

ANNUAL REPORT
OF THE
POMOLOGICAL
AND
FRUIT GROWERS SOCIETY
OF THE
PROVINCE OF QUEBEC

1899.

PRINTED BY
CHAS. PAGEAU, Printer to the Queen,
QUEBEC, 1900.

HON. SIR HENRY JOLY DE

HON. SYDNEY FISHER....

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AUGUSTA DUPUIS.....

CECIL P. NEWMAN.....

DR. N. W. WOOD.....

W. W. DUNLOP.....

District No. 1—W. M. PAT

“ “ 2—J. M. FISK

“ “ 3—J. H. CART

“ “ 4—Dr. BOLDU

“ “ 5—J. C. CHAP

“ “ 6—R. HAMILT

“ “ 7—W. TREMB

“ “ 8—R. W. SHE

“ “ 9—R. BRODIE

LIST OF OFFICERS FOR 1899.

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LIST OF MEMBERS, 1899.

HONORARY.

Charles Baltet.....Noyes, France

ANNUAL.

Buzzell, G. W.....	Abbotsford
Bamford, W.....	Lachute
Bourque, Curé C. F.....	St. Alexandre
Brodie, R.....	St. Henri
Bain, S. S.....	Montreal
Chapais, J. C.....	St. Denis
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Carter, J. N.....	Massawippi
Cox, Carlos.....	"
Craig, W., Jr.....	Abbotsford
Dupuis, A.....	Village des Aulnaies
Davies, G. E.....	Stanbridge East
Duggan, E.....	Murray Bay
Douth, Curé L. E.....	St. Leonard d'Aston
Decarie, B. T.....	Notre Dame de Grace
Dunlop, W. W.....	Outremont
Evans, A. A.....	Kingsey
Ewing, W.....	Montreal
Fisk, Charles.....	Abbotsford
Fisk, J. M.....	"
Fraser, John.....	Coaticook
Fraser, Rev. James.....	Cushing
FitzGibbon, R.....	Montreal
Gobeille, Rev. P.....	West Farnham
Glass, C. G.....	Montreal
Greenshields, J. N.....	"
Gareau, J. J.....	St. Roch l'Achigan
Grignon, Dr. W.....	St. Adele
Gibb, J. J.....	Como

Herrick, J. E. R.....
 Hardy, E.....
 Hamilton, R.....
 Horsey, Rev. H. E.....
 Heatly, W.....
 Hampson, R.....

Jack, W. E.....
 Johnston, Asa A.....

Kayan, B. H.....

Macaulay, T. R.....
 Murdoch, Geo.....
 Middleton, John.....
 Moreau, Dr. H.....

McGibbon, D. D.....

Orr, W. M.....

Pattison, W. Mead.....
 Parkes, T.....
 Price, H. M.....

Rowell, W. L.....
 Rugg, W. N.....
 Robinson, R.....
 Ramsay, W. M.....

Stevens, S.....
 Simpson, Mrs. G. W.....
 Stevenson, J. B.....
 Savard, M.....
 St. Pierre, G. H.....
 Stewart, Allan.....
 Smith, Malcolm.....
 Shepherd, R. W.....

Tomkins, E. F.....

Wurtle, Gilbert.....
 Wonham, W. R.....
 Westover, D.....
 Wood, F. F.....
 Wood, Dr. H. W.....
 Wilkinson, G. H.....
 Whyte, R. B.....
 Whitehead, Mrs. C.....

Herrick, J. E. R.....	Abbotsford
Hardy, E.....	St. Anne de la Parade.
Hamilton, R.....	Grenville
Horsey, Rev. H. E.....	Abbotsford
Heatly, W.....	Stonefield
Hampson, R.....	Montreal
Jack, W. E.....	Chateauguay Basin
Johnston, Asa A.....	Cowansville
Kayan, B. H.....	Massawippi
Macaulay, T. R.....	Montreal
Murdoch, Geo.....	Brownsburg
Middleton, John.....	Point Fortune
Moreau, Dr. H.....	St. Johns
McGibbon, D. D.....	Brownsburg
Orr, W. M.....	Fruitland, Ont
Pattison, W. Mead.....	Clarenceville
Parkes, T.....	Montreal
Price, H. M.....	Montmorency
Rowell, W. L.....	Ayers Flats
Rugg, W. N.....	Compton
Robinson, R.....	St. Amedee
Ramsay, W. M.....	Montreal
Stevens, S.....	Stanstead
Simpson, Mrs. G. W.....	Montreal
Stevenson, J. B.....	"
Savard, M.....	Les Ecureuils
St. Pierre, G. H.....	Coaticook
Stewart, Allan.....	Brownsburg
Smith, Malcolm.....	Lachute
Shepherd, R. W.....	Montreal
Tomkins, E. F.....	Coaticook
Wurtle, Gilbert.....	Como
Wonham, W. R.....	Montreal
Westover, D.....	Frelighsburg
Wood, F. F.....	Dunham
Wood, Dr. H. W.....	St. Johns
Wilkinson, G. H.....	"
Whyte, R. B.....	Ottawa
Whitehead, Mrs. C. R.....	Montmorency

FINANCIAL STATEMENT OF THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF THE
PROVINCE OF QUEBEC FOR THE YEARS 1898, 1899.

1898.

RECEIPTS

Cash on hand 31st Dec., 1897	-	-	-	-	\$533.70
Members' subscriptions	-	-	-	-	93.00
Government grant	-	.	-	-	500.00
					\$1126.70

EXPENDITURE

Directors' expenses, etc., attending meetings	-	-	-	-	217.13
Reporting meetings	-	-	-	-	100.00
Stationery and printing	-	-	-	-	25.95
Postage, express and telegrams	-	-	-	-	45.35
Plants for distribution	-	-	-	-	40.55
Secretary	-	-	-	-	100.00
Balance cash on hand	-	-	-	-	597.72
					1166.70

1899.

Cash on hand 31st Dec., 1898	-	-	-	-	597.72
Members' subscriptions	-	-	-	-	69.00
Government grant	-	-	-	-	500.00
					1166.72

EXPENDITURE

Directors' expenses etc., attending meetings	-	-	-	-	275.18
Reporting meetings	-	-	-	-	90.00
Stationery and printing	-	-	-	-	6.00
Postage, express and telegrams	-	.	-	-	39.90
Plants for distribution	-	-	-	-	21.60
Secretary	-	-	-	-	100.00
Balance cash on hand	-	-	-	-	634.04
					1126.72

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THE POMOLOGICAL

PROCEEDINGS

The Sixth Annual Meeting, held at Montreal, on January 1st, 1898, was successful in the history of the papers presented.

Mr. A. Dupuis, the President, presided in the proceedings, but in his absence, the chair was taken by Mr. Lachine. There were a number of papers read; R. Brodie, St. Henri; J. C. Chapais, Quebec; W. M. Orr, Vice-President; W. M. Orr, Montebello, and Prof. John Craig, late of Iowa Agricultural College, horticulturist, of the Ontario Agricultural College. Mr. Charles Fisk, Mr. R. Hamilton, Grenville; Asa Johnson, Cowansville; Neiges; S. S. Bain and C. P. Newman, Westmount.

Mr. Newman briefly reported on the work done, then read Mr. Dupuis's address.

Gentlemen of the Pomological Society:

I am happy to meet you here. Much has been made this year in fruit raising and the productiveness of new varieties.

Have your efforts been successful? The good old standard varieties have been raised for ten years or more have shown signs of improvement.

Has last year been particularly successful? All the species and varieties raised last year have shown signs of improvement.

THE POMOLOGICAL AND FRUIT-GROWING SOCIETY

OF THE

Province of Quebec.

The Sixth Annual Meeting of the Society was held at the Karn Hall, Montreal, on January 31st and February 1st, 1899, and proved one of the most successful in the history of the Society, both in the attendance and the quality of the papers presented.

Mr. A. Dupuis, the President, had come up from L'Islet county to take part in the proceedings, but he was unfortunately taken ill after arriving in the city. In his absence, the chair was taken by the Vice-President, Mr. C. P. Newman, of Lachine. There were also present Mr. W. W. Dunlop, of Outremont, the Secretary; R. Brodie, St. Henri; R. W. Shepherd, Como; J. H. Carter, Massawippi; J. C. Chapais, Quebec; and J. M. Fisk, Abbotsford, members of the executive; W. M. Orr, Vice-President of the Ontario Fruit-Growers' Association; Senators Owens, Montebello, and O'Brien, Montreal; Prof. Waugh, of Burlington, Vt.; Prof. John Craig, late of the Dominion Experimental Farm, and now of the Iowa Agricultural College; Dr. Saunders, director, and Mr. W. T. Macoun, horticulturist, of the Ottawa Experimental Farm; Mr. Percy Selwyn, Ottawa; Mr. Charles Fisk, Mr. W. Craig, jr., and J. E. R. Herrick, of Abbotsford; R. Hamilton, Grenville; N. Boulter, Chateauguay; Dr. Wood, St. Johns; Asa Johnson, Cowansville; Jas Robson, Outremont; Jas. Swail, Cote de Neiges; S. S. Bain and W. Ewing, Montreal; Gilbert Wintle, Como; James Smith, Westmount.

Mr. Newman briefly expressed his regret at the President's absence, and then read Mr. Dupuis's address as follows:

Gentlemen of the Pomological Society and Fruit Growers' Association:

I am happy to meet you again, and to hear from you what progress has been made this year in fruit-growing, in testing, and ascertaining the hardiness and productiveness of new varieties of fruit and their market value.

Have your efforts been successful in bringing back to vigor and fecundity the good old standard varieties of apples, plums and cherries, which for the last ten years or more have shown signs of decrepitude?

Has last year been prosperous, and what has been the best paying crop of all the species and varieties of fruit you cultivate?

Can you recommend a better grape than the Champion, equally hardy and as early?

Last season the delicious Fameuse apple, through good culture and spraying, was very fine. In the eastern part of the Province the crop was lighter than in 1896, but there was more money in it.

The choice sold at \$3.50 per barrel, and seconds \$1.50 to \$2.00 per barrel; Duchess sold at \$2.50 per barrel.

The crop was extra good. More money was realized per tree of the Duchess than of the Fameuse.

Red Astrachan were fine and large, but not more than one-eighth of a crop and like the Golden Russets and St. Lawrence, the trees have hardly recuperated from the effects of the winter of 1896-97.

The Tetofsky bore abundantly, and sold at 75c. a bushel, even before maturity.

The crop of Wealthy and Alexander was medium, but the apples were so bright and attractive that they even sold at \$3.00 to \$3.50 per barrel.

Crab apples were in abundance. The price ranged from \$1.50 to \$2.00.

Caterpillars and other insects did not injure the trees in the orchards that were sprayed, and the leaves were of a dark green. Some rust appeared in the Fameuse orchards where the trees are too near each other.

THE PLUM

Crop so abundant last season in the west and around Montreal, was medium in Montmagny and Kamouraska districts, and was very light on the Island of Orleans.

Blue Damsons and Reine Claude de Montmorency brought at the orchards an average of \$6 per barrel.

Quebec fruit dealers who stored these plums in refrigerators, speculating on an advance in price, were greatly disappointed. The plums had been gathered and packed too green, they must have been heated before being placed in cold storage and decayed. The loss was considerable.

The two varieties of plums were gathered ten or fifteen days later in some orchards, being just ripe they were shipped in baskets and were sold 40 cents a gallon.

Amongst the foreign varieties the Green Gage, Lombard, Pond's Seedling, R. Claude de Bavay gave good crops and sold at 50 cents a gallon.

CHERRIES.

This delicious fruit, specially the old Cerise de France, was most abundant in the few orchards of L'Islet Co., where the black knot has been destroyed. The fruit was easily sold at 15 cents per small strawberry basket.

Is it not regrettable that means well known cherry orchard, who

Some orchards every second year. fair return, though the price every family in

This Society, which and the large class of replanting of cherry

If this fruit does not its culture would, however birds have not been themselves with chok

In advocating cherry what I mean. I will Archbold wrote twenty Society.

"I am sorry to neglected for many years growing, I had as many have passed away. I generally about Montreal. There are good seedlings by taking them up and would be fit for finally

Mr. Archbold also Washington, Pond's Seedling and were equal in hard suggestions of Mr. Archbold varieties of plums grown which are seedlings of contributed all over the Province Montreal and Quebec cherry your door.

The people want the Ontario and California.

Thousands of bushels of the citizens' money spent packers and foreign exporters

The plums imported they are dry, without s

Is it not regretful to see the cherry orchards disappear, when there are means well known to save the trees. Not long ago every homestead had its cherry orchard, whose fruit was much enjoyed by young and old.

Some orchards in my neighborhood produced then each 50 to 60 bushels every second year. Not a tree is left of these small plantations, which gave a fair return, though the average price was only about \$1 a bushel. At this low price every family in cities and towns could afford to buy this good fruit,

This Society, which views broadly all questions interesting the fruit growers and the large class of consumers, should I believe encourage by all means the replanting of cherry orchards.

If this fruit does not pay around Montreal on account of the cunning city birds, its culture would, however, be profitable to farmers at a distance, where the birds have not been brought up in luxury and refinement, and who content themselves with choke cherries, worms and caterpillars.

In advocating cherry and plum culture, in bad English, you have to guess what I mean. I will therefore recall to your memory and cite what Mr. John Archbold wrote twenty-two years ago in his report to the Montreal Horticultural Society.

"I am sorry to say that the cultivation of the Plum has been sadly neglected for many years past about Montreal. In the palmy days of plum growing, I had as many as 43 varieties in cultivation, but I fear many of them have passed away. I would recommend that the plum should be planted more generally about Montreal, if only a few every year to keep up a succession. There are good seedling plums in the vicinity that can be grown from suckers by taking them up and transplanting them; two years in nursery rows they would be fit for finally planting in the orchard."

Mr. Archbold also mentioned that the Green Gage, Lombard, Bradshaw, Washington, Pond's Seedling, L. Golden Gage, were amongst the old favorites and were equal in hardiness. I know that some of you have followed the wise suggestions of Mr. Archbold. I had the pleasure to see samples of a great many varieties of plums grown by Messrs Brodie, Dunlop and Shepherd, many of which are seedlings of great promise, which should be propagated and distributed all over the Province, but I learn also that few proprietors around Montreal and Quebec cultivate this fruit, for which you have the best market at your door.

The people want this fruit, and not being able to get it here, import it from Ontario and California.

Thousands of bushels come from the Pacific Coast and thousands of dollars of the citizens' money serve to enrich foreign orchardists, Chinese pickers and packers and foreign express and railroad corporations.

The plums imported are attractive by their size, color and neat packing, but they are dry, without sweetness or flavor.

Everyone admits that they cannot be compared to the sweet, juicy and delicately flavored plums which have been and are still grown in this Province but in too small quantity for the increasing demand.

I humbly suggest that we should discuss at this meeting, the best means of giving an impulse to plum culture in this Province.

Honorable Mr. Dechene desires that good seedling plums should be fairly tried at the Fruit Stations. Honorable Mr. Fisher, who has also proved his devotedness in favor of the tillers of the soil, would no doubt help the orchardists by a liberal distribution of good plants.

The Federal Government, who by ability and economy shows so large a surplus over expenditure this year, would not hesitate to come to our help if requested by this Society.

Prominent orchardists of this Province have no objection to the advantages afforded to the consumers by the actual tariff on foreign fruit, but they have the right to demand the Government's help to foster fruit growing on our soil, and particularly plum culture, which received a great check in the disastrous winter 1896-97.

The gooseberry and currant crops were the best for many years. The Downing gooseberry, which is the most common east of Montreal, sold from 15c to 30c a gallon. A preserve factory in Smith St., St. Roch, Quebec, used a very large quantity.

Red and white currants sold so low that it did not pay to pick the fruit.

Caraway seed was abundant, but few gathered it. Formerly, and before the ex-Government put this seed on the free list, tons of it were shipped from our districts to the spice factories at a fair price. They now import the seed.

Last summer I had the advantage of visiting the fine apple orchard of Mr. Wm. Tremblay, on the shores of the Saguenay River at Chicoutimi, where the cold is very intense, reaching 40° and even 42° below zero. I lay before you Mr. Tremblay's report, showing the varieties that have failed and those that have endured such extreme cold.

