. The Genus Taxodium, to which belongs the beautiful Bald Cypress (T. distichum) of the Southern cedar swamps, was once represented in Europe by a species so like the American that its remains can be with difficulty distinguished. The Tulip-Tree (Liriodendron tulipiferum) is the queen of the forest in the Middle States. In Europe it has passed away, but its remains are entombed in the Swiss Miocene. Another of these tertiary fossils-an elm-like tree-was at first only distinguished from the American Planer Tree (Planera aquatica) by Prof. Heer on account of the size of its fruit; but on seeing the specimens at Kew he admitted that no distinction could be drawn between them. The Giant Redwood (Sequoia gigantea) lingers in California, dependent upon the protection of man to save it from extinction. Though now replanted and flourishing in European shrubberies, it passed away from that continent, ages before the woodman's axe or the more murderous forest-fire had begun to destroy. Of somewhat more recent date, but yet fossil, is the European Sweet Gum-Tree (Liquidambar Europaeum), a species closely allied to the Sweet Gum of the Eastern and Middle States of America (L. styracifluum), but the genus is now totally unknown in Europe. Again, the

Black Walnut of America (Juglans nigra) lies buried in the Miocene beds at Oeningen, and Europe has imported the far superior walnut from Persia to supply its place. The writer has been informed that the late Prof. Agassiz, on his arrival in this country, applied to a gentleman well known for his study of the American forest trees, and asked for an introduction to the Hickory Family of America, remarking that all the members with which he was acquainted in Europe were fossil in the tertiary beds of his native land. Lastly, no fewer than eight species of Smilax, a genus scarcely known in Europe, but abundant in America, have been found in the Miocene of Switzerland.

We may here remark in passing that anyone desiring to see for himself the close resemblance between the European fossils and their living American representatives can do so by paying a visit to the Agassiz Museum at Cambridge where, in one of the upper galleries, may be seen a collection which has no equal or second on this side of the Atlantic.

It is just necessary here, in order to avoid leaving a flaw in the argument, to state that many of these species have been discovered in beds of equal or greater age in this country. It is therefore impossible to urge that they may have passed from Europe to America so lately that changes have not yet had time to develop themselves. On the contrary, some geologists are inclined to maintain that they existed in America before they appeared in Europe. At all events, we are warranted in asserting that during the Miocene Age trees of the kinds named grew in Europe and America, as well as in Greenland and Spitzbergen and other points in the far north.

We do not propose here to investigate the causes of these changes. It is sufficient for our purpose to maintain the fact that during tertiary geological time the European Flora has changed, and largely changed, while the American Flora has remained stationary or nearly so. Plants which have changed in this interval thereby show an ability to change—a plasticity—which may be shown again should occasion arise. Plants which have not changed during the same interval show

no proof of possessing the same plasticity. Moreover, if the principle is true that long existence without change strengthens the habits or increases the rigidity of the species, it is a necessary inference that the American Flora, or so much of it as has existed during this long interval unchanged, must be less plastic than the present European Flora which has during the same interval been so largely modified. So many ages of persistence in type cannot well be without effect. Little as we yet know of geological time, we cannot estimate the age of the Swiss fossil plants at less than 500,000 years, and it may well be twice as much. This would place the European Flora just so far later or newer in age and in development than the American-would give it the advantage of so many years of slow change-and may be supposed in some degree to have maintained or developed that plasticity, to its possession of which we incline to attribute its ascendancy over the native American Flora. On the other hand, the native American Flora, living unchanged through all these 500,000 years, may well have lost some of the plasticity it perhaps once possessed, and have become comparatively rigid, so that it is to that extent unable to adapt itself suddenly to the changed condition of Europe at present. It cannot therefore compete with the more plastic and more highly developed forms which it meets in the Eastern World; nor can it, in all cases, even hold its own against them on a soil and in a climate where it has dwelt for so many ages unmolested. The younger plant-life of Europe, like the white man, is more than a match for the oldfashioned life of this so-called New World of America, and the weaker fails in the struggle. Our country swarms with the weeds of Europe, while our own weeds shrink from the conflict both in Europe and at home.

Summing up the argument, in conclusion, we have pointed out :--

1stly. That many of the weeds of Europe have migrated to America.

2ndly. That many of these have become so thoroughly natu-

ralized here that they prevail over some of the plants native to the soil.

3rdly. That only two or three American weeds have crossed the Atlantic and become naturalized in England.

4thly. That the difference of climate and the conditions of mutual commerce do not fully account for this marked difference in the migrative power of the two Floras.

5thly. That in the Miocene Era the European and American Floras were very much alike.

6thly. That since that era the European Flora has been vastly altered, while the American Flora still retains a Miocene aspect, and is therefore the older of the two.

7thly. That this long persistence of type in the American Flora may have induced, by habit, a rigidity or indisposition to change in the American Flora.

8thly. That the changes in the European Flora since the Miocene Age betray a plasticity of nature or power of adapting themselves to circumstances of which the American Flora gives no sign.

9thly. That in this view the European Flora is better able to adapt itself to the strange climate and conditions—that is, to emigrate—than the American Flora.

10thly. That being thus more plastic or adaptable it succeeds in the New World, while the less adaptable American Flora fails in the Old World.

P.S.—The above paper was hastily written at the request of the Society, and the writer hopes this may excuse any slight inaccuracies of detail, if such should be found by the critical eye.

## FORCING FRUITS AND FLOWERS.

### BY JAMES DAVIDSON, MONTREAL.

In submitting this paper, I neither aim at nor claim anything like originality for the general principles therein enunciated—principles patent and practised by every gardener of note around the English metropolis with whor. I am acquainted, as well, also, by my long experience in the different departments of horticulture—principles, moreover, explained and enforced by every distinguished writer on botanical or physiological science during the present century, more notably so by the late Professor Lindley, of King's College, London, Eng., whose multifarious researches, as an experimental botanist, have conferred such a boon on the horticultural community at large. His "Theory of Horticulture," in especial, as being more suited to the wants of practical men, should find a place in every gardener's library.