Mr. Tremblay's experiments and success are invaluable, showing how far north apple culture is possible.

Mr. H. Johnson's experiments in fruit culture at Black Cape, near Paspebiac (the new winter port of the St. Lawrence), are described in the report submitted to you. In October last I was astonished to see that such heavy crops of apples could be grown in that region.

The Quebec Government has established five Fruit Experimental Stations and I lay before you my report on the work done at these stations. The advice of the Society is solicited, so that these stations will realize the benefit to the public which you anticipated.

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I have mentioned in my report that this Society desires that the Government establish stations in this Western part of the province, to be managed by specialists in fruit culture, and who have already valuable experience and whose reports would benefit the fruit growers of the province. This plan was proposed by this Society last winter.

At the Provincial Quebec Exhibition this fall, a very large collection of apples was exhibited, which attracted greatly the attention of the crowd of visitors.

Such a large collection of beautiful apples had never been exhibited in Quebec. It was the product of the renowned orchards of a most worthy member of this Society, Mr. R. Hamilton of Argenteuil County.

This exhibit was not for competition but for the instruction of the people, who could hardly believe that such fine large fruit could be grown in this province. Mr. Hamilton stayed there during a week, answering with his usual courtesy all questions on fruit culture. I consider, gentlemen, that Mr. Hamilton gave the most instructive conference ever enjoyed by farmers of the eastern part of this province.

I would not be surprised if one hundred, may be one thousand, farmers, at the sight of these fruits, have been induced to plant orchards.

Was Mr. Hamilton compensated for the trouble of selecting his best fruits, for taking them down to Quebec, for making the installation, and for showing to the people the most reliable varieties for the North?

Not a cent of compensation was given him. He expected no more than you expect to-day. His reward is the satisfaction of being useful to his fellow citizens.

The report of L'Islet Co. Horticultural Society, which is submitted to you, will show you that the Society bought and distributed last spring, to its members, over 3,000 apple and plum trees, 5 to 6 feet in height, and held besides a fruit and flower show. The Society is progressing, guided by the work of the Pomological Society whose members have made costly experiments and serious observations, the results of which you come and give true reports to the public in view of making of this province a fruit country, that will in the near future rely no more on foreign fruits.

Your generous efforts are highly commended by the people, by the Government and by the powerful press of the country. For my part as a beneficiary I tender you my best compliments and most sincere thanks.

SOME OBSERVATIONS AT CORNELL UNIVERSITY.

BY NORMAN E. JACK.

Although this subject may not seem to be one of interest to pomologists, it is evolved from a sentence at one of our fruit growers meetings, when the remark was passed that "young men educated at agricultural colleges did not make good farmers." It seemed a libel on our Canadian college at Guelph, and on the grand cosmopolitan college at Cornell, and I answered with, perhaps, more zeal than prudence that the fault might be in the man and not in the college.

Since coming here I am more than ever of the opinion that in horticulture, as well as in all branches of agriculture, it pays to work on scientific principles. It is not so much that Cornell University is beautifully situated on a hill that overlooks Lake Cayuga; that its buildings are of excellent architecture and its endowments liberal, but the principal fact is, that its teachers are earnest thinkers and practical workers, and every effort is put forth to teach the students to be upright, honest citizens. The grounds are planted with a great variety of ornamental shrubs and trees; many that are too tender for our climate seem to thrive here and show sturdy growth, and all about in private grounds are trees of all the northern fruits, that grow on the edge of the sidewalk, and often the fruit lies on the ground unpicked; it is so plentiful as to be no temptation. Demonstration lessons in every department are practical and useful; the students of the horticultural department being chiefly farmers' sons seeking for knowledge in their calling, and for better methods. The study of injurious insects and best methods of spraying is interesting to those of us who have been fighting these enemies, without exactly knowing what we were about, and how to go about the work of extermination. The class are sometimes taken to a lecture on the grounds of some of the finest residences in the town, when they can see the working of private greenhouses and how managed. But one thing was noticeable, there is not to be seen an apple like the Fameuse when its cheek is clear of the unsightly spot that causes us so much trouble.

The founder of this institution, Ezra Cornell, made this remark: "I would found an institution where any person can find instruction *in any study*." It is this fact that makes it different from other colleges. "*In any study*." So that the fruit grower and florist, the grower of vegetables, out of door and under glass, can have the best instruction in the best methods.

When I think of McGill, with its splendid endowments, its citizens so liberal in encouraging art and science, its building for mining, for electricity and its woman's building, I feel that there is still a lack, when no one has come forward to help the sons and daughters of the farmers, and horticulturists—an institution where my father's son can find instruction in his chosen calling as well as taking his choice of the professions that are taught there. For if a farmer sends his son to college, he must choose his lot away from his father's noble work, and in this way the science and best methods are never learned; and all through the province it is supposed that if you want an orchard you

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There is no thought of study and research, of analysis of the soil and thorough drainage. Plant the tree and "le bon Dieu" will do the rest.

These thoughts come to mind when one sees the care taken here to experiment in every way with the fruits, and to teach the students enough of chemistry to be able to ascertain of what elements soil is composed. And may the day soon come when the agricultural and horticultural building will stand out among the others at McGill, and farmers' sons be able to learn what they require at home, without being dependent on the generosity of Ezra Cornell.

No article with this heading would be complete without a mention of the Lazy Club, that is known among horticulturists for its free spontaneous efforts to talk over subjects that come to hand, so as to bring them into touch with the students. Its weekly meeting is never postponed on account of the weather, but no one is asked to attend, there is no constitution or by-laws, no fees, no officers, but it is by all odds the most useful club in the University. Professor Bailey gives and takes with those who attend. He is full of horticultural enthusiasm, and imparts it to his class. But our province cannot take a first place in the grand work of horticulture unless there are teachers and methods of teaching that will bring us to the front by the excellence of their experience, and their practical working.

"THE FRUIT AND DAIRYING INTERESTS COMBINED"

BY J. M. FISK.

Agriculture is a broad question, and like a gigantic tree spreads its branches to the four corners of the earth; and as all our wearing apparel, as well as the food we eat, (except that which is taken from the waters) comes directly, or indirectly from Mother Earth, there are necessarily opened various avenues and special lines of cultivation, in order to provide for the daily necessities and caprice of man.

When one stops to contemplate these facts, there opens to all appearance an unlimited scope for the farmer to choose what special branch, or line, of agriculture he will follow in order to succeed, for success is the ultimate aim of us all, no matter what our calling; and there is no profession in which common sense and good judgment counts for more than it does in farming.

The climatic influence and geographical position of a man's farm, as well as the nature of the soil and surrounding commercial advantages, should determine what special line, if any, is to be followed.

It is generally conceded that the most profitable grain growing belts of the Dominion lie to the west; and that the homes of the great wheat and corn producers belong to the western portion, while we of the eastern part, can do no better than follow a line of mixed farming, keeping well to the front the fruit and dairying interests, which are well adapted to most parts of this province, and especially to the Eastern Townships.

The farmer who has naturally well drained lands can make no mistake in planting out a good orchard; and a commercial orchard should not contain too many varieties, but consist of the best summer, fall and winter varieties which are known to succeed in his immediate neighbourhood; always (other things being equal) giving preference to the red varieties, as they show bruises less, and have a greater commercial value; for example, such as our Fameuse which is the best commercial apple grown in the Province of Quebec; and now that spraying has come to stay, this old and popular variety is likely to hold its own against all comers, and be reinstated.

No part of the farm pays better than a well managed orchard, and can often be worked to advantage with a good dairy, as the two industries have much in common; requiring the same special care in production, and the same cold storage and shipping facilities in order to reach the markets in perfect condition.

The corn fodder, so essential to the dairy cow, can often be grown on the same ground as the orchard, and the manure collected from the cow and porker will go a long way to keep up the fertility of the orchard by liberal dressings. Orchardists living near the city can usually get plenty of manure for the hauling, or in any case, at a small cost compared with those in the country, who often have to "rob Peter to pay Paul" or, in other words, to stint one field in order to do justice to another; but the dairying question is helping many a farmer in this respect, especially when engaged in winter dairying, as he is enabled to keep more pigs in order to use the skimmilk; and as he necessarily feeds more grain and meal to both pigs and cows than formerly, the manure pit is nearly doubled in size and quality.

The dairying and fruit interests of to-day in Eastern Canada are the farmer's special lines, and have assumed such proportions that it is from these sources that they derive the best returns for their labor; and every effort should be made in order to increase the quantity, as well as improve the quality, of these products, for we are told England will take all we have to spare and pay a good price for it.

Nature has given us all she can in the way of climate, pure water, good grazing and farming lands, which are occupied by an industrious people. We beat the world in dairy products in 1893 at Chicago during the World's Fair, and yet these products, especially our butter, do not lead in the English markets.

The apple, which is acknowledged to be the king of fruits, grows in no part of the world to greater perfection than it does in Eastern Canada, rivaling the world in color and quality.

The Englishman fruit as arriving in low price. Something producer, or packer, dard for quality, and fiscate every package due to the middle agencies. If due to is the *bête noir*, for very roughly, especially of legislation be ma

Thanks to the G the steamers are fitted in the shape of cold the Atlantic; and the as to how to produce another matter to keep class condition.

Mr. Brodie—Do grass?

Mr. Fisk—So long age I should have the

Mr. Macoun—This year I have adopted t vating, as we have do soil, which is a shifting the roots and leaving tion in the orchard, k cultivated continuously

Mr. Orr—This qu Society for many year opposed to cultivation cultivate, taking year

Mr. Fisk—I would ping their fruit. Was

Mr. Orr—I think apples have been entire taste of the English pe

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The Englishman recognizes this fact, while the English trade often reports fruit as arriving in bad condition, there being many "slacks," which sell at a low price. Something is wrong; where is the trouble? If it is owing to the producer, or packer, then, for export purposes, let us by all means have a standard for quality, and a government inspector at the port of landing; and confiscate every package of fruit or dairy product that is not up to the mark. If due to the middle man, then put him aside and deal direct with responsible agencies. If due to the transport companies (and here, to a great extent I fear, is the *bête noir*, for the employees of the railway companies often handle fruit very roughly, especially in small consignments); let some provision in the way of legislation be made to meet this difficulty.

Thanks to the Government we have better ocean accommodations, as many of the steamers are fitted up with cold storage compartments, but more is required in the shape of cold storage warehouses, and refrigerating cars on both sides of the Atlantic; and there is much to learn yet, by both fruit grower and dairyman, as to how to produce at the least cost a first class article; and then, it is quite another matter to know how to place it on the markets of the world in first class condition.

Mr. Brodie—Do you believe in having an orchard cultivated, or under grass?

Mr. Fisk—So long as they are young I should cultivate, but after a certain age I should have them under grass.

Mr. Macoun—There should be no hard and fast rule about cultivating. This year I have adopted the plan of leaving our orchard in clover instead of cultivating, as we have done several years. I have come to the conclusion that our soil, which is a shifting sand, is better covered, to prevent it moving from the roots and leaving them subject to winter kill. I am going to practice rotation in the orchard, keep part in clover and part cultivate, but never keep it cultivated continuously, though I think some soils should be cultivated altogether.

Mr. Orr—This question has been discussed by the New York Horticultural Society for many years, and at the meeting held last week those who were opposed to cultivation quite gave up. They thought it more advantageous to cultivate, taking year in and year out.

Mr. Fisk—I would like to ask Mr. Orr what was their experience in shipping their fruit. Was it more of a success than the year before?

Mr. Orr—I think it has been rather better than the year before. Pears and apples have been entirely satisfactory, but our grapes did not seem to suit the taste of the English people.

Mr. Chapais drew attention to the following passage in Mr. Tremblay's letter, submitted by the President:—"Many varieties of apples can stand 40° below zero, provided that the trees are well protected about the roots, and that the earth has been frozen to a depth of 4 or 5 inches round each tree. In this

way the roots are not exposed to the sun in early spring and the sap cannot mount. When there is no sap in the tree, there is little fear of the effects of frost."

Mr. Moore—Does Mr. Tremblay allow his trees to be frozen in the fall before putting a mulch on?

Mr. Chapais—Yes, so as to prevent the sap flowing too early in the spring.

Mr. Brodie—I put a mulch on in December to prevent the trees blossoming too early.

Mr. Chapais—I think there is something in it, because I always cover my strawberries when the frost is in for about six inches deep. I cover them with straw and spruce boughs, and take it off in the spring after the last frost. It has been very successful. In 1890, I was the only one below Quebec who saved his strawberries. It shows there is something in preventing the thawing of the ground too early, and I suppose it is the same for fruit trees.

Professor Craig—It must be remembered that in the case of strawberries the mulch covers the entire plant. In the case of a tree it only covers the root. I do not think it is possible to make a difference of one day in the blossoming period of fruit trees by mulching the roots.

Mr. Chapais—Do you not think that in such a winter as 1896-7 it would prevent the ground from thawing and allowing the sap to go up the tree?

Prof. Craig—It might prevent freezing and thawing, but the buds would respond to the temperature if the roots were frozen.

Mr. Shepherd—Whether it retards the blossoming of fruit trees is a question, but undoubtedly mulching the ground will preserve the roots in such a winter as 1896-7. To my mind it was clearly demonstrated in Mr. Brodie's orchard, which I examined in the summer of 1897. He had his Fameuse in cultivated land and he lost nearly all of them. Part of the same field was in sod; there he had a fine crop of fruit and the trees were not injured. This proves that the sod is a great protection, and a mulch is the same thing.

Mr. Chapais—In the same winter I had some trees in the eastern part of my orchard, which was covered with snow and ice, and were not thawed. Those trees are all right, while the rest were killed.

Mr. Fisk—A great deal depends upon the site of the orchard. In planting, it is better to select northern and eastern than southern and western slopes. The cold winds preserve the fruit, and the trees are not so subject to thawing and freezing as in a southern exposure.

Mr. Chapais—That is my experience.

Mr. Orr—Twenty-three years ago, I went into fruit growing, and by the advice of the members of the Association I planted about four acres on a north-

ern slope with peaches. The trees were still on the ground, but the ground will not hold the blossoms.

Mr. Chapais—I think the heat start the blossoms.

Prof. Craig—Yes, the trees are frozen solid.

Mr. Orr—Certainly.

Mr. Macoun—Yes, the trees are still frozen.

Mr. Fisk—But the trees are still frozen.

Prof. Craig—I think the freezing and thawing of the trees is a sure preferable. The bark splitting is a very serious matter.

Mr. Macoun—Is it?

Mr. Chapais—No.

Mr. Brodie—Do you think the trees are subject to sun scald or frost scald?

Mr. Fisk—Is not the trees subject to sun scald?

Mr. Brodie—No.

Mr. Macoun—Do you think the trees are as a remedy for sun scald in peaches. It is a good remedy for the sap from the trunk.

Prof. Craig—I think the trees are exceedingly reasonable. I obtained at the Mississauga white wash reflects the trees some days. It is a good remedy for the sap from the trunk.

Prof. Waugh—A good remedy for the sap from the trunk. If the tops are cut off, the trees are naturally the better.

Mr. Chapais—We have the branches.

Prof. Waugh—In the greatest difficulties the trees are if he made his tops as

ern slope with peaches. I have seen those peach trees in bloom while the snow was still on the ground. I agree with Prof. Craig that keeping the roots frozen will not hold the bloom back one day.

Mr. Chapais—If a vine were in a greenhouse with the roots outside, would the heat start the buds?

Prof. Craig—Yes, it would have leaves and blossoms while the roots were frozen solid.

Mr. Orr—Certainly.

Mr. Macoun—You will find the native melons in bloom while the ground is still frozen.

Mr. Fisk—But will a northern exposure prevent bark splitting and bleeding?

Prof. Craig—I quite agree with you as to the injurious effects of alternate freezing and thawing, and on that account, I think northern and eastern exposures preferable. That is the experience of fruit growers in the west, where bark splitting is a very serious matter.

Mr. Macoun—Is Mr. Chapais much troubled with sun scald?