Taking, then as a type for our present purpose, the forcing of the peach-bearing in mind that the same principles apply equally to all forced productions, whether fruit or flowersthose who would rightly understand the philosophy of peachforcing must commence at the beginning, and first determine what it is they have to deal with. This can only be accomplished by examining the young flower-buds as they exist in the plant when it makes its first move towards growth. At that period they are collections of tiny scales, placed over a small, spongy centre. By degrees they take on the forms of calyx, corolla, stamens and pistil. They form successively in the order in which they are named-the calyx first, the pistil last. The calyx and corolla are the most simple, grow the quickest and most easily bear to be hastened; the stamens require more time for growth-the pistil most of all. When high temperature night and day, with abundance of moisture and as much light as March yields, are suddenly applied to the peach, it is compelled to grow. The predetermined parts advance and, obedient to the influences which their nature can-

not resist, they by degrees unfold. The oldest parts-namely the calyx and corolla-simple in structure and always advanced in their formation, suffer no injury, but appear in their usual state, arraying the blossom in gay apparel of pink and red. The next, however-the stamens-having less time to form, acquire, perhaps, their natural color, but are powerless for their allotted office; while the pistil, the most complicated of all the parts-that which demands the longest period for its perfect formation, but which is the latest that the flower produces and which is to become the fruit—is a mere tuft of abortions and incapable of quickening, and shrivelling into pitch-black threads as soon as it is fully in contact with the air. All this was long ago proved by Mr. A. Knight. That eminent experimentalist found that when melons are forced too fast they bear nothing but male flowers, and that cucumbers, if grown very slowly, produce nothing but females ;- that is to say, the excessive growth which he attained gave the complicated females no time to organize, but was enough for the preparation of the males, whose structure is more simple. On the other hand, when growth was preternaturally slow, the period of gestation was so long that all the parts of the flower which, under a higher and quicker stimulus would have become males, fashioned themselves into the complicated condition of the females. Nature works neither to the one extreme nor the other. Hers is a middle course, which alone can lead to perfect success. Let those who would rightly understand her processes look around and consider how it is that the peach is made to bear fruit naturally. Does the cold of winter suddenly change to that of the tropics ? Does warm dew incessantly bathe the rising herbage? Are the nights of spring more oppressive than the days? Is the climate in which the peach naturally delights in the smallest degree like the process which our practical friend has been pursuing with such care and expense ? Quite the reverse. Where the peach dwells the temperature rises very slowly, and at about the same rate as light increases. If one day is warm another is cold, and the nights are always so. The air, too, is dry more often than damp. Remembering, also, how ceaselessly the various phases of the weather sweep over the natural regions of the peach, five or six long months of steady growth are required to produce the peach under the most favorable circumstances. How, then, can we imagine that in three or four months the same end is to be obtained by unnatural means? No, never! We may assist nature; she repels compulsion. It cannot be too much reflected upon by every practical gardener when he is advised to apply the climate of the tropics to the plants of the north; and that the principles herein applied, if rightly understood, will tell him why his grapes, peaches, apricots, plums and cherries *do not set*.

In conclusion, we have hitherto chiefly adverted to the fruit blossom, and in so doing the vital functions performed by the leaf must not be overlooked. The leaf is the stomach of the plant and performs the same functions for the vegetable that the stomach does for the animal kingdom. The full development of the leaf by moderate stimulus should always precede or be in advance of the full expansion of the fruit blossom; otherwise it would prove disastrous to the fruit or, perchance, no fruit at all. And hence without a clean, healthy and well developed foliage, assimilation is checked, the plant becomes sickly and stunted, and with blossom or fruit but mere abortions. Old Dame Nature is a fond foster-mother, and is peculiarly partial to her own children; and woe betide the practitioner that would lightly esteem her immutable laws. But, rather, the more closely he assimilates his operations to those laws, the greater and surer will be his success.

There are two primary conditions essential to complete success in the forcing of the peach. First, thoroughly well ripened wood; secondly, to have the young foliage sufficiently developed and in advance of the fruit blossom during the process of setting; otherwise the embryo fruit, for want of sustenance, is apt to drop prematurely. There are also two primary evils incident to the culture of the peach under glass, resulting from injudicious watering. First, by watering on and around the trunk of the tree with very cold water during the setting of the fruit; and in the second place, by giving a copious watering to the root of the tree during the *stoning* process—each of which proves *fatal* to the fruit.

## THE IMPORTANCE OF PRACTICAL ENTOMOLOGY.

## BY G. J. BOWLES, PRESIDENT MONTREAL BRANCH ENTOMOLOGICAL SOCIETY OF ONTARIO.

Among the conditions necessary to ensure success in the cultivation of our various fruits, large and small, a knowledge of the habits and economy of the insects which prey upon them is of great importance. This fact has been fully recognized of late years, and the science of Entomology now occupies a prominent position in consequence. Since Kollar, some fifty years ago, wrote his book on injurious insects in Germany, many entomologists have directed their attention to the practical side of the science, and many valuable works have appeared, both in Europe and America. As regards agriculture and fruit-growing on this continent, the splendid work of Harris and the Annual Reports of the various State Entomologists in the neighboring Republic, as well as that issued by the Entomological Society of Ontario, have accumulated a mass of most interesting and valuable information with regard to both destructive and beneficial insects, which has saved millions of dollars to the people of both countries.

Insects play a most important part in the operations of nature, and affect the welfare of the human race to an incalculable extent. They live in the earth, the water and the air. Their food is principally vegetable, and many of them attack the very plants necessary to the existence of man. Though small in size, and therefore insignificant in the eyes of people generally, their numbers are so great and their increase so rapid that national calamities have often resulted from a visitation of the more destructive species. History records many such calamities; some caused by locusts, others by the various pests which attack the cereals—some on the old continent, others on the new.

The annual loss to agriculturists and fruit-growers by the ravages of insects is simply enormous. It has been stated on excellent authority that the damage done by insects in France amounts to \$50,000,000 annually, and that the quantity of human food consumed by them each year is equal to the entire consumption of the nation for a period of five weeks.<sup>1</sup> The loss by the wheat-midge in 1854 in the United States exceeded \$16,000,000. Riley estimates the loss of corn and small grains caused by the chinch-bug in the North-Western States, in 1874, at \$60,000,000. In 1870, the white butterfly destroyed \$500,000 worth of cabbages in the vicinity of New York alone. The losses by this insect in Canada, and the more important damage done by the Hessian fly, wheat-midge, &c., in past years, are but too well known. Nor are the special enemies of the fruit crop less destructive. The grapevine phylloxera threatens to destroy the vineyards of France, and has already gained a footing in the United States; while the curculio, the canker-worm and the tent caterpillar devastate our orchards, and other insects attack the smaller fruits.

Happily our Province is free from some of the injurious insects which harass the fruit-growers of the West. Those, however, which we do possess are sometimes sufficiently numerous to give great annoyance, as parties engaged in the business know from their own experience.

The cold climate of our Province places an obstacle in the way of fruit-growers which is difficult to overcome, and this, in addition to the insect pests, has discouraged many from attempting to follow the pursuit. The disadvantage of climate, however, will in time be surmounted by the introduction of varieties capable of surviving the cold of winter, and the other

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drawbacks may be lessened, if not prevented, by gaining a knowledge of the history and habits of the insect depredators -a most interesting and in this case a most profitable study. It should embrace, however, not only a knowledge of our enemies but also of our friends, for many insects which by the ignorant are classed among the former really belong to the latter, and in the economy of nature are the most powerful allies we can have in the destruction of injurious species. Now that practical Entomology is so far advanced there is no difficulty in obtaining the necessary information from the numerous books and reports published on the subject. The fruit-grower, therefore, who suffers loss from the ravages of insects has only himself to blame; because, in nearly every case, an acquaintance with the habits of his insect foes would have enabled him to prevent, or at least to lessen, the damage he has sustained. No matter how suitable the soil and situation may be, or how careful the cultivation, if the proper precautions are not taken against the attacks of insect enemies, the result is sure to be disappointment and loss.