Mr. Chapais—No, and I think it is because of the northern exposure.

Mr. Brodie—Don't you think there are certain varieties of apples more subject to sun scald than others? I cannot grow Canada Baldwin at all because of sun scald.

Mr. Fisk—Is not the Ben Davis affected?

Mr. Brodie—No, not seriously; perhaps an occasional tree.

Mr. Macoun—Does Mr. Craig know anything of whitewashing the trunk as a remedy for sun scald? It is successful in holding back the blossoming period in peaches. It might be successful in preventing the flowing out of the sap from the trunk.

Prof. Craig—I do not know of any definite experiments, but it sounds exceedingly reasonable. I suppose you know of the very striking results obtained at the Missouri Experimental Station with respect to peaches. The whitewash reflects the sun instead of absorbing it and holds back the blossoming period some days. It would be an interesting line of experiment to follow out.

Prof. Waugh—A great deal depends on the amount of trunk you expose to the sun. If the tops are 8 or 10 feet high, the trees stand over and catch the sun, and naturally they suffer from sun scald.

Mr. Chapais—We keep our trees very low, so that the snow almost touches the branches.

Prof. Waugh—In the Kansas-Missouri district, where sun scald is one of the greatest difficulties they have to contend with, they would think a man crazy if he made his tops as high as I have sometimes seen them in New England.

Mr. Macoun—Is there any objection to sloping the trees at an angle?

Prof. Waugh—I do not see any objection to it, though I do not think it accomplishes anything. It depends more upon the way trees grow during the first four or five years than upon the way they are set; and the way they grow is regulated by pruning.

Mr. Brodie—Do you believe in staking?

Prof. Waugh—Yes, if you cannot hold the tree in any other way; but I do not care for that sort of tree.

Mr. Fisk—Trees are kept high for two reasons—in order to cultivate the land round the tree, and for spraying.

Prof. Waugh—Why don't you spray from the top?

Mr. Fisk—If you have sheep and hogs pasturing, you must have the fruit out of their reach.

Mr. Shepherd—There are extremes in all cases, and around Montreal I think they have the trees too high. I think about 3½ feet is a good medium height. But a man must be governed by the conditions under which he is labouring. Some varieties are affected by sun scald, and must be moderately low branched for protection, I have often wondered whether it would be a good idea to nail a board on the south-western side of the trunk.

Mr. Newman—My experience is against too high tops. The wind gets a great leverage, and if the tree leans to the north it is hard to make it healthy. I should make the tops as low as possible, according to the variety. With the Yellow Transparent you can begin at 1½ feet, and bring the young tree into bearing much quicker than with a high top.

Mr. Brodie—I believe in having trees low set, though it is awkward when the branches interlace on account of them having been planted too closely. I have had Fameuse trees give me 4 or 5 bushels when low set. If they were high set I should not have as many apples. I think 4 feet is about right.

Mr. Fisk—Yes, 3½ to 4 feet.

Prof. Waugh—I do not think the tree can be started too low, and you can trim it in the later life of the orchard, though of course you cannot cut off many large branches. As to spraying, it is not a question of spraying inside, but outside, where the blossoms come and the fruit is borne.

Mr. Shepherd—There is no doubt that since spraying came in, it is necessary to plant our trees further apart. I do not think 35 feet is too much.

Prof. Craig—I do not quite agree with Prof. Waugh. Some varieties are spoiled if you start too low and prune afterwards. I think a medium course is the best to pursue.

Mr. Orr—Do you think trees set 25, 30 or 35 feet apart would yield most fruit?

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Prof. Craig—It depends upon the locality. In Quebec I should say 35 feet would yield a maximum profit, and lower down the St. Lawrence, where Mr. Chapais is, you might put it at 40. In Ontario, say Essex County, 25 feet would probably yield more than 35 feet, and in the Annapolis Valley, N.S., I would say 25 feet for Gravenstein, Northern Spy and Greening.

Before the morning session ended, Mr. Fisk urged that the report should be got out earlier, and suggested that an arrangement might be made with the Ontario society to get their reports. The secretary said the last report was in the hands of the printer and ought to be out in another month.

Mr. Orr said the Ontario society would be glad to arrange to let the members have the *Horticulturist* on favorable terms. He would be pleased to bring the matter before the executive and advise them of the result.

AFTERNOON SESSION.

RECENTLY TRIED RUSSIAN APPLES

BY R. HAMILTON.

Amongst the best of the recently tested Russian apples, I would enumerate the following and attest their value, if not for extensive planting, at least for careful trial.

Taking them alphabetically, so as to avoid the appearance of recommending any one of them as specially ahead of the others, we have first:

The Amtmann.—This is a very large, late fall apple of fine quality, and seems to be almost identical with one imported by the United States Government in 1870, under the name Golden White or Long White and Autumn Stripe. It is larger than the Duchess; rather better in quality; not unlike it in coloring, and equal to it in bearing, and being a month or more later, I think it is more valuable. The tree, however, is not equal to the Duchess in hardiness—that is, while it is capable of enduring as low a temperature, it blights in the hottest weather, some years very badly.

Bogdanoff.—I quote Mr. Chas. Gibb in the eighth report of the Montreal Horticultural Society, as his statement there expresses my view exactly; "As a longkeeping apple of fine quality, I have every hope of this being a valuable variety." The fruit is large, and in form, size and striping, much like our St. Lawrence. The tree, at least while young, and before it has borne heavily, very upright in growth, with rather slender branches. It is ironclad and promises to

be a heavy bearer. I was very much pleased with the few specimens produced on two or three trees of this variety last season. Of the large sized Russians this is probably the most promising keeper.

Bors dorffer.—This is the best attested of all the Russians as a long keeper, but it is very small, as generally grown. Last spring I thinned out one tree to top graft it, and found a remarkable change in the size of the fruit on the remaining branches. It was more than double the size of the fruit on the trees not so thinned, making it clear that thinning both branches and fruit is necessary to the production of the highest quality of fruit. I quote Aaron Webster, of East Roxbury, Vt., in the seventh report of the Montreal Horticultural Society, as to its quality, etc. He says; "The fruit is small to medium, flattened, skin smooth and glossy, yellowish-green, with a warm cheek in the sun; texture, firm and fine; flavor, mild subacid, rich and good." It is in season all winter and spring, being a first-rate keeper, valuable for home use, but maybe too small for the general market. I may add that it is an enormous bearer when it becomes fairly started, and that it will possibly rival the good Russet as a cider apple, having a dense sweet juice, and it leaves nothing to be desired on the score of hardiness.

Champagne pipka.—I have grown and fruited this variety for several years without having been impressed with any sense of its value, but during the last two years I have observed that it is much liked as an early sweet apple. It is so mildly subacid that the acidity is not apparent to the ordinary observer. The fruit is large and beautiful, a greenish-yellow with the brilliant crimson striping that is a marked feature of so many Russian apples. It is a fairly heavy bearer though not equal to many other Russians.

Flat apart.—This is one of the very largest apples; at my place it has been much larger than the Alexander and higher colored, and besides yields more than double the Alexander. The tree is iron-clad. It has a broad flat top; the branches are fine, light colored and too numerous, entailing much labour in pruning.

This variety has kept till March, but as the flesh is rather soft, I would not recommend holding it, but on the contrary disposing of it in early winter. It is of fairly good quality though not, in any sense, a dessert apple.

Juicy Burr.—Though I have not regarded this hitherto as a winter apple, it has, the last two seasons, kept fairly well, although picked late, and I believe if it were picked early in September, it would prove a pretty good keeper. It is a flat-topped tree that does not require very much pruning, is iron-clad and does not blight.

The fruit is hardly as large as the Duchess and flatter; when ripe the skin is yellowish-green with red striping. It is decidedly acid, rather soft fleshed, and I do not believe the variety will ever be valuable as a commercial apple, although it is a fairly good annual bearer. Some of our members have this under the name Hibernial.

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Longfield.—Although this variety has been a long time before the public, I do not think that its merits and demerits have been fairly grasped.

It is one of the hardiest Russians and one of the most productive, and when planted in good soil, kept well pruned and the fruit thinned, it is of good size, nice appearance and fine flavor. If picked rather early with great care, and put away in shallow boxes, not more than three apples deep, it will keep till March. And I think that trial will show it to be a good cider apple. Its demerits are, that under ordinary careless treatment, it is very small, of no appearance, and utterly useless as a commercial apple. This latter feature might be overcome by cultivating the public taste. It is of such fine table quality, that I cannot but think that the demand for it would grow rapidly if it were only better known. For the private garden and for family use it cannot be surpassed in its season.

No. 185.—This is a tree and fruit that resembles the Alexander very closely. Though it has borne fruit a few years at my place, it is only this year that I have decided that it is a distinct variety. We had formerly shipped and sold it as Alexander. It is hardly as large as Alexander, and not so flat. It is as firm, but not so tough as that variety, and is of better flavor and texture, and although I have not proved it, I believe it will be a better keeper. The color is a deep purplish crimson on a green ground.

Repka Malenka.—This bore last summer for the first time at my place. It is a small apple that resembles a Canadian Baldwin in shape; the skin is smoother and the red is more like that of the Fameuse. When picked it is quite acid, almost as much so as the Scotts Red Winter, and probably like it will only be soft enough for table use by spring.

Mr. Aaron Webster wrote of it in 1880: "An enormous alternate bearer, so that the fruit is small; if thinned it attains a fair medium size. It is too hard to be eatable till warm weather in spring, when it gradually ripens, and is tender, juicy, and of fair quality and flavor."

The tree does not appear to me to be as hardy as many others.

Sklianka, 4 M of the Iowa Experimental Farm.—This is a large apple, the size and shape of the Alexander, but a very light green in color, with a faint blush cheek on the sunny side. It is a thick skinned, fine grained, rather acid fruit, that sells well in a near market. The tree is as hardy as any, not much subject to blight, broad and rather branchy, requires a good deal of pruning. It is a heavy bearer two out of three years. Its season is the beginning of October. I highly esteem this variety.

St. Peter.—This is one of the most beautiful of the Russians. It is full medium in size, with a milk white skin, faintly striped and marbled towards the stalk end, with a clear deep pink. The flesh is fine, tender, juicy, very mildly subacid, almost sweet, and faintly aromatic. The tree is rather slow of growth, not equal in hardiness to some, and is only a moderate bearer, at least while young. It is amongst the earliest to ripen, but not quite so early as the Yellow Transparent.

Beel ought to have been a white apple according to the Russian naming, but it is a large green apple with purple markings, not at all unlike the Gravenstein. It was planted 12 years before coming to bear; but for its season there could not be a better apple to eat. I do not think it would compare with Duchess or Wealthy as a market apple.

Agora is a Swedish apple about the size of the St. Lawrence, and not unlike it in markings. It is also very spicy, not unlike the former in flavor. But as they come at a time when the market is glutted, they are not much use to the commercial fruit grower.

Mr. Newman—How long do you find Longfield will keep?

Mr. Hamilton—I had it last year till March.

Mr. Brodie—My Longfield is a fall apple and only keeps two or three weeks.

Mr. Hamilton—Possibly the apple I have is the Englishman's Pippin. I had some doubt about the name. They are very much alike.

Mr. Chapais—In my district the Longfield keeps till June.

Prof. Waugh—I saw some Longfields in Geneva, N.Y., which were quite a revelation to me. They were grown by Mr. Willard, who is extensively engaged in producing market fruits. He made a great point of thinning the fruit, and not allowing them to grow less than 6 inches apart. They were as large as Ben Davis and realized \$4 to \$4.50 a barrel.

Mr. Newman—My Longfields this year were larger than ever before, but they were unattractive looking and very soft. I do not suppose they last with me beyond November 1st.

Prof. Waugh—Did you ever try thinning the fruit?

Mr. Newman—No, but they are very heavy bearers, and I should doubt if it could repay the labour.

Prof. Waugh—It is quite necessary. I do not think you can grow Longfields without thinning.

Mr. Fisk—One disadvantage to them as a commercial fruit is that they show bruises.

Mr. Brodie—Where people can grow Fameuse or Mackintosh, it does not pay them to try Longfield. Many of the wild apples round Montreal are quite as good as Longfield.

Prof. Craig—It is a question of adaptation of variety to environment. I have never before seen such Longfields as Mr. Willard produced. They were fine in color, form and quality, but he is an experienced fruit grower, who believes

thoroughly in fertile fields unless you attract attention, and I think better results.

Mr. Hamilton—it is better to grow

WINTER APPLE
CENT

By W. F. M

Horticulture has been carried on at the Centennial to determine their value has received special

Situated as it is, grown successfully, the value to the fruit grower is useful to those in need of opportunity of test

The apple orchard one of which has been American sorts, mainly Russian varieties and

Part of the land while the other part which, as a rule, is well suffer in time of drought to determine if fall planting that year was very successful experience of the past planting in the spring success. In the spring 72 were standard sorts kinds tested has been in comprising about 1400 Nearly 150 additional secured, so that we expect orchard before long. In America, and this at Ot

thoroughly in fertilizing, pruning and spraying. It is no use growing Long-
fields unless you are prepared to give them the highest possible culture and
attention, and I think there are other varieties that with the same care yield
better results.

Mr. Hamilton—I quite agree with what Mr. Brodie and Mr. Craig says that
it is better to grow Fameuse and Mackintosh.

WINTER APPLES WHICH HAVE SUCCEEDED BEST AT THE CENTRAL EXPERIMENTAL FARM, 1888-1898,

BY W. F. MACOUN, Horticulturist, Central Experimental Farm.

Horticulture has always been one of the most prominent branches of work
carried on at the Central Experimental Farm, and the testing of the large fruits
to determine their hardiness, quality, productiveness and freedom from disease
has received special attention there.

Situated as it is, almost at the northern limit of where the apple can be
grown successfully, the results of tests made at this farm should prove of great
value to the fruit growers of the Province of Quebec, and should also prove
useful to those in more favored sections of the country, who have not the means
or opportunity of testing many varieties.

The apple orchards at the experimental farm are divided into two sections,
one of which has been reserved for the testing of standard varieties and new
American sorts, mainly, while the other has been hitherto used principally for
Russian varieties and those from other European countries.

Part of the land chosen for the orchards has a slight northern exposure,
while the other part is almost level. The soil is principally light sandy loam,
which, as a rule, is well supplied with moisture, and it is seldom that the trees
suffer in time of drought. The first planting was done in the autumn of 1887,
to determine if fall planting could be carried on successfully, but the winter of
that year was very severe and a large proportion of those planted died. The
experience of the past ten years has shown that the best results are had by
planting in the spring, although trees have been planted in the autumn with
success. In the spring of 1888, 205 varieties of apples were planted, of which
72 were standard sorts, and 133 Russian. From year to year the number of
kinds tested has been increased until now we have 653 varieties in the orchard,
comprising about 1400 trees and covering an area of about 20 acres of ground.
Nearly 150 additional varieties are growing in the nurseries, or are being
secured, so that we expect to have in the neighbourhood of 800 sorts in our
orchard before long. It is not probable that there are many such collections in
America, and this at Ottawa, where a few years ago only a small number of the

older varieties were grown. But in this large collection there are only a limited number of good winter apples which are exempt or fairly exempt from root-killing, blight and sun-scald, three of the worst enemies the orchardist has to fear in Eastern Ontario and the Province of Quebec. The orchards at the Central Experimental Farm have suffered very severely from these three causes. During the years 1894 and 1895 the blight destroyed so many of the larger branches of the trees, in many cases killing the trees outright, that the orchard presented a very uneven appearance. The winter of 1895-6, owing to lack of snow and sudden changes of temperature, caused the root-killing of a large number of trees, so that the vacancies in the orchard in the spring of 1896 were numerous. After such trials as these, those varieties of winter apples which remained in good, or fairly good, condition may be called iron-clad indeed.

Before speaking of those winter apples which have succeeded best at Ottawa, I shall relate the fate of a few of those which have not survived.

Baldwin.—Two trees were planted in the spring of 1888. One of these, after making strong growth that summer, succumbed during the winter of 1888-9. The other lived until 1890-1, when it also died.