The Entomological Society of Ontario, established in 1863, has done and is still doing a great work for the agriculturists and fruit-growers of Canada. A branch of the Society, composed of resident entomologists, is in operation in Montreal. The members have taken up the pursuit, not only with the view of advancing the study of the insects of Quebec scientifically—a work which has hitherto been much neglected—but they are desirous of assisting the agricultural and fruit-growing interests of the Province as much as lies in their power. In response to an invitation from the Association, this paper has been written as an introduction, and is intended to be followed by others on Practical Entomology in future Reports. A valuable paper on "Borers"—insects which have done great though unsuspected lamage to our fruit-culturists—is given this year from the pen of one of our members.

In order to make our efforts practically valuable to the fruit-growers of Quebec, we ask their co-operation in this important work. The observations of parties in different parts

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of the Province during the coming spring and summer, in relation to insects they find to be injurious, will be thankfully received by our Society; and specimens sent by mail, either to the Secretary of the Association or to F. B. Caulfield, Natural History Society, Montreal, will be especially valuable. In this way much new light may be shed on the history of our noxious and beneficial insects (some of them, perhaps, indigenous to the Province), and much benefit derived by the fruit-growers of Quebec.

Information is particularly desired with regard to the following :

On fruit trees.—The canker-worm, the fall web-worm, the codling moth.

On the grape.—The phylloxera, which has been detected in Connecticut and Massachusetts, and may possibly have entered Quebec. It forms small excrescences on the leaves and also small swellings on the rootlets. Also any other grape insects.

Insects affecting small fruits.

Specimens should be sent in strong pasteboard or tin boxes, filled with leaves to prevent injury in transit.

## FRUIT TREE BORERS.

BY F. B. CAULFIELD.

AFFECTING THE APPLE. ORDER COLEOPTERA—FAMILY CERAMBYCIDÆ—THE ROUND-HEADED APPLE TREE BORER—Saperda candida, FABR.



Saperda candida.-a grub ; b pupa ; c perfect beetle.

The grub of this insect is of a pale yellow color, with a brown head and black jaws. The beetle to which it eventually changes is brown, with two chalk white stripes extending from the head to the end of the wing covers; the legs and under surface are also white. It attains its perfect condition and leaves the tree during the months of June and July, and during these months the female lays her eggs near the base of the tree. Prof. Riley states that they are not deposited in the crevices of the bark, as has been generally supposed, but are deposited in an incision cut in the bark by the female. The grub soon hatches out and commences feeding on the sap wood. Prof. Riley states that as winter approaches the young larva descends as near the ground as its burrow will allow, and doubtless remains inactive till the following spring. In the course of the next summer it cuts a cylindrical passage upward into the solid wood, and before having finished its larval growth, it extends this passage right to the bark. It then stuffs the upper end of the passage with a sawdust-like powder, and the lower part with curly fibres of wood ; it thus finishes its gnawing work during the commencement of the third winter, but remains in the larval state till the following spring, when it becomes a pupa. After resting three weeks in the pupa state, it becomes a beetle, with all its parts at first soft and weak. These gradually harden, and in a fortnight more it cuts its way through its sawdust-like castings and issues from the tree, through a perfectly smooth and round hole, having been in the tree only a few days less than three years.

The most effective means of protection against the attacks of this insect is to keep the base of the tree well supplied with soft soap during the months of June and July, as the female will not lay her eggs upon trees so protected. If no precautions have been taken and the grubs are already in the tree, Prof. Riley advises cutting through the bark at the upper end of the burrow, and gradually pouring hot water intothe cuts so that it will soak through the castings and penetrate to the insect. The trees should be carefully examined in the fall, when any young grubs that may have hatched during the summer can be found and cut out. I do not think this beetle is common in the vicinity of Montreal, as I have only seen a single specimen, which was taken by Master Philip Pearson; but as it hides by day and flies about at night, and is thus not often seen, I may be mistaken. Mr. Couper states that it is common about Quebec (Can. Nat. vii. 278), where it has done much injury to the apple trees. It also attacks the pear, quince and mountain ash, but its natural home is in the wild crab-apple.

# ORDER COLEOPTERA—FAMILY BUPRESTIDÆ—THE FLAT-HEADED BORER—Chrysobothris femorata, FABR.

This species is more abundant than the round-headed borer, and more troublesome, as it does not confine itself to the base of the tree, but deposits its eggs on various points of the trunk and larger limbs. The grub may be easily known by its extremely large and flattened head and by the corresponding shape of its burrow, which is oval in shape and twice as wide as high. It passes through its transformations in one year, and during the months of June and July the beetles may be seen basking on the trees in the sunshine. The perfect beetle is greenish black above and presents the appearance of burnished copper beneath. It flies during the day time and is very lively, taking wing readily when alarmed. Besides the apple it infests various forest @



trees, swarming on fallen trees and cord- Chrysobothris femorata.wood piled in the woods. The same re-larva; b pupa; c head of medies apply to this as to the last species, but require a more general application.

### AFFECTING THE RASPBERRY.

ORDER COLEOPTERA-FAMILY CERAMBYCIDÆ-THE RASP-BERRY CANE GIRDLER-Oberea tripunctata, FABR.

The natural home of this beetle is among the wild raspberries, where abundant evidence of its work may be seen. The perfect insect is a narrow, elongated beetle, not quite half an inch in length. With the exception of

the neck and breast, which are Oberea tripunctata.—a head of yellow, it is entirely of a deep larva; b larva; c beetle magnified.

black color, and there are three small black dots on the top of the neck, from which it takes its specific name. The beetles leave the canes in June, and by the end of the month the females commence depositing their eggs. Mr. Bethune, who was the first to describe the operation, says: "The parent insect begins by cutting with its jaws a series of small punctures, side by side around the cane, six or seven inches from the top. As soon as the first row is completed, it turns round, and facing the other way, cuts a second row, measuring the length of its own body. These two girdles being completed, it makes a



small hole a little above the lower girdle, and deposits in it its small yellow egg. From this egg there hatches out in a few days a small yellow footless grub, which proceeds to burrow downwards, eating the pith of the cane, and eventually causing its destruction."

Soon after the cane has been girdled the top begins to droop; and this is the time to destroy the insect, by cutting off the girdled canes below the lower ring and burning them. This insect appears to be common throughout Canada. I have seen abundant evidences of its work in the vicinity of Montreal, both on the wild and cultivated raspberries. It appears to be the insect referred to by Mr. Brown, in the Report for 1876, as a beautiful dark blue fly, of the Ichneumon species. There may have been Ichneumons flying about the bushes, but the insect that girdled the trees was undoubtedly an Oberea.

The *Ichneumonida* are all parasitical upon other insects, depositing their eggs on, or in the body of, their victims, and are the best friends the agriculturist has; indeed, without their aid his task would be a hopeless one.

#### AFFECTING THE CURRANT.

# ORDER LEPIDOPTERA-FAMILY ÆGERIADÆ-THE IMPORTED CURRANT BORER.-Ægeria tipuliformis, LINN.

This troublesome pest has been introduced from Europe, and is now spread all over the country. The parent insect is a little clear-winged moth,

and looks very like a wasp or ichneumon fly. *Regeria tipu*. It is of a dark blue color with three golden bands across the abdomen. They make their appearance in June, when they may be seen flying about the currant bushes in the sunshine. The female lays her eggs singly on the stems near the buds. As soon as they hatch out, the grubs eat their way into the centre of the stem, where they remain during the summer.

Before changing to the chrysalis state, they cut a passage through the stem just to the bark. The winter is passed in the chrysalis state, and in the following June the chrysalis wriggles itself against the slight skin covering its passage, and breaking it, pushes itself partly out of the hole; soon afterwards, the chrysalis case bursts, and the perfect insect flies off in search of food and companions. As remedies, Mr. Saunders recommends searching for and burning all infested canes, and destroying all the moths observed about the bushes.

# ORDER COLEOPTERA—FAM. CERAMBYCIDÆ—THE AMERICAN CURRANT BORER—Psenocerus supernotatus, SAY.

This insect is a small cylindrical beetle of a brown color, with a white dot before the middle of each wing cover, and a larger oblique spot of the same color just behind the middle. Its habits are similar to those of the preceding species, and the same remedies apply to it. It is generally distributed throughout Canada, but is not abundant. I have found it about wild currant bushes in the vicinity of Montreal, but never observed many of them. If not kept in check, it may, however, prove troublesome in gardens.

# FRUIT CULTURE IN L'ISLET COUNTY.

### BY AUGUSTE DUPUIS.

#### I —APPLES.

All I could learn from the oldest inhabitants here, and particularly from A. Morin, Esq., N. P. (this gentleman, lately deceased, 85 years old, planted an orchard of twenty acres 50 years ago, trees all grafted by himself), in 1871, is that the first French settlers paid much attention to the growing of apple, plum and cherry trees, and were very successful with a few varieties of each.

Mr. Morin told me that, when a young boy, he remembers having seen at different places on the shore of the St. Lawrence—at St. Rochs and St. Jean Port Joli—apple trees of immense size bearing heavy crops of good fruit. He told me that most of the largest orchards then existing have disappeared, and he ascribes the cause to neglect in pruning, to suckers left growing at the feet of the old noble trees, and to immense snow drifts covering the trees and breaking them, which hastened their decay.

The varieties of apples which were cultivated with profit by our forefathers were the Calville Rouge, Calville Blanche and Reinette.

Now, a great many varieties of apples are still cultivated under the same names, whilst they are only seedlings or suckers of the trees imported from France.

Some cf these seedlings have proved so profitable that they deserve to be propagated for dissemination, considering the hardiness and vigor of the trees, and the beauty, flavor and good marketable size of the fruit.

Really, all the trees on each farm are seedlings or suckers, with the exception of a few well-organized orchards in each parish of the county where trees have been grafted, preserving thus the old varieties, and propagating seedlings of merit.

Amongst those men who have the credit of having thus established orchards of varieties of good quality without purchasing trees (there being no nurseries in the district), Amable Morin, Esq., N. P., Mr. Verreault, father of P. G. Verreault, Esq., M. P. P., Mr. L. M. Morin, and Jean Belanger are the most prominent, and have been successful.

"What were the most profitable varieties?" was the question I put to the proprietors of these orchards, and they answered:

1.-FAMEUSE.

II.-CALVILLE WHITE.

III.—GERMAIN ST. PIERRE—A new variety produced from seed in the garden of Kuerouack, L'Islet; grafted on erab apples by Mr. G. St. Pierre of St. Jean, where Messrs. Morin, Verreault and others took many hundred grafts. Trees are large, hardy and productive, bearing a fine fruit, resembling the Fameuse in size and color, flesh white with red veins. juicy, rich and sweet, ripens in September, keeps till October. A first-rate apple.

IV.-BOURASSA.

V.-CRAB APPLES-Two varieties of good quality.

The above is the experience of those who have planted for the last sixty years, and after careful examination of these orchards and comparing them with orchards of the same age, even in Western New York, where the soil and climate are both superior to ours, I find the trees as healthy, though not so large, and the percentage of decayed trees is not much larger here, where trees are not planted too close.

What has been the result of the plantations made in the county for the past twenty years ?

Trees have been bought largely from nurseries in Montreal, St. Catharines, Ont., Rochester, N. Y., and from my small nursery, with very little success to the purchasers generally.

I ascribe the cause of failure to the bad selection of varieties, planting in old orchards without renovating the used up soil, planting without care, and ignorance of the remedies for the diseases of trees.

Those who planted in proper soil, made good selections of trees, and took intelligent care of their trees, have succeeded well with the following varieties in the following order :

I.-DUCHESS OF OLDENBURG.

II.-FAMEUSE.

III.—ST. LAWRENCE.

IV.---TRANSCENDENT CRAB.

V.-RED ASTRACHAN.

The apple borer has done a great deal of damage for the last fifteen years in this county. It was unknown before, and must have been imported with nursery trees.

#### II.-PLUMS.

This fine fruit is cultivated in the county with profitmore so than the apple, particularly two varieties, under the names of Large White Imperial and Damas Blue.

They are very hardy, bear young and abundar.tly. Fruit of good quality, maturing two weeks later than the Reine Claude.

They generally bring a good price in the Montreal market. The trees reproduce themselves perfectly from suckers.

The White Imperial are large trees, bearing sometimes three bushels each, and the trees live thirty or forty years.

Many hundred bushels were sold last year in this county at an average of \$2 a bushel delivered here.

A few varieties of plum trees have been imported from the St tes and planted here, of which the B.adshaw, Lombard and Yellow Egg have given the best results. They have been tried on such a small scale, however, that they could not be recommended as profitable for planting largely.

The plum growers could double the profit on the sale of their fruits, by packing them properly in small boxes instead of barrels.

The curculio has not made it appearance here, and is not wented either.

#### III.—CHERRIES.

Only one variety of cherries seems to have resisted our climate. The oldest inhabitants do not remember having seen here any other variety. The fruit is very good, and answers to the description given by Downing of the Early Richmond.

It succeeds very well in this county and on the north shore of the St. Lawrence, even at Gaspé, where I sent young plants four years ago.