Fallwater.—Three trees were planted in the spring of 1888. One was winter-killed during the winter of 1889-90. The other two struggled on until 1894, when another died, the remaining one being root-killed by the winter of 1894-5.

Belle de Boskoop.—Two trees were planted in the spring of 1888. Both died in 1891.

King.—Five trees were planted in the spring of 1888. One died in 1890, three in 1891, and one died after planting.

Northern Spy.—Four trees were planted in 1888. One died in 1891, two were root-killed by the winter of 1894-5, and one by the winter of 1895-6. This apple top grafted on two trees of *Wealthy* in the spring of 1891, is doing well and produced fruit in 1897 and 1898, the fruit last year being very fine.

Rhode Island Greening.—Three trees were planted which were killed respectively in 1889, 1890 and 1891.

Esopus Spitzenburg.—Three trees were planted, two died from the winter of 1888-89 and the last in 1891.

The notes on these varieties will convey some idea of what happens to trees which are not of the very hardiest sorts.

Now, let me mention some of those that have endured the rigors of ten winters at the Experimental Farm,

Scott's Winter.—This tree is one of the healthiest in the orchard and appears perfectly hardy. It has made a fine growth and the trunk is uninjured from sun scald. It has fruited every year since 1895, and probably began before that

time. The fruit is doubtless due, in a very good quality,

Winter St. Lawrence and has made excellent crop, however, was appearance, and is c

McIntosh Red.—A shy bearer, is, I think, Ontario and the Province as this fruit has made it very popular growth and are in Some trees planted i

Canada Baldwin trees have made satisfactory in 1895, 1897 and 1 many parts of the co

Lawver.—Although the trunk being among those which a fruit is of good size flavoured, is juicy, sp Its best point, however, dition for a year, and was wrapped in waxe and although only ke what. This variety h

Delaware Red W this is apparently dis Farm, though very sin tender as *Lawver*, and of the skin is also of a

Salome.—All trees and other injury by w succeeded best at Ottawa it, but its delicate color acid, and, though not c mid-summer, retaining

The varieties just in 1889 and which are

Winter Bough.—T a promising sort. It br

time. The fruit at the Experimental Farm has been of good size, which is doubtless due, in a large measure, to the soil being kept cultivated. It is not of very good quality, but has many good points in its favour.

Winter St. Lawrence.—This variety seems quite as hardy as Scott's Winter, and has made excellent growth. It has also fruited every year since 1895. The crop, however, was light in 1898. The fruit is of good size and quality and fine appearance, and is certainly a desirable apple for northern orchards.

McIntosh Red.—The McIntosh Red, though having the reputation of being a shy bearer, is, I think, certain to become one of the leading apples in Eastern Ontario and the Province of Quebec. Few varieties have as attractive an appearance as this fruit and its tender flesh, delicious flavor and high aroma have already made it very popular. The trees at the Experimental Farm have made good growth and are in fine condition. It has fruited regularly ever since 1895. Some trees planted in 1890 began to fruit in 1894.

Canada Baldwin.—This variety appear to be quite hardy at Ottawa. The trees have made satisfactory growth and are in good condition. They fruited in 1895, 1897 and 1898. It is an attractive apple and is well thought of in many parts of the country.

Lawver.—Although this apple has not altogether escaped injury from winter, the trunk being partly injured by sun-scald, yet it may be fairly classed among those which are the most promising for this section of the country. The fruit is of good size and attractive in appearance, and, while not being high flavoured, is juicy, sprightly and aromatic, and is a very refreshing apple to eat. Its best point, however, is its keeping properties. Apples keep in excellent condition for a year, and we have one specimen at the Experimental Farm which was wrapped in waxed paper in the autumn of 1896, more than two years ago, and although only kept in a cellar, has not yet decayed, though shrivelled somewhat. This variety has fruited every year since 1895.

Delaware Red Winter.—Although hitherto classed as a synonym of Lawver, this is apparently distinct from that variety, as grown at the Experimental Farm, though very similar to it. The flesh of Delaware Red Winter is not so tender as Lawver, and not so sprightly in flavour as that variety, the colouring of the skin is also of a brighter red than Lawver.

Salome.—All trees of this variety have not proved exempt from sun scald and other injury by winter, but it may be classed among those which have succeeded best at Ottawa. The fruit is rather small, which is somewhat against it, but its delicate colouring makes it a very attractive apple. It is juicy, sub-acid, and, though not of high flavour, is pleasant to eat. It keeps until nearly mid-summer, retaining its flavour well. It is an early bearer.

The varieties just mentioned were planted in 1888. A few of those planted in 1889 and which are doing well are :

Winter Bough.—This apple appears to be very hardy, and is, I think, quite a promising sort. It branches low and appears to have great vigour. The fruit

is large, of fairly attractive appearance and good quality. It has fruited during the last three years. It is said to be one of the best apples grown on Prince Edward Island. Season, December to March.

Shiawasse Beauty.—This variety is quite hardy, the trees being healthy and in good condition. The fruit is of medium size and flat in shape; flesh, juicy, tender, sub-acid. Quality, very good. It is a productive variety.

American Golden Russet.—It is sufficient to say that this is quite hardy at Ottawa.

Since 1889 many other varieties have been planted, and some of those which have been tested sufficiently long to allow us to reach some conclusions as to their hardiness are herewith given :

Ben Davis.—Planted in 1890. This apple seems to accommodate itself to nearly every district in which it is grown. It has proved quite hardy at Ottawa and on account of its bearing early, productiveness, and keeping and shipping qualities, will probably be extensively planted for some time to come.

Gano.—Planted in 1891. Though resembling Ben Davis somewhat, this apple is better coloured, though about the same in quality as that variety and keeps as well. The tree is a vigorous grower, and perfectly hardy, so far. The trees bore well in 1897 and 1898.

Stark.—This is one of the strongest growing varieties yet tested, and seems quite hardy. The fruit is large, not highly coloured and of only fair quality, but it is a very good keeper.

There are other varieties of winter apples which have proved hardy at Ottawa, but those already mentioned are the most promising. It will be noticed that among these there are no Russian varieties mentioned. At Ottawa, we have not yet had any winter varieties of the Russian apples that have come under my notice which have appeared as promising.

La Victoire.—There is one seedling apple which should be mentioned, viz., the La Victoire. Two trees were planted in 1888 and are doing well. It originated near Grenville, Que. For regularity of form and fine colouring there are few apples its equal. The flesh is rather coarse, fairly juicy, sub-acid and of pleasant flavour. Quality, almost good. It is a good bearer. Season, December to March.

EXPERIMENTS BEING TRIED TO OBTAIN HARDIER TREES.

In the years 1896 and 1897 a number of trees of such hardy varieties as Gideon, Haas, McMahan, White, and Romna, were planted in the orchards for the purpose of top grafting some of the tenderer sorts on them in the hope that better results would be obtained. This work was begun last spring and will be continued this year, and it is probable that good results will be had, judging by a few trees which have been top grafted on hardy stock for some years.

Last autumn have proved hardy time, the rest with seedlings grown something good.

Experiment (baccata), which whether it can be respect, it will be killing is prevalent interesting results

About 2,000 Russia, but although of them have pro

Mr. Newman ance to us. We had if a satisfactory one to ask Mr. Craig

Prof. Craig—has never attained Prince Edward Island a few apples in 18 being among the any commercial in

Mr. Hamilton recommended near where it would no

Mr. Macoun—tree in the orchard

Prof. Craig—American Baldwin America, except at Iowa, but was killed

Mr. Shepherd—am trying to raise

Mr. Brodie—I in November. It is

Last autumn the seed of most of the best varieties of winter apples which have proved hardy at Ottawa was collected, part of which was sown at that time, the rest will be sown next spring. It is proposed to plant an orchard with seedlings grown from this stock, and it is probable that we shall in time get something good.

Experiments are also being tried with the Small Siberian Crab (*Pyrus baccata*), which is hardy in Manitoba and North-west Territories, to determine whether it can be used successfully as a stock. Should it prove useful in this respect, it will be a valuable tree for those parts of the country where root-killing is prevalent. This crab has also been crossed with the larger apples, and interesting results are looked for.

About 2,000 seedlings have been raised from seed imported from Riga, Russia, but although a considerable number of them have already fruited, none of them have proved valuable winter apples.

DISCUSSION ON MR. MACOUN'S PAPER.

Mr. Newman—This is a very valuable paper on a subject of great importance to us. We have been looking for a winter apple for some years back, and if a satisfactory one can be found it will mean a great deal to us. I should like to ask Mr. Craig about this apple Winter Bough, Mr. Macoun has mentioned.

Prof. Craig—It is an old variety, well known in New York State, but it has never attained to commercial importance there. I remember it also in Prince Edward Island. On the farm it was among those that bore early; it had a few apples in 1894, '95 and '96. But it did not impress me at that time as being among the valuable varieties. I should hardly think it likely to be of any commercial importance, though I should not like to say so positively.

Mr. Hamilton—Winter Bough is perhaps one of the class of apples to be recommended near the sea shore. It may succeed in Prince Edward Island, where it would not inland.

Mr. Macoun—It is certainly succeeding at the Farm. It is the healthiest tree in the orchard.

Prof. Craig—Stettin Red is a Swedish apple, and appears to belong to the American Baldwin type, though I do not know of it succeeding anywhere in America, except at Mr. Fisk's place at Abbotsford. It was planted at Ames, Iowa, but was killed by blight.

Mr. Shepherd—We have some grafted and they are doing so well that I am trying to raise some in the nursery.

Mr. Brodie—I would like to recommend the Princess Louise, which ripens in November. It is one of the finest in quality I know of.

QUEBEC EXPORTABLE APPLES

By R. W. SHEPHERD, Montreal.

Until fifteen years ago, or perhaps less, the summer or early varieties of apples were the most profitable, reaching the market when people were pining for fruit of that kind; but, to-day, since the refrigerator cars have made it possible to put California's tempting fruit in competition with ours, there is no profit to be made out of our early apples.

The steamship cold-storage must be used if we would send our Duchess and other early apples to England; but experience in shipping these varieties warns us that the venture is not always profitable, and it is a conundrum, at the present time, to find out how to dispose of the early varieties to the advantage of the grower.

The "Emperor Alexander" apple, when picked carefully and early, well packed in barrels is generally a profitable apple to export. It can stand considerable rough handling and yet reach the other side in fine condition.

The hope of the Quebec orchardist is the cultivation of such varieties as may be exported *profitably*. In this province we can grow the reddest and the handsomest apples in the whole world. If we cultivate our Fameuse, McIntosh Red, Canada Baldwin, Canada Red, Winter St. Lawrence, Scott's Winter, and Blue Pearmain, etc., leaving out all early apples and those without colour, we cannot go far astray in the field of profitable apples for the English market.

It will pay those who have large orchards of Duchess trees to top graft with Canada Red or McIntosh Red. Times change rapidly and the orchardist must look well ahead of him and be prepared to combat the different phases of opposition in the trade, which this advanced aged of "Rapid transit" has developed in later years.

There is no doubt that the English palate is becoming more and more in love with the *peculiarly delicious* flavour of our Queen of apples "La Fameuse." Experience teaches us that the demand for that apple is rapidly increasing each season; and, with few exceptions, those who, like myself, have turned their attention to the exportation of the best grade of Fameuse, find that there is an unlimited demand in England for that particular apple.

It will pay the Quebec orchardist to give greater attention to the cultivation of "La Fameuse," and by thorough and systematic application of the spray pump there is no difficulty in producing to-day as fine Fameuse as ever were grown in the early days on this island of Montreal. McIntosh Red is, in my own estimation, the second most profitable exportable apple to cultivate. Its quality is good, but not so delicately delicious as Fameuse. In richness of colouring it surpasses all our Quebec apples and its size is larger than Fameuse, having almost the same texture and whiteness of flesh.

This variety is, also, much inclined to be affected by fungi and the spray pump must not be allowed to stand idle in the proper season, if fine clean fruit is desired.

Great improvement in our regular steamships when cold storage was used last season, I was informed had been paid for at a low temperature consignment of Duchess apples obtained. I was informed that the eggs, but, whether or not, say, the result of the

It seems to me that when cold storage was used that all steamers were fitted for fruit, and that I know that the season is comparatively successful in export trade in fruit. I saw \$900,000 last season was trade from the port of the shipment of our developed, the demand for the regular lines to its infancy.

I am pleased to see the Provincial Fruit Growers' Association for the appointment of steamships, and the regular steamships.

Mr. Newman—We should cultivate in good order it is our

Prof. Craig—I have experience in top grafting

Mr. Shepherd—but I don't want to see the importation of

Prof. Waugh—The problem is solved by getting more supplied.

Mr. Brodie—La Duchesse cold storage to London took 20 days, but that by the same steamer

Great improvements can yet be made in the cold storage accommodation on our regular steamships crossing to England. As a rule there are few occasions when coldstorage for fruit in September, can be secured. In my own experience last season, I was sometimes unable to secure cold storage because that compartment had been partly, or altogether, engaged for butter, which is carried at too low a temperature to suit apples; and I made a serious loss in consequence on a consignment of Duchess apples packed in cases, because cold storage could not be obtained. I was induced to ship in the ventilated compartment occupied by eggs, but, whether the compartment was really ventilated and cooled, I cannot say, the result of that shipment was most unfortunate.

It seems to me that during the shipping season of September and October, when cold storage for fruit exportation is, at this day, an absolute necessity, that all steamers fitted with cold storage should have compartments available for fruit, and that even during the season of heavy shipments of dairy produce. I know that the season when apples must necessarily be shipped in cold storage is comparatively short, not over six weeks, or perhaps eight weeks, yet the export trade in fruit from the port of Montreal reached the value of about \$900,000 last season (in 1896 it must have been still greater), showing that the trade from the port of Montreal is a very important one. As success attending the shipment of our delicate apples by means of cold storage, becomes more developed, the demand for space will increase, and it will pay the steamships of the regular lines to make apple provision for meeting this trade, which is yet in its infancy.

I am pleased to hear that a memorial is being prepared by all the Provincial Fruit Growing Societies to present to the Dominion Government, asking for the appointment of officers to secure the proper storage of fruit on ocean steamships, and the proper ventilation of all holds, in which fruit is stored on steamships.

Mr. Newman—Mr. Shepherd has preached good doctrine when he says that we should cultivate our high colored early winter apple. As long as it arrives in good order it is one of the most lucrative.

Prof. Craig—I should like to ask Mr. Shepherd if he has had any experience in top grafting Duchess and McIntosh Red.

Mr. Shepherd—It is the best you can do with the Duchess in my opinion, but I don't want to handle so many Duchess as I have, unless we can prohibit the importation of Californian fruit.

Prof. Waugh—The problem of getting more cold storage will probably be solved by getting more fruit for cold storage. If there is a demand, it will be supplied.

Mr. Brodie—Last year I made a shipment of 30 barrels of Alexanders in cold storage to London, not being able to get space for Liverpool. The voyage took 20 days, but the fruit arrived in first-class condition. I also sent a barrel by the same steamer to a friend, and they say they never had such good apples.

Mr. S. S. Bain—I had the pleasure of seeing fruit sold for three days in London, and it was done so fast, at first I could hardly follow it. Everything depends upon the fruit being put up in an attractive shape, for it is the first glance that gives the impression. In boxes about 10 inches high and $2\frac{1}{2}$ feet square, it fetches a great deal more than in barrels. I saw quite a number of growers in England, France, Holland and Belgium, and they are all very careful about classifying and packing their fruit, so that it will present an attractive appearance. Too much attention cannot be paid to this point.

Mr Brodie—The prices realized on the other side are all right, but the charges are very heavy. On my 30 barrels I had to pay 15 shillings cartage from London Docks to Covent Garden, $12\frac{1}{2}$ cents a barrel, while here you can send them to Maisonneuve for $2\frac{1}{2}$ cents.

Mr. Orr—Mr. Whelan sent 172 barrels to Germany and they brought \$1002, realizing between \$600 and \$700 when all expenses were paid. The agents report that every apple was perfect, and there was not a slack or nasty barrel. There is no doubt that it pays to send good fruit, well packed.

SOME IMPORTANT FACTORS IN MODERN BEE-KEEPING.

BY PERCY H. SELWYN.

Last winter I had the pleasure of attending the meeting of this Society held at Lachute, and of contributing a paper dealing with some of the conditions which together had made the season of 1897 one of almost total failure, if not actual loss, for the bee-keepers of this province as well as a considerable portion of the Province of Ontario. Except in some few favoured localities, little or no surplus honey was obtained until quite late in the season, consequently the little that was obtained could only be considered as inferior in quality, being chiefly gathered from buckwheat. Under these circumstances it is therefore particularly gratifying to be able now to record the season of 1898 as certainly one of the best, if not the best, from a money-making point of view, that the bee-keeping industry in Canada has seen. From all sides come reports of enormous yields of an excellent quality of honey, both extracted and in the comb, and although the price obtainable, particularly for section honey, is considerably lower than in the past, there is still a good margin for profit on account of the unusually large yield.

The paper I have prepared for the meeting to-day is not on bee-keeping in general, but is especially devoted to "*Some of the important factors in modern bee-keeping.*"

There are so many, comparatively speaking, new methods, which have an important bearing on modern apiculture that it would be impossible to give any-

thing like an adequate reasonable length to hope that the

The first is whether is it better of it by climbing after the experience. Both methods have an arrangement of hives of climbing fences passing in a possible continued intrusion of trees, etc., by heavy be obviated by removing drawbacks, which the queens and of would materially leg in addition to swarm just as re bees, may possibly where she will be bee-keeper, soon k return, enter the s many, if not all o is strong in bees, will not, however unknown" when main objections to very likely to occur apiary during swa several feet, or bet

Under ordinary ance in the apiary, queens are unable

When the swa to put the swarm a then keep a close v certain to do sooner any small box or q hive to a new sta begin to return and enter and it is safe further trouble. E the use of her wings how far the swarm a place easy to ge

thing like an adequate or intelligent description of them all in any one paper of reasonable length. I have therefore chosen two out of the many, and venture to hope that the discussion of these two may not tax your patience.

The first is "*clipped versus unclipped queens*," or to be more explicit whether is it better to leave the queens with the power of flight or to deprive them of it by clipping the tip of one wing? I have tried both methods, and after the experience of the two past seasons am personally in favor of clipping. Both methods have their good and bad points, but under certain conditions as to arrangement of hives and size of apiary, there is no question that a vast amount of climbing fences, trees and ladders, can be avoided, to say nothing of trespassing in a possible neighbor's garden, who may very naturally resent the continued intrusion and sometimes by no means slight damage done to young fruit trees, etc., by heavy swarms clustering upon them. This can in a great measure be obviated by resorting to "clipping," but as I said before, the practice has its drawbacks, which are briefly as follows: 1st, the difficulty to many in finding the queens and of safely performing the operation of clipping when found, as it would materially injure the queen's activity and utility in the hive to clip off a leg in addition to the wing. 2nd, a clipped queen will of course issue with the swarm just as readily as though unclipped, and being unable to join the flying bees, may possibly get lost in the grass, or, worse still, enter an adjoining hive, where she will be at once "balled" by the occupants and, unless rescued by the bee-keeper, soon killed. 3rd, That the bees composing the swarm may, on their return, enter the same hive that their queen has done, which usually results in many, if not all of them, being stung to death, particularly if the invaded hive is strong in bees, and consequently in fighting trim. The loss from this cause will not, however, be any greater than from colonies leaving for "parts unknown" when the queens are left with the power of flight. These are the main objections to "clipping" and are certainly not insurmountable, or indeed very likely to occur with the exercise of ordinary care and attendance in the apiary during swarming, and also by having a separate stand for each hive, with several feet, or better still, yards between.

Under ordinary conditions and with even a capable boy in constant attendance in the apiary, the work of hiving swarms can easily be attended to if the queens are unable to fly, and may be briefly described as follows:—

When the swarm is seen issuing take the new hive in which it is intended to put the swarm and place it alongside the one from which the bees are issuing, then keep a close watch on the ground until the queen appears, as she is almost certain to do sooner or later. When seen pick her up carefully and place her in any small box or queen cage from which she cannot escape, then remove the old hive to a new stand and put the new one in its place. As soon as the bees begin to return and cluster at the entrance of the new hive, allow the queen to enter and it is safe to say the bees will quickly follow and as a rule give no further trouble. How different is the tale often to be told when the queen has the use of her wings. It is, in the first place, always a matter of doubt as to how far the swarm will go before clustering, also as to whether they will select a place easy to get at, or, on the other hand, the highest tree in the vicinity.

Then, when this is decided, and the swarm, or as much of it as possible, has been made to enter the hive or box prepared for their capture, it is by no means unusual, just as they are landed safely on the ground, to see them all swarm out again and return either to the place they have just been taken from or to their old home, the reason being that the queen had by some mis-chance been left behind. Then, again, there is always the chance of the queen issuing and making off with the swarm to the woods without clustering near at hand, but this rarely happens with the first swarm unless led by a virgin queen, and they, of course, cannot be clipped until after mating.

Another disadvantage is when two or more swarms issue at the same time they will almost invariably all unite in one cluster, and only those who have tried, can realize how difficult it is to find the queens and separate the swarms satisfactorily.

Taking all these points into consideration, it would appear that the amount of unpleasant, if not actually hard work in an apiary, may be very considerably lessened by adopting this unnatural method, which can, of course, be only applied to colonies possessing laying or mated queens.

The next factor in apiculture which I have chosen for discussion this afternoon and, on account of its paramount importance, have entered into in some detail, is the hive or "skep," as often called. Of these there are very many, possibly *too* many, different kinds, ranging from the first old box which comes to hand, up to the latest improved Langstroth hive, I say Langstroth hive because on this continent it is certainly one of the best known, and one from which exceedingly good results are obtained. One thing is certain, and I cannot emphasize the point too strongly, that if a man or woman wishes to succeed in bee-keeping and to make the greatest possible amount out of his or her bees, the old box hive must be abolished and give place to one or other of the movable frame hives. The box hive served its time as a link in the chain of progress, but that time is or should be long since past, I say *should be*, because there are yet for too many bee-keepers, mark you, not bee-masters, who still stick to these relics of ancient bee-keeping history, and in doing so must surely be losing money, not only in the quantity and quality of honey obtained, but because of the destruction each autumn of many of their colonies to secure any honey at all. To me it always seems like "killing the goose which lays the golden egg," and which, in the case of the bees, would continue laying golden eggs with different management.

I will now endeavour, as briefly as possible, to describe the advantages on the one hand and disadvantages on the other of the two systems or methods of keeping bees, viz:—

In movable frame hives versus in box hives: With the movable frame hives a skilful bee-keeper can and *should* know all the existing conditions in every hive in his apiary. For instance he should be informed as to whether the queen in each hive is prolific or the reverse, and indeed as to whether there is a queen at all, as during a time of excessive swarming, as well as from other causes, hives are frequently left queenless, to their certain destruction from both

moths and robbers colonies are destroyed a queen in these Another important suffer from lack of honey is obtainable cease or almost cease there will be but few should be regulated are necessary, and drones in the apiary by many prominent decidedly conducive view seems quite not swarm. But, on strong that if *only* cut out portions of that any full frames are either extracted space for egg-laying utmost in this respect from the hive the and if the weather is the result being that store it again above hive and the queen often been astonished tion and at the rapid thousands of eggs in that every square inch if every cell is occupied under ordinary conditions easily be seen what a with brood would make

Yet another feature was a most fruitful subsequent desire to hold either the egg or controlled by the care giving additional room and it really seemed the attempt, for no so begun, and so on, ever cising the greatest advanced bee-keepers All these and many rule, be easily attended enough to use modern

moths and robbers if not soon re-queened, and it is safe to say that hundreds of colonies are destroyed annually from this cause alone, simply because the loss of a queen in these inaccessible old hives is not easily detected until too late. Another important matter which must be looked to, is that the brood does not suffer from lack of food during the early part of the season, before sufficient new honey is obtainable, otherwise, should a shortage occur, the queen will at once cease or almost cease laying, with the result that when the flow of honey comes there will be but few bees to gather it. The amount of drone comb in each hive should be regulated, as not more than a few square inches, (or the equivalent) are necessary, and more than that will only entail a superabundance of idle drones in the apiary, and a corresponding loss of worker bees. It is also held by many prominent bee-keepers that a large number of drones in an apiary is decidedly conducive to excessive swarming, which is little to be desired, and this view seems quite reasonable, as it is certain that without drones the bees will not swarm. But, on the other hand, the natural instinct of reproduction is so strong that if *only* worker comb were allowed the bees they would undoubtedly cut out portions of it and build in drone comb. It is also often important to see that any full frames of honey which may have been left over after wintering, are either extracted or replaced by empty frames, as the queen requires more space for egg-laying, so that she may in no way be prevented from doing her utmost in this respect. Perhaps a better and safer way than actually removing from the hive the full combs of honey, is to bruise the surface of the cappings, and if the weather is warm, place one frame at a time in the centre of the brood, the result being that the bees will at once begin to remove the honey and to store it again above and about the brood, this will cause unusual activity in the hive and the queen will be stimulated to greatly increased egg-laying. I have often been astonished at the result of this seemingly simple piece of manipulation and at the rapidity with which a good queen will respond, by depositing thousands of eggs in the area thus placed at her disposal. When it is considered that every square inch of worker-comb, taking both sides, will produce 50 bees if every cell is occupied, and that an ordinary Langstroth frame $17\frac{3}{8} \times 9\frac{1}{8}$ would under ordinary conditions produce about 7,000 bees every three weeks, it can easily be seen what a material difference the addition of one or two frames filled with brood would make in the working strength of the hive.

Yet another feature to be observed and one which, last summer particularly, was a most fruitful source of trouble, and that is queen-cell building, and the consequent desire to swarm as soon as these cells are sufficiently advanced to hold either the egg or larvæ. As a rule swarming can, in a great measure, be controlled by the careful removal of those queen-cells at the right time, and by giving additional room above for the bees, but not so during the past season, and it really seemed as if nothing could or would deter the bees from making the attempt, for no sooner was one lot of queen-cells destroyed than another was begun, and so on, even to the third and fourth attempt, and it was only by exercising the greatest amount of patience and perseverance that even the most advanced bee-keepers could control swarming, and then only to a certain extent. All these and many other important factors in successful apiculture can, as a rule, be easily attended to and regulated by the bee-keeper who is enterprising enough to use modern hives and appliances, such as are now readily available

at moderate prices. It is unquestionably those who do pay close attention to the seemingly small details of which I have been speaking that will in the long run reap the greatest pecuniary benefit, and without the movable frame hive it is simply impossible that these details can be successfully attended to.

We will now pass on to consider the box hive and its many disadvantages and few advantages. I can only think of one or two things which may be in its favour, and these are first, its cheapness and simplicity of construction, and second, that without absolutely destroying the hive and bees, the chances are greatly in favour of all colonies going into winter quarters with ample stores, for the simple reason that the honey is not easily available to the bee-keeper. You all probably know exactly how a box hive is made? it is certainly simplicity itself, consisting of four walls, (dimensions to suit the fancy of builder) a cover, nailed on hard and fast, a bottom board usually loose, but sometimes also nailed on, two round sticks let in about the centre of the box and crossing each other at right angles, which act as braces to the combs when built, and last, an entrance cut near the bottom on some one of the sides, this opening being either round or square or oblong, as fancy dictates. Now, how farmers and other men and women calling themselves bee-keepers, and who are reasonably intelligent and keen to make money in other ways can be satisfied to drag along with their bees, perhaps 20, 30 or 40 colonies, as the case may be, in these hopelessly impossible and ungetatable hives is beyond understanding, but unfortunately only too often the case. With a hive like this the bee-keeper has nothing whatever to say as regards the internal economy and arrangement; after the bees have taken possession they have everything to do and set about doing it quickly and well, but by no means in accordance with the requirements of modern apiculture. For instance, the combs when built are all immovable, some large, some small, some thick, some thin, and so different to the beautiful straight combs, all uniform in size, to be found in modern hives where full sheets of comb foundation have been given to the bees, or indeed where even narrow strips of foundation known as "starters" have been used.

Then another objectionable feature is the large amount of drone comb always to be found in these box hives, often to the exclusion of sufficient worker comb. Indeed I have carefully examined a large number of such hives and found certainly half, if not more, to consist of drone comb. Now how can good results be expected under such conditions? The queen may be the very best, but if she has not sufficient worker cell room to deposit all the eggs she can lay, what does it matter if she is prolific. The statement may safely be made that there are thousands upon thousands of unnecessary honey-consuming drones in many of those hives during the months of June, July and possibly August, and the surplus honey obtained from such hives is practically *nil*. Next the swarming, how can that be controlled? It simply cannot be, and the result is that the bees swarm and swarm until there are practically none left in the parent hive; and the second and after swarms being led by virgin queens very frequently leave for the woods without giving the owner any opportunity to hive them.

If a queen dies, or is lost on her wedding flight, how can her absence be detected until too late, and the weakly guarded combs are being devastated by

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the bee moth grub, or robbed of every drop of honey by some stronger colony. Then last, and most important from an economic point of view, what is the quality and quantity of honey obtainable from such a system of bee-keeping, even under the most favourable conditions. If the hive is strong, and the season favourable, there may be some nice white comb-honey taken in small boxes, which have been placed on the top of the hive, and to which the bees have access through a small aperture, but at best the amount will be small as compared with that which can be obtained from a modern hive under similar seasonal conditions, and should it be decided to break open the box and destroy the poor bees, in order to obtain the whole of their season's work, what a sticky hotch-potch is the result, a mixture of dead bees, pollen and honey. Possibly some box-hive bee-keepers will say that I have taken the worst possible view of the situation, perhaps I have, but if so, I trust that I may be excused, and I feel sure that if they once accustom themselves to modern hives it will not be long before they accord with my views, and wonder how they could have been satisfied with the old methods so long.

BEE-KEEPING.

BY GILBERT WINTLE, COMO.

ADVICE TO BEGINNERS.

It is not every one who wants, or who has the time, to make a regular business of apiculture; but I think that every one who lives in the country may find much pleasure and interest in the care of a few hives of bees, and in their produce a quite acceptable addition to the household resources. To a fruit grower the work which the bees do in cross-pollenization of the blossoms would make it worth while to keep them, even if they made no honey at all.

Well, to any one who decides to start apiculture, let me give a word of warning. Do not let him suppose that because he has read a few bee-books he knows all about it. Even if apiculture, or anything else, could really be learned from a book, I will be candid and tell him that he knows merely the outlines of the subject. Of course, much more has to be done really. The honey, for instance, has to be taken off and freed of bees without being harmed; which is not so easy as you would think, since the first impulse of a bee when frightened in his hive, is to break through the nearest piece of white capping, and fill himself up with honey. The hives have to be coaxed into proper state for winter. Swarms have to be looked after, and artificial swarms have to be made. Disease has to be guarded against continually. Queens have to be reared and superseded. And so on. In fact, volumes might be written, and a good many volumes have been written, on the art of scientific bee culture; and not one of them, still less anything that I can say here, is any use to a beginner without practice. "Experientia docet" holds good, I suppose, in every craft, certainly in none more than that of the bee-keeper. So my advice to any one wishing to

start bees is: Buy a couple of stocks in good modern hives and for the first year keep them for comb-honey—it will never pay to buy an extractor for two hives—and beyond hiving the swarms and taking the honey, do as little to them as possible. Of course, you must get a good bee-book to show you how to do even this, and equally, of course, you will want to do all the other wonderful things that you see described in it. But don't. Be content to go slow at first; then in a few years you will find yourself making artificial swarms, brooding queens, selecting drones, and all the rest of it, with the best of them, and what is more to the point, making a very comfortable little addition to your income into the bargain. But don't try too many experiments at first.