The trees are propagated by suckers and seed, both which reproduc invariably the same fruit.

The trees are not very long lived, forty or fifty years being the average on the best sandy soil adapted to them; but they produce immense crops, generally every two years, some farmers in this parish selling from forty to fifty bushels each in the Quebec market, at an average price of from \$1 to \$1.50 per bushel, wholesale. They do not put up their fruit properly, and lose consequently.

### IV.-PEARS.

They are nearly unknown in this county; only amateurs have planted a few trees. They do not look healthy. I have planted many varieties, such as Bartlet, Seckel, Flemish
Beauty, Vicar, and Louise Bonne de Jersey—twenty-five plants altogether. Of the whole, one single tree of Louise Bonne de Jersey is strong and vigorous, and produces splendid fruit.

The blight kills the trees, and I believe they do not find proper nourishment in our sandy soil.

I intend to continue my experiments with Flemish Beauty and Louise Bonne de Jersey, and expect a better success by mixing clay with the soil.

The first settlers in this parish had imported pear trees from France, and very large pear trees existed fifty or sixty years ago on our shores.

I do not intend to write of my own experience in fruitgrowing, as it would bring no light on the subject. I send you here enclosed my subscription as a member of the Montreal Horticultural Society, and I would like to see the intelligent farmers and gardeners of this county join the Society, to acquire, as I hope to do myself, practical knowledge in the agreeable and profitable science of fruitgrowing.

I intend sending fruits from my orchard to the Exhibition next fall, as well as fruits from seedlings which have proved profitable here.

# FRUIT IN VAUDREUIL COUNTY.

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## BY R. W. SHEPHERD, JR., COMO.

The soil in some parts of this county is admirably adapted for the cultivation of fruit trees, the apple in particular. From such information as I have been able to obtain, I learn that about forty years ago there were some large and productive orchards in the county, principally in the district then known as Cavagnol, now called Como. In those days every farmer had his orchard of seedling trees, and it was evidently no trouble to grow them on the virgin soil. I am informed that C

very few of the orchards contained grafted trees, but that many of the seedlings, had they been propagated, would have been valuable acquisitions to the fruit lists of this Province. I can well remember one tree that was alive and productive eighteen years ago (since dead); it at that time was probably over fifty years old, and was renowned for its excellent winter fruit. I would like to possess scions of that tree to-day. Its fruit was much like Red Astrachan in appearance, of rich sub-acid flavor, and kept till mid-winter. No doubt there were many other seedlings of equal merit that have been altogether lost because no attention was paid to their propagation.

One Mr. Cook had, perhaps, the largest orchard; it is said he gathered annually about fifteen hundred bushels of apples. He made quantities of cider, having a mill on his premises; numbers of bushels were sold to the Hudson Bay Company officials and Indians at Oka, on the opposite shore of the lake. In those days the Indians were prosperous, and most of them in the employ of the above-named Company.

That the farmers do not pay much attention to the cultivation of fruit is very evident from the few orchards in the county to-day; and after the manner they have been "taken in" by tree peddlers from the Eastern States, it is no wonder many have given up planting, preferring to buy their fruit rather than to grow it. In almost every case the trees sold by these peddlers have turned out, if they lived, not true to name and worthless; but by far the greater number, and I speak from experience, reached the farmer more dead than alive. Of all men perhaps the tree peddler is the most insinuating; with his beautifully colored and attractive pictures of fruit, his voluble and persuasive language and pertinacity, he soon finds a victim in the farmer. Five or six years ago thousands of dollars were taken from this and the neighboring counties of Prescott and Argenteuil, and I think it no bold assertion to say, that at the present time there is not to be found, in the three counties, one good orchard planted with trees sold by these men. If the same number of trees had been purchased

from reputable nurserymen in Canada or the States, carefully planted and cultivated, the tale to tell of productive orchards in Vaudreuil County to-day would be very different.

### RIGAUD DISTRICT.

Messrs. J. & E. McCabe, of St. Henry, have the largest orchard of bearing trees in the county. Their orchard of seven acres (one-half planted twenty years and the other fifteen) is favorably situated on the southern slope of the Rigaud Mountain, and well protected from the north and east winds. The soil is gravelly, and has been artificially under-Messrs. McCabe have cultivated the following drained. varieties · Fameuse, Golden Russet, Lemon Pippin (Eng.), Pomme Grise and Bourassa. They only recommend Fameuse for profit, and speak in the very highest terms of this variety. Golden Russet, they say, comes next to Fameuse, but does not bear so well, and although commanding a higher price is not so profitable per tree. Mr.J. McCabe had not a sample of the fruit to show me, but I am of opinion that these trees are not the Golden Russet of Western New York ; they are too upright in growth, and the shoots, by which this variety is easily known, did not show the light-colored specks. The Pomme Grise and Bourassa are gradually dying out, notwithstanding that they have received the same care and attention as Fameuse. The McCabes gathered over nine hundred bushels of apples last season, and the prices obtained average \$3.50 per barrel, delivered at the Rigaud steamboat landing. They sell principally to fruit-dealers in Ottawa, better prices being obtained there than in Montreal.

Three years ago the caterpillar was a perfect plague, and made great havoc with their trees, eating off every leaf, and many of the trees have never recovered from the enervating effects of these pests. The borer has not been destructive in the Rigaud district.

The soil of the McCabe orchard is only moderately rich, but between the rows of trees receives a top dressing of very old and rotten manure, every second year. The example set by the McCabes has been followed by a good many farmers in their district, and the result is, that several young orchards may be seen to-day.

## COMO DISTRICT.

I am testing over forty varieties of apples, eight of plums, seven of pears and six of cherries, in my experimental orchard Most of the trees have been three years planted; some have agreeably surprised me, and with others I have been woefully disappointed.

One of our orchards was planted about eighteen years ago with Fameuse, St. Lawrence, Bourassa, Pomme Grise and King of Pippins. The two former have proved profitable; Fameuse the most profitable of all. St. Lawrence has proved quite as hardy and long-lived as Fameuse, but bears only about two-thirds the crop. Bourassa bears well with high cultivation; the tree, however, is not hardy. Ponme Grise has not proved very hardy; is not productive, and therefore unprofitable. The King of Pippins bore enormous crops every year, but all the trees of this variety died in the winter of 1876. I attribute their death to the severity of the winter. Talman Sweet, planted about twelve years, has proved hardy and altogether a desirable winter fruit for home use.

Within the last six years I have planted the following in quantity, one-half Fameuse, remainder Duchess of Oldenburg, St. Lawrence and Canada Baldwin. The latter has not been thoroughly tested, but the trees appear hardy, and bear well; the fruit is a good salable color, and I have great hopes of this as a winter variety. The following have stood a test of four winters in orchard, and are so far satisfactory : Blue Pearmain, Early Joe, White Calville, Fall Pippin, Tetofsky, Ribston Pippin, Norton's Melon, Winesap; but Hubbardston's Nonsuch, Benoni, Wagoner and Golden Russet have not proved quite hardy; the latter, particularly, has disappointed me. Norton's Melon, strange to say, has proved more hardy than Golden Russet.