Sometimes, however, it works out differently. A man with a country house and rural tastes buys some hives, tries to look after them himself, does not take to it, and decides that bees are out of his line. So he turns his attention to other things. Meanwhile the bees perhaps get a sort of a half looking after by the gardener, or perhaps get no looking after at all. And so things remain until some fine day one of the enterprising rising generation discovers the forgotten bee-book, absorbs it through a whole wet afternoon, and by night shows all the symptoms of an acute attack of bee-fever. Well, the nucleus of a bee business is already on the estate, and the best thing that the family patriarch can say is "go in my lad and win." After all, viewed from the standpoint of the paterfamilias, bee-keeping is a far better pastime than—than breaking the paternal windows with a catapult, say.

By the way, if a personal reminiscence will be pardoned, it is something in that way that I began my own apicultural experiences. I was eleven years old at the time I made my venture, and without undue boasting, I think I may affirm that a more successful commercial undertaking was never carried through. I will not dwell on the statistics, which were something like this: My father gave me bees, hives and all appliances. I sold him the honey at a shilling a pound and ate it myself afterwards. Cent per cent gives but a feeble idea of my profits in those days. However, there is no need to start the young idea quite so luxuriously as that. On the other hand, do not discourage him; he will meet with quite enough set-backs without your help. It is some of these set-backs and failures, to be expected by every novice, that I now intend to deal with.

Imprimis, we remember that if there is one person in the world who merits the appellation, apicultural expert, it is the young man who has got hold of a bee-book for the first time and has just read it through. Expert! Why that is not the name for him. Principle and practice, he knows it all; he's—well, there is only one word to express his knowledge—he's infallible. The only worse case is that of the young lady in similar circumstances; however, she generally subsides after one good stinging. And now he comes to realities. He gets his hives, and, during clover he learns to manipulate them. In fact, he learns this so easy that he can't do enough of it. He pulls out the frames for every conceivable and inconceivable purpose, but as often as not that his family may see how nicely he does it; till one day he finds that the bees are not working on clover any more, and by the time he has been stung all over the face and hands,

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he thinks he will go and look up the directions for opening hives again. And now let me give him a word of advice. In angry times like these, never open a hive till you have blown two good puffs of smoke in at the entrance with a couple of minutes interval between them—then take off the cover, lift a corner of the quilt, smoke, then the other three corners in succession, smoking a little at each; then quickly and firmly, but quietly peel off the quilt, smudge down the bees, and do what you have to do. A little coal oil squirted amongst the smoker fuel helps considerably.

The next thing that the novice will discover not quite according to book is, in spring a quarter of his bees will be dead. I am afraid that here I cannot comfort him except by saying that wintering with success is a thing that we all have to learn by experience and by experience only. However, if he has the right kind of grit, this failure should only nerve him to greater care and fresh efforts towards future success. As a preliminary, he should, of course, try to diagnose the cause or causes of the mishap. Perhaps I may with advantage obtrude a few observations as to the basis on which his self-examination should be conducted. First, did he take care to unite all weak colonies early in the autumn? Unless he is very unlike other novices the answer will be, no, he was too anxious to go ahead and have a big apiary quickly. Secondly, did he leave his bees alone during winter? Here again I fear the answer will be no, he went and shook them up about twice a week to make sure they were alive. He probably had the satisfaction of finding that they were so through about three parts of the winter, and then suddenly found that this violent solicitude had been a little more than their constitutions could survive, and that they had succumbed. Thirdly, perhaps most important of all, were his covers really watertight? If not, that explains everything. However, sheet iron, shears and roofing nails are all cheap, and these with a little paint are all that are required to remedy the matter for next time.

And so having got our beginner through the first winter, not too successfully, but probably quite as successfully as is good for him, let us close with a word of advice to him (which, of course, he will not follow) for the spring. Do not let him give way to the mania for sudden increase. An apiary that is artificially swarmed too much is like a man who has been bled to exhaustion, it is so weak that nothing will succeed with it—at least in the hands of a beginner—certainly next to no honey will be obtained. Even if a profit is tried to be written in by valuing the new stocks at six dollars each; what with all the sugar that will have to be bought to get them into shape for the winter, and the number that will die before spring, a great part of this will be dissipated.

So my final advice to beginners in apiculture is "go slow and you will go sure."

DISCUSSION ON BEE-KEEPING.

In answer to questions, Mr. Selwyn said he recommended the Italian bees because they are more tractable. They remain on the comb perfectly quiet when you open the hive. They also guard their hives very much better from robbing bees, and bee moths. The black bees will succumb at once to robbers whom the Italian bees would drive off.

Mr. Brodie—Have you proved that spraying trees in bloom will kill the bees?

Mr. Selwyn—Oh, yes, it will kill them in thousands.

Mr. Brodie—Some people think the bee is such a wise insect it won't touch the poison.

Mr. Selwyn—It won't touch the poison if it detects it; but if mixed with the nectar, he does not notice it till it gets into the honey sack. It is not as bad for the bees as for the brood. The chief symptom of the poison is extension of the abdomen. It extends the membrane of the stomach to an abnormal size, and the poor bees crawl round unable to fly. They drag themselves out of the hive and die.

Mr. Brodie—I see the Legislature are going to pass an act to protect bees

Mr. Selwyn—I was glad to see that. In Ontario, where the bee-keepers are very progressive, they stop spraying during blossoming time. Year by year bee-keeping is becoming a more important industry, and I have no hesitation in saying that in the near future it will take a prominent position in the agriculture of Canada. The yield of honey which can be obtained during a fairly good season is very great, and in a *good* season, such as last year, it is simply marvellous. I have two pupils near me at Rockcliffe, who had no idea of bee-keeping two years ago, and now have 100 colonies, and produced 4,300 lbs. of honey last year. The year before they worked with me, and no doubt have had exceptional advantages, but it shows what can be done. One of them, Mr. Kendall, is working at Mr. Edwards' saw-mill during the day, and the other, a Mr. Allan, has most of his time to devote to the bees. I got 4,700 lbs. of honey, and they got 4,300; yet we are only a quarter of a mile apart. Some people would think it impossible to keep so many bees in that small area, and I don't consider Rockcliffe a first class locality. It is bounded on one side by the Ottawa, and we lose a great many bees through their being blown into the river. Our product was practically all white clover honey, and much of the land is barren.

Mr. Shepherd—What price did it average?

Mr. Selwyn—I never sold a pound of honey at less than \$1.20 a dozen sections wholesale, and 10 cents a pound for extracted honey. Usually the comb honey is 15 cents and extracted 10. Of course the extracted honey is cheaper to produce, because for comb honey you have to provide the section and the foundation.

Mr. Shepherd—How do you explain them selling at the same price?

Mr. Selwyn—I think a great many people are prejudiced against comb honey because they do not like the wax, and they like to have it separated.

Mr. Wintle—It is a little easier to handle, too.

Mr. Selwyn—Yes, but the comb honey is put up so well now that it is not difficult to handle.

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Mr. Wintle—It was
honey at 15 cents.

Mr. Smith—Yes,

Mr. Shepherd—It is so much more delicate in flavor that I am surprised at anyone not taking it in preference to extracted honey. Perhaps the latter is in greater demand for manufacturing purposes.

Mr. Selwyn—There may be something in that.

Mr. Shepherd—Is it exported to any extent?

Mr. Selwyn—Several apiarists in the West have attempted to export, but it has not been very successful, owing probably to the fault of the agents on the other side. I could never see why it should not be a success, because the prices paid in England seem to indicate that we could realize 14 or 15 cents on the English market. I think it is only a question of putting it in the proper hands. I believe there is an unlimited demand in England, if we supply a good article, but it must be good. They do not mind paying the price, but they want the quality. I suppose it is the same with apples.

Mr. Shepherd—Certainly. It is no use sending anything but the best quality.

Mr. Johnson—I should like to ask Mr. Wintle what he uses coal oil for?

Mr. Wintle—I put it into the fuel, but only with a particularly vicious colony.

Mr. Selwyn—When colonies are wicked, I simply do away with the queen as quickly as possible, and substitute another. I never think it is worth while having a cranky hive. It is like keeping an angry bull about the place. There is as much difference in the temper of bees as of cattle. One queen will go on with her work while you hold the comb in your hand. Another is nervous and excited, and it probable that her bees will be the same. I think the best way is to get rid of her, and substitute another, which will be more tractable.

Mr. Johnson—I quite agree with Mr. Wintle that it is not worth while to purchase a comb foundation machine and make your own. I got one, but I find I can buy a foundation which is much superior.

Mr. Wintle—A good factory keeps up a temperature of 110° while the work is being done, and there are very few bee-keepers who can obtain the conditions.

Mr. James Smith, (Westmount)—I had over a ton of honey, and I could not get ten cents a pound for it. I wrote to a friend in England to see what could be got for it; he tried Liverpool and London, and I was offered 5 or 6 cents only.

Mr. Wintle—It was extracted, I suppose, because I had an offer for comb-honey at 15 cents.

Mr. Smith—Yes, it was extracted.

Dr. Saunders—Some shipments were sent from Brantford, but the agents in England reported that it was not satisfactory; they said it had a peculiar flavour, which they described as minty. But Mr. Holderman told me it was quite free from any objectional flavour. We made inquiries about prices in New York, but they did not strike me as encouraging, though I do not remember the details. I think the bee-keepers can do very much better with their honey at home. Still, the English market should not be abandoned at the first attempt. It is certainly a matter worth investigating, but it must be remembered that our honey would have to compete in England with large shipments from South America, Brazil and other countries, where they make honey all the year round.

Mr. Wintle—I think that is all extracted honey.

Dr. Saunders—Yes, and I think that shipped from Brantford was extracted.

Mr. Selwyn—A gentleman who saw my comb honey said he had not the least doubt that in England he could get 17 or 18 cents a section for it.

Dr. Saunders—The difficulty is to get hold of the right man. Some of the agents seem to want to make all the money themselves.

Mr. W. Craig—I was very much interested in what Mr. Selwyn said about clipping bees. The difficulty, to my mind, would be to get hold of the queens.

Mr. Selwyn—I find I can easily pick out my queens. Every queen has her own characteristic look.

Mr. Johnson—If you clip, you must be on the spot. Otherwise you will probably lose some valuable queens.

Mr. Selwyn—That is quite right. If you have less than twenty hives, I would let them swarm a second time.

Mr. Wintle—I should like to ask Mr. Selwyn if he has tried entrance guards.

Mr. Selwyn—Yes, but I find they hinder the work of the hive by knocking off the pollen and blocking up the entrance.

The Committees were then appointed as below :—

Nominating Committee.—Messrs. Fisk, Chapais and Brodie.

Fruit Exhibits.—Messrs. Hamilton and Macoun.

Resolutions and Legislation.—Dr. Wood, Mr. Shepherd, and the Secretary.

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EVENING SESSION.

Mr. C. P. Newman, Vice-President, was in the chair and briefly introduced Dr. Saunders, Director of the Dominion Experimental Farms, who delivered a very interesting lecture on "Horticulture at the Experimental Farms," illustrated by about a hundred lantern slides. Dr. Saunders said:—While the primary object in view in the establishment of Experimental Farms in Canada was to assist the farmer in his endeavours to overcome the difficulties attendant on his work, and to devise such measures as were likely to result in making farming in Canada more profitable, it was not intended that the work of the farms should be limited to these important lines. The act to which these farms owe their existence prescribed among other subjects of investigation, "that they were to test the merits, hardiness and adaptability of new or untried varieties of fruits, plants and trees," with the object of assisting those engaged in gardening and fruit growing and also "to conduct experiments in the planting of trees for timber and for shelter." It is to horticulture in this larger aspect that I propose to call your attention this evening, and to show you by a series of photographic views what has been done during the past ten years by the Experimental Farms, not only to advance fruit growing, but also to awaken a greater interest in the subject of horticulture generally by demonstrating what can be done, notwithstanding climatic disadvantages, in the way of growing beautiful trees, shrubs and flowers in the different climates of Canada, and to indicate how some of the hardier forms may be utilized for wind breaks and the making of hedge enclosures so as to shelter and protect such species and varieties as are more tender.

I shall first introduce to your notice some scenes on the Central Experimental Farm.

Eleven years ago this farm was a very rough place, comprising 465 acres of land, a large part of which was covered with stumps and stones. There were also 140 acres of second growth timber to be cleared and 40 acres of swamp to be drained. This has all been cleared and reclaimed and brought into a good condition of cultivation.

While much the larger part of the land has been devoted to agricultural purposes, 42 acres have been set aside for the testing of fruits and vegetables and about 8 or 10 acres devoted to ornamental planting along the margins of the main roads and about the buildings. Further, sixty-five acres have been devoted to the establishment of an Arboretum and Botanic Garden, where trees, shrubs and plants from all parts of the world are being brought together and so arranged as to give to each individual the necessary space required to attain to its full growth.

A number of views were then thrown on the screen showing the development of the trees and shrubs planted on the farm.

Some very interesting hybrid fruits have been produced at the Central farm, one of which, although of no practical value as a fruit, is of much scientific interest, viz., a cross between a black currant and a gooseberry.

In the many tests made with apples and crab apples in the Canadian Northwest, the only species which has stood the climate without injury and fruited freely, is a small Siberian crab, known as the berried crab *Pyrus Taccata*. This is a very ornamental tree, low branched and well adapted to resist the force of the prairie winds. The fruit is very small, about the size of a cherry. This has been crossed with many of the hardier forms, such as Duchess, Anis Tetofsky, Elcelsior, Fameuse, Red Astrachan, Yellow Transparent and others, with the expectation of raising seedlings from these crosses with larger fruits such as will be useful in the North-West country.

I shall now give you some fragments in connection with the horticultural work. One of the earliest flowers in the spring is the Russian Columbine, *Aquilegia*, *Oxysepola*, a lovely flower of a rich deep blue, with petals tipped with yellow. Another very useful and hardy perennial is the double form of *Spiroea filipendula*, a beautiful pure white flower, forming large masses compared with the size of the plant.

Many difficulties were experienced in the early efforts to grow some kind of spring flowering bulbs, in Ottawa, notably hyacinths and narcissus. To meet this difficulty an evergreen enclosure was planned to catch the snow in winter, using Norway spruce and Arbor vitae for this purpose.

The lilacs are among the most useful and attractive ornamental shrubs in spring and many of them flower early. Among this, handsomest of the many forms of the common lilac *syringa bulgarus*, brought originally from Persia and Hungary, the following are worthy of note:—

The White Lilac, a pure white single form Charles the 10th, which is one of the first bloomers of them all. The flowers are single, of a rich reddish purple colour, and very fragrant.

President Carnot—This variety produces large trusses of deep lilac coloured flowers, which are singles.

Frau Damman is also a single form, but of a very pure white; the flowers in this variety are produced in very large, loose and graceful clusters.

Emile Lemoine is a variety with very double flowers of a fine reddish lilac colour. It is a very free bloomer, producing its flowers in large clusters.

One of the best of all the new varieties which have yet bloomed at the Experimental Farm is Madame Abel Chateau. This is a pure white and very double flower of great substance. The individual flowers are large and waxy in appearance; the flower clusters are very large and the shrub blooms very freely.

Among others desirable are Persian and its cross *Rothamagensis*, flowers small, bluish purple. Josibea from Hungary, Emod is from the Himalayas, Oblata from China, Villosa from North China, Amurensis from the Amur, and Japonica from Japan. A judicious selection of these will now extend the period of blooming to about a month.

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The Spiræas al is a lovely shrub, w ally covered with m and is very graceful genus, which has a attractive. There a are well worthy of a

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The Tartarian, or Bush Honeysuckle (*Lonicera Tatarica*), is a very free bloomer and one of the earliest of flowering shrubs in the spring. When covered with its pink or white blossoms or later with its bright coloured berries, it makes a very pretty object on a lawn.

The Spiræas also are very free and early bloomers. Van Houtte's spiræa is a lovely shrub, which during the latter part of May or early in June is literally covered with masses of white bloom. It has a pendulous habit of growth, and is very graceful in form. Spiræa Bumalla is another species of the same genus, which has an upright form. This is also a free bloomer and is very attractive. There are a large number of species in this group, and many of them are well worthy of a place in the flower border.

The Wiegeliæ are very beautiful Japanese shrubs, which are not entirely hardy at Ottawa, the young wood being usually killed back by the severe weather in winter. In most instances, however, a sufficient quantity of the wood survives to give a considerable amount of bloom.

Siebold's Variegated Wiegelia has proved one of the hardiest forms at the Central Farm. It blossoms profusely in its season and its variegated foliage makes it specially attractive.

The different species and varieties of Philadelphus (known as Syringa or Mock Orange) are charming bushes and are quite hardy. The flowers vary in size from one to two inches across. Some are single and some double, and most of the varieties are richly perfumed. Philadelphia Speciosissimus is one of the largest flowering sorts. There are many other varieties which are free bloomers.

Among the species of Cornus, or Dogwood, there are also some useful flowering shrubs. The Liberian Cornus is a very shapely and hardy sort (*Cornus alba* var *Siberica*.) It is very pretty in summer. When covered with its flat white clusters of blossoms and when devoid of foliage in winter, its brilliant red stems form a beautiful contrast with the white background of snow.

The variegated Dogwood (*Cornus Variegata*) is one of the most beautiful of shrubs at all seasons. The foliage is richly variegated with silvery white, and the variegation is well maintained throughout the season.

The snowball—*Viburnum opulus* var *Sterilis*—is an old-fashioned species, but a most desirable one for the shrubbery border. During the blooming season it is literally covered with globe-like masses of snow-white blossoms.

The *Viburnum lantana*, or Wayfaring tree, is a very handsome shrub, with richly veined leaves and flat clusters of white flowers, succeeded by bunches of berries which at first are red, but turn black when ripe. This is a native of Great Britain, and is a very hardy and a free grower.

The American Arrow-wood (*Viburnum dentatum*) is another member of the same genus, but a native of this country. It is smaller than the last mentioned, but is attractive, especially when in bloom.

Later in the season the Japanese Hydrangea (*paniculata* var-*grandiflora*) becomes a very prominent object in the collection of shrubs, from the large bunches of flowers so freely produced at the end of each branch. This species has found its way into public favor very rapidly. Only twenty-four years have passed since it was first introduced from Japan, and during that comparatively brief period its merits have been universally recognized, and it has become one of the most widely distributed and favorite shrubs in cultivation.

I shall next show you a few of the trees which we find most hardy and attractive at the Central Farm, and as the evergreens maintain their handsome appearance throughout the year, and on this account are of especial value, attention will at first be called to a few of these.

The Scotch Pine (*Pinus Silvestris*) is a handsome tree. The rich green colour of this species makes it an attractive object at all times. Trees of 18 inches high planted nine years ago now measure 15 feet in height.

The Norway or Red Pine (*Pinus Resinosa*) has a stately habit and a softer outline than the Scotch Pine. It also makes a beautiful tree.

The Austrian Pine (*Pinus Austriaca*) is a very stately evergreen, of fine form and habit, very hardy, and a fairly vigorous grower. A tree planted seven years ago of 18 inches, now measures about 8 feet in height.

The Mountain Pine (*Pinus Montana*) is a very desirable object for a lawn. It has a low-growing, bushy habit, with branches close to the ground, and is well adapted to localities where space is limited.

The Heavy wooded Pine (*Pinus Ponderosa*) and the common White Pine (*Pinus Strobus*) are also very handsome trees.

Among the different sorts of spruce the native White Spruce (*Picea Alba*), the Norway Spruce (*Picea Excelsa*), and the Black Spruce (*Picea Nigra*) are all valuable trees. So also is the Japan Spruce (*Picea Alcockiana*), but the Rocky Mountain Blue Spruce (*Picea Pungens*) is without doubt one of the most valuable introductions of late years and ranks among the most beautiful of hardy evergreens. The foliage in some specimens assumes a rich shade of steely blue, most striking in the early part of the summer, when the new growth of the season is well advanced. Many of these trees have been planted in exposed places on the Experimental Farm at Ottawa during the past eight years, and all have proved perfectly hardy.

The Arbor vitae, or White Cedar, is a very handsome tree (*Thuja occidentalis*), of which there are many interesting varieties in cultivation. Some are close, compact and dwarf in their habit; others are larger and more loose and graceful. The foliage of one of the varieties known as Douglas's Golden Arbor Vitae has a golden yellow line. This is a brilliant object on a lawn and also makes a beautiful hedge. Another form grows like a pyramid and is of a very stately character. This occupies very little space on a lawn, but soon becomes a most striking and interesting object.

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The European Larch (*Larix Europea*) although not an evergreen, belongs to the group of conifers, and is related to the pines. This makes a beautiful tree, which has a very graceful drooping habit. It is a rapid grower.

Among the deciduous trees the European Mountain Ash (*Pyrus aucuparia*) is very ornamental when well grown and clothed with branches to the ground

Its beautiful foliage and abundant clusters of white blossoms, in the spring, succeeded by branches of scarlet berries in the autumn, makes it attractive throughout the season.

The Katsuro tree (*Cercidiphyllum japonicum*), from Northern Japan, is an interesting tree, which is quite hardy at Ottawa. The unique character of its foliage, strong and beautifully veined, as well as its handsome form, render it most desirable.

The Cut Leaved Birch is one of the most ornamental trees grown and exceedingly graceful in habit.

Castana sativa var *Americana* is a useful tree. This is a native of Western Ontario, but is grown with some difficulty at Ottawa. After several failures we have two or three of these trees well established, one of which blossomed last spring.

The Russian Olive (*Oleagnus hortensis*, var *angustifolia*) is a small tree of graceful habit, with foliage and branches of a charming silvery hue, which is best brought out from a background of dark green growth. It is a very hardy tree and when in blossom its numerous small yellow flowers fill the air with their fragrance.

Among the hardy varieties of Poplar introduced from Russia one has been found of value, especially in the colder sections of the Dominion. This also makes a fairly handsome tree. It is known under the name of *Cercolensis* and being a rapid grower it sometimes serves a very useful purpose in providing quick shelter for more tender things.

More pictures of the flowers grown in the enclosures were then thrown on the screen and were followed by a few views of the farms at Brandon and Indian Head, showing the progress made in tree culture in the North-West. They were much admired and loudly applauded.

Prof. John Craig then gave a very interesting address on strawberries, also illustrated by numerous lantern views. He said:

STRAWBERRIES.

BY PROF. JOHN CRAIG, Horticulturist, Iowa State College.

The cultivated strawberry of to-day is a native of the Western hemisphere, but came to us by way of Europe. In the early days, when explorers were busy on this continent, many new plants were carried off to the Old World, and there their economic value was discovered. Later on, settlers brought back the

seeds of these fruits, often after the varieties had been greatly improved. There are three principal wild species of strawberry. The original Chilian strawberry, known to science as *Fragaria chiloensis*, the European strawberry, *Fragaria elatior* and the Virginian *Fragaria Virginiana*.

These three types enter very largely into the cultivated forms of to-day, but the Chilian seems to have predominated. This type was brought to notice no longer ago than 1836, by one of the foremost cultivators of that time, Mr. C. M. Hovey, of Boston.

Members of the society are familiar with the difference between the self-fertilizing varieties and those which have not the power of self-fertilization, so I need not dwell on this point. In the former the flowers have both pistils and stamens, in the latter the stamens are wanting.

I shall now give you a sketch of the strawberry industry as carried on at Oswego, N. Y. One of the first things to do is to prepare the ground thoroughly. There is nothing better than clover, which enriches the soil more cheaply than any manure we can manufacture. Alfalfa does very well on a sandy soil, mammoth red on ordinary soils. If we would have our strawberries run down well into the soil, we must plough deeply. By this means we still allow the water to percolate to lower depths, and the strawberry is one of the hardest drinkers and greediest feeders in the vegetable kingdom. The plants are set out in rows two by four feet apart or a little more. The ordinary plan for commercial purposes is to plant 30 by 36 inches apart and allow the plants to run so that they become "matted rows."

So far as I have been able to discover, the first strawberries were planted at Oswego in 1853. In 1863 the first strawberries were sold on the market at Oswego in large boxes, at one cent for each berry. At this price they excited a great deal of public attention, and four years later all the markets were supplied. Towards the end of the decade, 1867 or 1868, the Oswego strawberries began to cross the line into Canada at Kingston, and early in the seventies they found their way into Montreal. At that time they were packed in baskets which held about four quarts, and crates were used which cost \$3.75 each. The industry developed rapidly thereafter. The fruit improved in flavor and texture and the demand extended.

The transportation facilities were also improved. They were at first shipped by express at considerable cost, but later by refrigerator car. Now not simply car loads of strawberries go from Oswego to Boston and New York, but train loads.

The Oswego growers, when they go into the business now, make up their minds what kind of market they are going to cater for—the general demand, or a special market, which gives high prices for fruit of first rate quality. The "special market" man grows one or two varieties and sets the plants a little closer together than ordinary. Only four runners are allowed from each plant, two on each side. He picks the fruit with great care, and grades it before shipping. The larger berries are put in special boxes, all points up, and the boxes wrapped in parafined paper to prevent bruising.

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In 1896 the strawberry growers of Oswego sold their berries wholesale at 12 cents per quart; in 1897 the price was 10 cents. Last year the crop was so enormous that the market was glutted, and the price fell to 8 cents. When you consider that they count 9,000 quarts to the acre a reasonable return, you will see there is money in it.

STRAWBERRIES UNDER GLASS.

There are people who can afford to buy strawberries in winter, and this has become quite an industry in New York and Boston. The plants are potted in the field in September so as to allow them to become well rooted. They are taken up before the frost comes and the pots are set in cold frames, to be protected from freezing and thawing. Next they are taken into the forcing house, and in about six weeks the flowers and young fruit will form. Of course the conditions inside are quite different from outside. Outside we have the wind and the insects carrying pollen from one plant to the other, and the flowers are fertilized by natural agencies. Inside the pollen must be carried by hand. The grower usually collects a considerable quantity in some small vessel, and transfers it by going from one plant to another.

The clusters of berries are protected from injury by light wire screens.

A berry of the Marshall type—bright, glossy and shining, is the most suitable for indoor growth. There are grown from 6 to 12 berries to each, but probably 7 or 8 would be the average number. The price varies according to the competition of southern berries grown outside, but on account of their superior quality the indoor berries fetch three times as much.

Glen Mary has done very well in some localities; in others it has not been satisfactory. It is uncertain.

Bederwood is very good as an outdoor berry, but for forcing it is very little used, as it is too light in color and too soft in texture.

Sharples does well, but is rather light in color also.

Among the enemies in the house the red spider is perhaps the most difficult to contend with. It is very small, and you cannot use fungicides. A strong spray of water is the best. Any plants that are affected must be carefully watched, for if it once gets ahead it is impossible to control it.

The lecture was one of practical value as well of great interest, and was listened to with the utmost attention.

MORNING SESSION

Tuesday, February 1st.

Mr. Chapais presented the following report, which was adopted :

REPORT OF COMMITTEE ON NOMINATIONS.

Your Committee on Nominations begs leave to report as follows about the list of Officers and Directors for the present year :

Honorary President—Hon. H. Joly.
 Honorary Vice-President—Hon. S. Fisher.
 Honorary 2nd Vice-President—A. Dupuis.
 President—C. P. Newman.
 Vice-President—Dr. Wood.

DIRECTORS

No. 1 District—W. M. Pattison.
 “ 2 “ —J. M. Fisk.
 “ 3 “ —J. H. Carter.
 “ 4 “ —Dr. Bolduc.
 “ 5 “ —J. C. Chapais.
 “ 6 “ —R. Hamilton.
 “ 7 “ —W. Tremblay.
 “ 8 “ —R. W. Shepherd.
 “ 9 “ —R. Brodie.

It is supposed and hoped that our worthy Secretary, Mr. Dunlop, will continue to fill the position of Secretary.

J. C. CHAPAIS,
 R. BRODIE,
 J. M. FISK.

The minutes of the last annual meeting were read and approved.

Mr. Herrick moved the following resolution :

“That our worthy Secretary be requested to procure all the information possible in regard to exporting fruit of all kinds, including the names of forwarding and commission houses in Canada and Europe ; where packing cases, baskets and barrels can be secured at lowest prices, names of such houses and their addresses, the same to be embodied in the report which we propose to issue in March or April of this year. As I understand, this Association is a mutual one for the benefit of each one of its members in particular and the Dominion of Canada in general. Real true co-operation produces power. I think if we co-operated, we could get our Paris green, sulphate of copper, and other things necessary for the orchard at the lowest wholesale prices.”

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MR. W. W. DUNLOP

Dear Sir,—At t held at St. Catharin of our apples and ot much fault was fou arrive in the British

Mr. Fisk seconded. He thought the idea was a good one, though it was perhaps open to the objection that by naming one particular firm they would establish a monopoly.

Mr. Chapais said a similar suggestion was made at the Quebec Dairymen's Association, and the Board of Directors felt it would be dangerous to adopt it on the ground Mr. Fisk had mentioned.

Mr. Herrick—The Secretary could give the names of several houses.

Mr. Brodie—I generally get my sulphate of copper and Paris green at wholesale prices. I get the sulphate of copper by the hogshead. The cheapest I ever paid for it was 3¼c. a few years ago. Before that I bought 30 or 40 lbs. at a time and paid 8c. for the same stuff.

Mr. Herrick—I have paid 10c.

The Secretary—The conditions are always changing, and the information we gave at one time might not apply to the future. But we might get prices from leading houses and issue them in a circular to the members. It would be a dangerous thing to recommend a commission house, for you never know how they will turn out.

Mr. Fisk—Could it not appear with the notice of the plant distribution?

The Secretary—Well, we have not yet decided what we are going to distribute. Last year we had to change a great deal owing to the San Jose Scale Bill excluding American plants. Our nurserymen have hardly caught up to the demand yet, but I suppose it is only a question of time.

Mr. Herrick—Some of the country members do not know the names of the firms or how to get prices.

The Secretary—It depends on the quantity. The only way to effect a saving is to get the fruit growers in each section to combine, and divide a barrel between them.

Mr. Newman—The important point on Paris green is not so much the price as the quality; and if you pay a high price, you are not at all sure that the quality will be good.

The resolution was agreed to.

The Secretary read the following correspondence:—

GRIMSBY, December 8, 1898.

MR. W. W. DUNLOP, Montreal, Que.

Dear Sir,—At the recent meeting of the Ontario Fruit Growers' Association, held at St. Catharines on the 1st and 2nd instant, the subject of transportation of our apples and other fruits on shipboard to Great Britain was discussed, and much fault was found with the present methods adopted, by which our fruits arrive in the British markets in a bad condition.

A committee was appointed to consider this matter, and to urge upon the Government the appointment of officers whose duty it shall be to see that proper ventilation and greater care be given to the storage of apples and other fruits exported to Great Britain on ocean steamers.

I was authorized to correspond with your Association, and those of Nova Scotia and Prince Edward Island, asking for the co-operation of the Provincial Society in this work. I shall write to the Minister of Agriculture asking him whether he would receive a united delegation from all societies, or whether he will prefer to simply receive memorials from each of us expressing our views upon this question. When I receive his reply I will correspond with you farther.

In the meantime, will you be kind enough to bring this matter up for discussion at your next meeting so that we may bring to bear all the influence possible upon the Department of Agriculture. We believe that money cannot be spent better by the Government than by encouraging the export trade of fruits. Not only is it important that our fruits be carried in a proper manner, but it seems to us also worth considering whether we ought not to ask the Minister of Agriculture to provide for the inspection of fruit in boxes, where such inspection is desired on the part of the shipper. Some of us in Ontario have been shipping fancy fruits in small packages, in accordance with the advice of the Dairy Commissioner, Prof. J. W. Robertson. The package has been figured in the *Canadian Horticulturist* and also in Prof. Robertson's report. This package has been branded "Inspected Canadian Fruit," and has, so far, been inspected at the cold storage warehouse at the point of shipment by a Government inspector. Of course, it might not be everyone who would wish to have his apples pass such an inspection, but a large number might desire to have the inspection brand, for no doubt this would bring higher prices in the British markets. I do not think it would be practicable to inspect apples in barrels, but I think it would be possible to inspect apples put up in boxes. They can be easily opened and, if one in ten were opened at random, it would surely be a sufficient guarantee for the inspection mark. The Inspector, of course, would refuse to brand the whole of a shipper's lot at any shipment when he found even two or three packages not true to the grade named.