The following, although only two years planted, promise well: Walbridge, Wealthy, Haas, Plumbs' Cider, Pewaukee, Ben Davis. I shall not give the names of all those that failed altogether, nor yet of those that have a struggling existence but Northern Spy, which I understand succeeds well in Huntingdon County, has completely failed here. Three Gravenstein, planted in 1875, were killed down the first winter, but have sent up shoots above the graft, and may possibly survive yet.

Red Astrachan does - it appear extra hardy, and it certainly does not bear well. I have trees of this variety planted fifteen years that do not bear even fair crops.

I have found it more advantageous to plant orchards on high ground, and avoid much of the expensive operation of underdraining.

For fertilizers I use a compost (two-thirds of muck, marl and decayed forest leaves, and one-third wood ashes), which appears to answer the purpose well. This compost spread to a depth of three or four inches serves the double purpose of a fertilizer and mulch, and prevents the growth of noxious weeds and grass near the tree. Those who mulched their trees last autumn will find the benefit next spring, as, owing to the scarcity of snow, and the keen frosts of December and early part of January, it is probable many trees may be rootkilled this winter. The borer has been the most troublesome pest with us, and has destroyed many trees in this district. The only cure is that recommended by Todd, "Catch 'em aud kill 'em." I have used with advantage a solution of potash (one pound to one gallon of water), applied to the trunks of the trees in June. This wash at least cleans the stems of the young trees, gives the bark a bright healthy color, and a little of it poured on the ground at the collar of the tree, I think, completely destroys any eggs of the beetle that it touches. Twice every season, in June and October, each tree is carefully examined at the collar for the borer, and if lodged there he is quickly cut out and killed; after a little practice a man can examine a great many trees in a day, and readily extract the pest without doing much damage to the tree. Many old trees have been killed or greatly injured by the borer. In July, 1876, I extracted three large ones from an cld Fameus, tree that, to all appearance, was dying; in the month of August t) is tree was in full blossom, and last year bore a number of fair-sized apples. With careful attention the tree may yet survive many years.

Mr. I. J. Gibb, of Como, who has a large garden, has been most successful in growing fruit—small fruit in particular. In reply to a note sent him, I received the following, which explains in a few well-chosen words his experience:

Сомо, 5th Feby, 1878.

ROBERT W. SHEPHERD, JR.

Dear Sir:—In reply to your favor of the 2nd instant, with reference to the different varieties of apples, grapes and small fruits which I have succeeded in raising in my garden here, I beg leave to say that the Duchess of Oldenburg and Fameuse have succeeded well. In grapes the Adirondac, Delaware, Sweet Water and Creveling have yielded well and ripened thoroughly. I have not been fortunate with Strawberries.

The Kit'atinny, Dorchester, Lawton and Early Wilson Blackberries winter-killed so badly that I ploughed them up.

In Gooseberries the Houghton though small is good in quality, very productive and never mildews; all other varieties have failed with me, mildewing badly.

The Mammoth Cluster and Doolittle (black cap) Raspberry have produced large crops, and are hardy, and ought to be produced by every gardener.

In Raspberries the Clark (red) and Brincles Orange are very productive and delicious fruit, and never winter-kill.

Yours faithfully,

### I. J. GIBB.

Many farmers in this district have lately set out orchards, among whom I may mention Messrs. W. K. Robinson, T. Parsons and Jos. Sanderson. I have no doubt their worthy example will soon be followed by others.

#### ISLE PERROT DISTRICT.

There are some good orchards on this Island; the Rev. Bellarmine Ricard having the largest. Not having seen his orchards, nor received an answer to a communication addressed to him, I am unable to speak positively, but I understand he has cultivated Fameuse and St. Lawrence largely for over thirty years. The soil of the Island appears very suitable, as numbers of seedlings are growing on the highways, and so equal in distance are the trees one from the other that I pre-

sume they have been planted there.

One often hears the assertion that "apple trees do not live long enough nowadays to be profitable," that in fact the trees alone are to blame. This idea is not by any means a new one. Henry Phillips in his "Companion to the Orchard," a book published in London, 1831, says Pliny writes (1800 years ago) of the decay of the apple trees in his time, and observes that "the apple trees become old sooner than any other "tree, and that the fruit becomes less, and is subject to be "cankered and worm-eaten even while on the tree."

It is a well known fact that apple trees are grown more easily (in fact, without any care whatever) on the virgin soil of newly settled parts of Canada than in the older settled districts. But if trees will not grow in the older settled parts now, it is in my opinion more the fault of the cultivator than the tree; as having allowed his soil to become impoverished, the tree in consequence becomes enfeebled, and in this state soon succumbs to the attacks of insects or severe winters.

Of course, all things being equal, some varieties of apple trees live longer than others; but to maintain a tree in a healthy condition that it may bear largely and live long it is necessary to keep the soil in good condition. We planted a St. Lawrence tree about eighteen years ago quite near a hennery, its roots extending into the hennery yard. It may be said, therefore, that this tree stood in the richest of soil. What has been the result? This tree is larger and healthier than those of the same variety and the same age in the orchard; it has always borne more and better fruit. The attacks of the borer have not injured it, and it has never been affected with sun-scald; in fact it is the best tree on the farm.

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It is evident, I think, that the great secret of success is high cultivation, and that it is always necessary. The higher the cultivation the better and more abundant will be the fruit and longer the life of the tree.

#### PEARS.

Very few pear trees have been planted. The late Mr. George Matthews, of Mount Victoria, raised one or two varieties successfully, but I have been unable to ascertain the names, as the trees having died down and sprung up from the roots, are now bearing seedling fruit.

The following varieties have so far withstood three winters with me: Brandywine, Flemish Beauty, Napoleon, White, Doyenné, Duchess Angouléme, My Belle; Lucrative and Osband's Summer (dwfs.) and Clapp's Favorite (stds.), have winter-killed. Duchess Angouléme will bear this year.

## CHERRIES.

Some years ago the habitants of Petite Côte, near Vaudreuil Village, cultivated the cherry extensively in their gardens, probably a seedling of Early Richmond type, but most of the trees have died and have not been replaced.

#### PLUMS.

There are two or three varieties, both red and yellow, of the wild plum growing in the neighborhood of Como that are well worthy of cultivation, being of fair size, good flavor, not astringent, thin skinned, and excellent for preserving.

Imperial Gage, Green Gage, Lombard and Bradshaw have succeeded fairly; I shall be better prepared to report on the above-named, however, in a year or two.

### REPORT

OF THE

## FRUIT GROWERS' ASSOCIATION OF ABBOTTSFORD.

## N. COTTON FISK, President. CHARLES GIBB, Corresponding-Secretary.

In our last we detailed the results of our experiments. We will now speak of our Exhibition, held here in September last, and of the bearing of such exhibits upon our Horticultural progress.

On the 20th, a glorious morning brought our friends from far and near. We did not know we had so many friends; 30 many really interested in our work. There were present probably not less than 1,500. These, for the most part, came long distances, showing that enthusias in the culture of fruit is not confined to Abbottsford.

Is a Horticultural Exhibition in this part of the Province a want? These fifteen hundred people say it is, and many more kept continually re-echoing this want by the regrets of their non-attendance. Our space carefully planned, we found totally inadequate for the quantities of fruits, vegetables and flowers, and new plans had to be made on the spur of the moment to accommodate the unexpectedly large amount of products brought for exhibition. The exhibit was not merely a local one. From Shenord, Brome, Missisquoi, and still more distant counties, came our fellow fruit-growers with their fruits; fruits new, but thought worthy of notice; fruits whose names were lost; fruits to fight us with. They did fight us and we were badly wounded, for Mr. N. S. Whitney, of Frelighsburg, carried off the second prize for "best collection" of apples, and Mr. David Westover, of the same place, the second prize for crab apples. Since then we have met by night and held meetings. We have been drilling ourselves in the mysteries of plant life. We have reconnoitred the weak points of our insect enemies, and next September, "if the gods be kind," we promise our pomicultural friends a warm reception. In the prize for the "best five varieties," merit of fruit is the sole consideration. For this there were nine entries, and this table of forty-five plates was that of which connoisseurs could not cease to speak. We are proud to say that of the three prizes in this section all were held by Abbottsford men.

After the Exhibition we sent a box of samples to Toronto, where specimens were being selected from which to make casts for the Paris Exhibition. We learned, to our surprise, that several specimens of our old varieties there met no worthier rivals, and some of our natives (seedlings); then for the first time brought to notice, were so highly prized by the Ontario nurserymen, who there saw them, as to cause immediate demand for scions.

Of apples there were upon the tables 400 plates, including 38 plates of crab apples. This collection embraced over 70 varieties of apples, and 17 of crabs, besides others but locally known and little prized. This collection in quantity, variety and extent was, as far as we can ascertain, at least as fine as any that competition has gathered in our Province.

The following "undescribed" apples we wish to draw attention to. They are named in order of ripening : FALL MELLOW (so-called).

This apple deserves description. It was brought here 30 years ago, by Rev. Thomas Johnson, from the nursery of one Jas. Finlayson, at East Hatley. Mr. G. W. Cook procured from New Hampshire the grafts used by Mr. Finlayson, but now states that he has no knowledge of any such variety as we describe. That this is a foreign fruit seems almost certain, but more we cannot say, for the Committee of Nomenclature of the American Pomological Society has been unable to identify it.

In nursery, the tree is hardy, yet a tardy and crooked grower, often causing dissatisfaction to purchaser.

In orchard, it still grows slowly, and forms a small tree with horizontal branches, but is exceedingly tenacious of life and a profuse bearer. Fruit, largish, roundish, often oval; skin, whitish yellow, becoming golden yellow when fully ripe. Flesh, whitish, granular, tender; moderately juicy, very mildly subacid, pleasant.

It bruises easily, and shows its bruises; it ripens soon after Duchess, at a time when it has many competitors, yet for near market it has proved very profitable.

VICTORIA.



The Victoria made its *debut* into pomological society at our late Exhibition, where its rare beauty attracted much attention. It was brought by Capt. Campbell along with Pomme d'Elysar and other fine fruits, natives of St. Hilaire.

The "original" tree is growing in the orchard of M. Olivier Leduc, and was grown from seed sown by M. Elysar Ducharme about 18 years ago.

The tree has been propagated to a very limited extent and is said to be vigorous in growth and hard in texture of wood, which would lead us to expect early maturity of wood and probable hardiness of tree. We have ourselves seen but one tree of it, a four-year-old, and we must candidly yet sorrowfully say that there has evidently been for the last two years a want of vitality in the terminal buds which does not augur well. This does not seem to be the opinion at St. Hilaire, and we hope we are mistaken.

The fruit we can only judge from the specimens on exhibition. These were large—almost very large—roundish and regular. Color, a rich, glossy red, mostly dark, sometimeslight, with numerous pretty well defined small grey dots. Flesh, whitish, tender, rather juicy, with a sprightly and rather fine subacid flavor. This apple will ship fairly—that is, it will injure, kut will be slow to show its injuries. It is in season the latter part of September and beginning of October.

The Victoria has had but a very limited trial compared with the other varieties we describe, yet we awarded it a special prize; and a specimen sent to Toronto for modelling in wax was so highly prized by those who there saw it as to cause immediate demand for scions. The tree is, to say the least, fairly hardy. What fruit we have seen is of marked beauty and good size, while its quality is by no means disappointing.

#### MOUNTAIN BEET.

Under this uneuphonious name there has been grown at Abbottsford an apple whose market value has been overlooked.

That this "Beet" is a native of our mountain slopes has been doubted by some, from the fact that Boston dealers seemed to recognize the fruit as the "Flesh and Blood" apple an apple occasionally found in their market. However, the "original" tree is at Abbottsford. It is still in good health and still bearing heavy crops in the orchard of Mr. Abraham Fisk, who remembers its being planted by his father 59 years ago, the nursling having been brought from the seed-bed of the late Joel Frizzle before the arts of budding and grafting were introduced. We may add, too, that suckers from this parent tree are in full bearing in several of our orchards, proving beyond all doubt its seedling origin.

The tree is a vigorous grower, and is more hardy and longlived than the Fameuse. It is a young and reliable bearer. In growth it is upright until fruiting impresses upon it a spreading and even drooping form.

The fruit is an oddity. It is above medium in size. In form, roundish to oblong conic. Skin, usually a dark, dull red. Flesh, white; but in two specimens out of every three stained to the very core like a blood beet,—hence its name. The flesh is tender, moderately juicy, sharp, refreshing acid, becoming subacid when fully ripe. It ships well for a September fruit.

As a "fancy" fruit this variety, at two different times, has taken well on the Boston market. Boston apple dealers, who sold it at \$5 per barrel, urge us to go into it, and we think we should.





Attention to this promising fruit was first called by Mr. Sydney Fisher in the second report of the Montreal Horticultural Society, page 82.

The "original" tree stands in the large seedling orchard of Mr. John Blunt, of West Bolton, planted 30 years ago. These trees Mr. Blunt raised in his own seed-bed, having obtained the seed from Mr. Austin Wheeler, who had in bearing at the time the Late Strawberry and other varieties—brought from the Spalding Nursery on Shefford Mountain, the grafts for which nursery were brought from New England.

The Blunt is without doubt a seedling of the Late Strawberry, which last variety is known in the County of Brome as Wheeler's Lawrence.

In nursery the Blunt is more "stocky" and vigorous than the Fameuse, is quite hardy, and is such a tree as nurserymen can readily find sale for. In orchard it is upright in growth, but opens from excessive fruiting, causing even a weeping habit of growth in this "stocky" tree. The growth, though less "brushy" than the Strawberry, needs a good deal of pruning, which pruning does not, however, seem to injure, showing proper maturity of wood. It bears every year, but heavily alternate, which are the "odd" years.

Fruit, large—on young trees very large. The parent tree, which has been in sod since planted, has borne specimens 14 inches in circumference. Skin, greenish yellow, mottled and splashed with red. Form, roundish. Flesh, yellowish, juicy, crisp, rather coarse, sprightly, subacid, good. It ripens evenly and keeps—let us be on the safe side and say—till March. Mr. Blunt has kept them till June 15th, yet from the texture of the fruit we judge that when barrelled and shipped its keeping would not average anything like so late a date.

Though large in size, the Blunt cannot command the same price as a bright, all-red apple; yet as a *late keeper* for home use and for local markets it promises to be of *real value*. We therefore awarded it, as in the case of the Victoria, a special prize.

The following were the varieties on exhibition :

Red Astrachan, Duchess of Oldenburg, Newbury Sweeting, Calville d'Eté, Fall Mellow, Peach (of Montreal), Gueule Noire, Cranberry, Alexander, St. Lawrence, Mountain Tulip, Mountain Beet, Reinette (of St. Hilaire), Golden Ball, Red Calville, White Calville (of St. Hilaire), Pound Sweeting, Late Strawberry, Wealthy, Fameuse, W. W. Calville (of Abbottsford), Blue Pearmain, Red Pearmain, Canada Baldwin, Talman's Sweet, Bourassa, Northern Spy, Pomme Grise, Pomme de Fer, Golden Russet (of W. N. Y.), and others—all of home growth.

From Captain Raynes, of Montreal, specimens of India Rareripe, Irish Peach, Strawberry (of Montreal), Early Joe, Monstrous Codlin and Kentish Fillbasket. From Mr. Imrie, Lord Suffield. From Mr. Morgan, Stump. Also from Montreal, Decarie, Fameuse Sucrée, Keswick Codlin, Blinkbonny and John Richardson.

From Missisquoi, of kinds not above named, Brunswicker (which we believe to be none other than Duchess), King of the Pippins, Black Gilliflower, Rhode Island Greening and Roxbury Russet.

Per Capt. Campbell, of St. Hilaire, Victoria, Elysar and others.

Per Mr. Sydney Fisher, of Knowlton, Blunt, Corey, &c.

From Dr. Hoskins, of Newport, Vt., specimens of Yellow Transparent (earliest known), White Wochins, Lubsk Queen, Magog Red Streak and Scott's Winter.

CRAB APPLES.—Montreal Beauty, Queen's Choice (which we claim to be none other than the Montreal Waxen), Transcendent, Soulard, Wheeler's Scarlet, Fall Stripe and Pringle Sweet (of Brome), Golden Sweet (of Wis.), Sweet Russet, Minnesota, Orange, Hesper Blush and Gen. Grant (of Minn.), Aikens, Striped Winter (of Iowa), Geneva (of Ill.).

For out-door Grapes the past season was most propitious, and the display such as was never before shown in this Province. There were upon the tables 56 plates and many homegrown bunches of marked beauty; but it is to Messrs. W. W. Smith, of Philipsburg, and to Jas. Morgan, jun., of Montreal, and to Judge Duncan, of Knowlton, that the laurels belong, and deservedly so, for they have taught us in one easy but not easily forgotten lesson what varied and luscious grapes may belong to the grape-grower even in this cold Province of Quebec.

On the evening of the exhibition the Fruit Committee commenced the important work of examination. The delight of finding in some new seedling points of passing merit is one that enthusiastic truit growers alone can conceive; but the testing of these grapes was unlike the current run of human labor. It was rather Edenic refreshment, and following the example of him who first wrought in Eden, the Committee obtained the necessary assistance of the ladies, who determined that such treats hereafter should be frequent and at their own firesides.

The extreme earliness of Champion, kindly sent by Mr. Decker of Montreal, who there grows it for market, drew much attention; as did the fine flavor of pulpless Adirondac and aromatic Crevelling; Delaware, too, always suggestive of the fragrance of the sweet pea; also the extreme delicacy of Allen's Hybrid and Rebecca, and the fine muscat flavor of Lindley.

The following were the kinds exhibited :

Champion, Janesville (of Wis.), Hartford Prolific, Adirondac, Crevelling, Telegraph, Sweetwater, Rebecca, Allen's Hybrid, Delaware, Rogers No. 33, Lindley (Rogers No. 9), Agawam (Rogers No. 15), Concord, Wilder (Rogers No. 4), Iona, Black Cluster (?), Diana, Diana Hamburgh, Royal Muscadine, Union Village and others. Also a grape of great promise from Mr. Morgan, of unknown name, and an Abbottsford wilding, sweet and good and suitable for covering arbors.

The display of Flowers was good, and the varied forms of floral designs showed much artistic merit and bore great credit to the ladies, who were the only competitors.

In Vegetables competition was strong and the assortment large and varied. In certain roots the blue clay flats excelled, while the lighter soils of our mountain slopes bore the palm in all else.

#### FINIS.

We have now a central society, the Montreal Horticultural —local in name yet provincial in work. In the past Montreal horticulture has without doubt been greatly stimulated by her local society. The Society's new plan of work will still more intensify her local influence—will more widely diffuse her use-

Those who shall attend her exhibits may profit by fulness. the many lessons which such exhibits have to teach, while others can profit by such horticultural reports as she may rublish or procure, and such scions as she may obtain for the purposes of experimenting. Such work is not merely useful, it is necessary to fair progress. Yet exhibitions are apt to be useful to different localities in inverse proportion to their distance. The Montreal Horticultural, however liberal in her expenditure, however energetically she may carry out her wellthought plans, can never really reach the horticultural needs of the Province. To make out lists of fruit "for home use" and "for profit" for different localities, to gather provincial collections of fruit, and other works clearly within her present scope, she must have the co-operation of local associations As an association we have done some good work. We published the first report on fruit the Province ever had. We have been persistent experimenters with such fruits, whether of native or foreign origin, as seemed of special promise. We have gathered a collection of fruit which has caused a "fruit fever" throughout this part of the country. What local work we have done other fruit-growing localities may do if they will. Local horticultural societies are our great and pressing want. We have proved them to be possible-we have proved their use-we have shown their need.

MONTREAL : "WITNESS" PRINTING HOUSE, BONAVENTURE ST.