Yours truly,

L. WOOLVERTON, *Secretary.*

GRIMSBY, December 17, 1898.

MR. W. W. DUNLOP, *Secretary Pomological Society,*
Outremont, Que.

Dear Sir,—At a meeting of the Ontario Fruit Growers' Association held in the city of St. Catharines, Ont., on the 1st and 2nd instant, a committee was appointed, consisting of L. Woolverton, Secretary, W. M. Orr, Vice-President, and A. H. Pettit, a member, to make representations to the Dominion Govern-

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ment asking for the appointment of officers to secure the proper storage of fruit on ocean steamships and the proper ventilation of all holds in which fruit is stored for ocean shipment to foreign ports.

A resolution was also passed authorizing the Secretary to communicate with the various provincial societies requesting them to appoint one or two delegates to join the delegation from this Association to interview the Government and urge upon them the importance of appointing officers whose duties it shall be to see that proper ventilation and proper care be given the storage of apples and other fruits, and that the Secretary make all arrangements and dates for the meeting of such deputation. It was also decided to discuss with the Government the advisability of some system of inspection.

I have been corresponding with the Minister of Agriculture regarding the receiving of this deputation, and have received a letter in which he suggests that I communicate this resolution to the various provincial associations and get them to endorse it, or else pass a similar one, and then send them all on to him. He writes that he will be very glad to do his best to meet the requirements.

I am, therefore, writing to all the associations asking that such a resolution be passed and forwarded to me at as early a date as convenient, and I will have them all forwarded to the Minister of Agriculture.

The inspection part is the only one to which I need refer. The idea in my mind with regard to that is simply that the Department should provide an officer who would inspect fruits, if the shipper so requested, so that, on the payment of a small fee, every shipper might have the privilege of having his goods receive the inspection brand, and thus enable him to secure higher prices in the British markets. Further, I think this inspector should be empowered to prevent the shipment of any goods which were marked with the Government brand of grading, unless they were found to be as represented by the brand. This would tend, I think, to give greater confidence to foreign buyers in the fruit shipped from our country, and help us to secure sales at home to foreign buyers. The carrying out of this might be difficult, but I think that, if the inspector found one package in ten of a certain brand not up to the standard, he might refuse to allow that grade to remain branded upon the lot of that kind of goods. However, this is merely a suggestion for your consideration.

Yours truly,

L. WOOLVERTON, *Secretary.*

Mr. Brodie—I think it would be very useful to have a man to look after the cold storage, but I don't see how it would be possible to inspect the fruit when they ship 20,000 or 30,000 barrels a week. It seems to me the inspection needs to be done on the other side, where we are subject to be swindled by the commission men.

Mr. Carter—I am sure the time will come when we shall have an accredited agent to receive our produce in England, not only fruit, but butter and cheese. The man's salary would be amply recompensed and it would pay from the start.

Now we are at the mercy of the people we ship to. They may be honest and fair men; but there are dishonest men in England just the same as there are here.

The Secretary—With regard to cold storage accommodation, inspection may be necessary in the initial stages, but in the end competition will right the matter. The men who refrigerate properly will get the trade. As to inspection of fruit, it is evidently better that it should be done on the other side.

Mr. Brodie—Professor Robertson told me that the Government have already an agent over there to report how these shipments in cold storage arrive.

Mr. Carter—I think the man should be an accredited agent of the Government, and have authority to interfere if any fraud or crookedness was going on.

Mr. Fisk—Mr. Woolverton, in his letter, speaks of the inspection of fruit sent in boxes, but the barrel is the acknowledged commercial package for apples. For some reason or other there are constant reports of wet and slack barrels, which are put up at auction and sold at prices hardly meeting the cost of transportation. Something ought to be done to remedy this. I have shipped at different times barrels of very fine apples to my friends on the other side, and invariably they have arrived in poor condition. Of course there was no cold storage in that day. Now that there is, there should be no cause for complaint. I think some means should be adopted to see that the fruit is properly received.

Mr. Orr—Some years ago our association appointed a committee, which investigated this matter thoroughly, and decided that the inspection of fruit was impossible, owing to the large quantity exported. All that could be done was to make every man brand his own package, and any man putting up a package in which the top layer did not represent the whole should be guilty of a criminal act. I think that would meet the requirements of the case. There is so much greed and fraud in the packing of fruits. It is simply amazing that men will not learn from experience that it does not pay to do it. If you look at the last reports of prices in England, you will find there are apples selling at 10s. and the same variety fetching 22s. It means poor fruit or fraudulently put up. Mr. Tweedie sent apples to Germany, which had to be trans-shipped to London, and all arrived in perfect condition. If fruit were properly put up we should hear less about wet and wasty barrels. Bad packing gives dishonest commission men an excuse for defrauding honest packers. I do not believe all commission men are dishonest, but I think some are. I do not think the inspection of fruit is possible, but it is all right to see that the cold storage arrangements are good, and to look after its arrival on the other side. For the rest, we must get at the growers, and I know of no better way than the one I have indicated—to make packing poor fruit in the middle of the barrel a criminal act.

The Secretary—That would require further legislation.

Mr. Orr—Yes.

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The Secretary—Have any steps been taken to secure such legislation in Ontario?

Mr. Orr—I think not. Unfortunately a good many fruit growers are not in favor of such steps being taken.

Mr. Fisk—Would it be Dominion or provincial legislation?

Mr. Chapais—It is a matter of trade. It would be federal.

Mr. Newman—I agree with Mr. Orr that the inspection of barrels is impossible, apples are not like butter and cheese, which are uniform; there are so many grades of fruits. But the legislation suggested by Mr. Orr seems somewhat severe.

Mr. Orr—I do not think it severe. Are we going to condone a fraud?

Mr. Brodie—We all like to brand our name on first class fruit, but when it comes to second or third class, we are not so proud of it. I put a private mark on it, but of course it is sold as what it really is, second class fruit. It is surprising how few fruit-growers know how to pack properly. They are always afraid to put enough fruit in and press the head close. It would be a good thing for an inspector to go through the farming community and show them how to pack.

Mr. Newman—The inspector of cold storage might also endeavor to arrive at some idea of the quantity of fruit coming and regulate the shipping. After the heavy crop of apples three years ago, 2,000 or 3,000 barrels were left on the wharves for two or three weeks, though they had covers on, they must have suffered considerably.

Mr. Shepherd—There is no doubt that shipments packed by honest men are often seriously affected by a small lot of dishonestly packed fruit. It is with the idea of getting at these dishonest men that the inspection of fruit is suggested. I wish it could be done, but it does not seem to me to be practicable.

Mr. Hamilton—Could legislation be obtained to oblige every man to brand his barrels, so that if they turned out to be dishonestly packed the fraud could be traced back to him.

Mr. Chapais—We have such legislation with respect to cheese.

Mr. Hamilton—I do not see why we could not have it with respect to apples, so that every man would be held responsible for the apples he exports. If a man sends dishonestly packed barrels, to the detriment of good and honest packers, that man ought to be made to suffer.

Mr. Shepherd—In that case it would be necessary to define very distinctly what a No. 1 apple is. If you take half a dozen growers, they will have half a dozen different ideas about it. Some people call what I consider No. 2 apples No. 1; but it is because their classification is not so severe as mine. It is a very delicate matter and there are many difficulties in the way.

Dr. Wood—There would be more difficulty in defining the second and third grade of fruit than the first. I should say the first should be all perfect apples, uniform in size. But I don't know how you would define the second and third.

Mr. Orr—After discussing the matter very thoroughly and defining a first class apple as perfect in form, size and color, we found a satisfactory classification impossible. One man's first class apple may only be equal to another's second class. It is impossible to set up any absolute standard. But if you require that the outside layer shall fairly represent the contents, that covers the whole ground.

Mr. Hamilton—On the other side apples are sometimes sacrificed, perhaps dishonestly, and some one ought to be there to see that the auctioneer handles the fruit honourably. The top layer may be crushed by too tight packing, but that is no reason for selling the whole lot for next to nothing, as I believe sometimes happens.

Mr. Brodie—They empty one barrel into a basket and open up one or two of the others.

Mr. Hamilton—There is an impression that dishonesty prevails, and that barrels are preferred because they give the opportunity for it.

Mr. Shepherd—I ship as little as possible to commission men. If your fruit is good and there is a demand, you get well treated; but if there is a glut, you get very poor treatment. I prefer to deal with people who know my brand, and will put a price on my apples before they are shipped. Of course large orchards which ship thousands of barrels must deal with commission men, but they run great risks.

Mr. Orr—Every dishonest package not only injures the man who sent it, but every honest grower as well. If people had good fruit and could depend on its being first-class, there would be double the quantity consumed. But when they are sold a bad bushel or barrel, they stop right off.

The following resolution was then carried unanimously :—

Moved by Mr. J. M. Fisk, seconded by Mr. J. E. R. Herrick,

That this Society concur in the resolution of the Ontario Society recommending the appointment by the Government of inspectors to secure the proper storage of fruit on ocean steamships for export to foreign ports, and that the President, Secretary and Mr. R. W. Shepherd be appointed a committee to co-operate with the Ontario Society and interview the Government if necessary.

[The Secretary read a letter from Mr. Dupuis with reference to the Fruit Exhibit at the Paris Exhibition, but after a short conversation it was decided that the resolution passed by the Society at Cowansville meeting met the necessities of the situation.]

Mr. Macoun presented the report of the Fruit Committee, which was approved, as follows :—

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The Committee on Fruits begs to submit the following report:—Six collections were shown.

Mr. Asa Johnson, of Cowansville, exhibited 25 varieties, all winter apples. Among these may be mentioned the Kin-Kead, a very handsome apple of good quality, but not generally grown; also two apples unknown to the Committee, one of which, a red variety, being of very good quality.

Mr. R. Hamilton, of Grenville, P.Q., exhibited 12 varieties, 3 of which were Russians. In this collection the only promising sort was La Victoire, a promising red seedling apple originated at Grenville, P.Q. In connection with Mr. Hamilton's exhibit was a collection of 7 seedlings from Mr. Jas. Weldon, Grenville, P.Q. Though some of these were apparently good keepers, none of them were sufficiently promising to be worthy of special mention.

Mr. R. Brodie exhibited two varieties of apples, one of which was the Fameuse which had been kept in cold storage.

Mr. J. E. K. Herrick exhibited one plate of seedling apples, which, although apparently a good keeping sort, is only of fair quality and lacks size.

Mr. J. M. Fisk, of Abbotsford, P.Q., exhibited a plate of Stettin red apple, a very high colored sort, and said by Mr. Fisk to be a good keeper. The sample as tested, though a handsome apple, was past best condition and was of medium quality only.

The Central Experimental Farm exhibited a collection of 21 varieties of apples. Of these those which were deserving of special mention were the La Victoire noted already in connection with Mr. Hamilton's exhibit, and the Lawver and the Delaware Red Winter varieties. These last two, though generally considered the same, are, as grown at the Experimental Farm, quite distinct. The Lawver is the better in quality, having tender flesh and being more acid than the Delaware Red Winter. There are also other points which distinguish these apples. Both of these varieties are very highly colored, being two of the most attractive apples exhibited. They are great keepers, a sample of the Delaware Red Winter having been shown which was picked on September 24, 1896, and which, though much shrivelled, showed the great keeping qualities of this fruit.

Submitted by,

R. HAMILTON,
W. T. MACOUN.

ORCHARD FERTILIZATION.

By J. C. CHAPPAIS, St. Denis.

IMPEDIMENTS TO THE DEVELOPMENT OF FRUIT GROWING.

Our horticultural societies, our pomological associations and our best fruit-growers have had to make strenuous efforts to bring over our farmers to the understanding of the importance of fruit growing and to induce them to plant orchards. However, their work has proved successful and, to-day, we find that, in almost all the districts of our province, orchard planting is practiced on a large scale. But this should not make us believe that the fruit-growing industry is so strongly established that it is no more necessary to evince as much zeal and help it no more in its development. If on one side this industry takes some extension, we find, on the other, that its progress is much impeded through the negligence of a large number of the planters, who did not make a good selection of the different varieties of trees, who have planted undiscerningly in poor ground, and who seem, above all, to be ignorant of the fact that a fruit tree takes away the fertility of the soil in the same way as it is done by a crop of other plants generally grown on it.

NECESSITY OF MAINTAINING THE FERTILITY OF THE ORCHARD SOIL.

This last point of the decrease of the fertility of the orchard soil, brought by the fact of the growth and production of the trees cultivated on it, is one of the most important to be taken into consideration by the fruit grower, for, if he does not pay attention to it, he will never grow fine trees, and, above all, he will never get heavy crops, nor get good fruit. It is, therefore, important to remind fruit tree planters who are careless about this, of the methods to follow in order to preserve the fertility of the soil of their orchards.

The fertility of the orchard soil is to be considered under three different bearings indicated by the condition of the orchard itself. This fertility should, first, be secured at the time of the plantation of the orchard. Then, it should be maintained to a certain degree, during the first year of the growth of the young trees. Lastly, it should be the object of a special and continuous attention when the orchard is in full bearing.

FERTILIZATION OF THE SOIL OF THE ORCHARD BEFORE PLANTING THE TREES.

Besides the work of cleaning, draining, subsoiling and mellowing, which must be done on the ground to be used as an orchard, it is necessary to provide this same ground with fertilizing elements before beginning to plant it with trees, unless it should prove to be exceptionally rich, a thing seldom to be found. Sixty single loads of good barnyard manure, per acre, may be called a good manuring of the kind. It should be spread, if possible, one year in advance before the plantation, on the soil which should give, the same year, a crop of roots or some other hoed crop.

MAINTENANCE

Good and well to use for the prelin maintain its fertili what is required fro growth, barnyard r growth. This nitro lime to provide for supplying, at the sa ments of the crops v orchard. A supply in autumn, will be s between the trees, to the soil even a surpl

FERTILIZATION OF

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One year grow

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MAINTENANCE OF THE SOIL FERTILITY DURING THE FIRST YEARS OF THE
CULTIVATION OF THE ORCHARD.

Good and well preserved barnyard manure is considered as being the fertilizer to use for the preliminary preparation of the soil of the orchard, as well as to maintain its fertility during its first years of cultivation. As a matter of fact, what is required from the fruit trees at that period of their life is a strong wood growth, barnyard manure contains enough of nitrogen to ensure this strong growth. This nitrogen is combined with enough of phosphoric acid, potash and lime to provide for the needs of the young trees during these first years, while supplying, at the same time, enough of fertilizing elements to fulfil the requirements of the crops which it is deemed advisable to grow in the soil of the young orchard. A supply of forty single loads of barnyard manure, every two years in autumn, will be sufficient to feed the crops of the various plants cultivated between the trees, to secure a thrifty growth for the young trees and to leave in the soil even a surplus of fertilizing elements for future wants.

FERTILIZATION OF THE SOIL OF THE ORCHARD WHEN THE TREES BEGIN TO
BEAR FRUIT.

If the barnyard manure mentioned above for the two first periods of the existence of the orchard is quite sufficient for its maintenance in good condition, we will see that, from the moment the orchard is in bearing, barnyard manure is no more a complete and sufficient fertilizer to provide for the high requirements of trees bearing fruit. In order to be convinced of the truth of this, we must first take into account the fertilizing elements carried away from the soil by the trees. To do this, I will borrow some figures from a report of experiments made during many years on a large number of trees by Dr. Steglich, of the agricultural station of Dresden, Saxony.

ELEMENTS OF COMPOSITION OF FRUIT TREES.

I make here an abstract of the figures given by Dr. Steglich, in order to show the amount of elements of composition contained in the one year growth in wood, leaves and fruits, of a large number of trees having ten inches in diameter, and bearing fruit:—

One year growth of apple trees having 10 inches in diameter.

	lbs.	oz.	Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Wood.....	10	0	2.72	0.50	2.30	4.91
Leaves.....	9	4				
Fruit.....	31	0				

(Containing after being dessicated a percentage of)

One year growth of pear trees having 10 inches in diameter.

	lbs.	oz.		Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Wood.....	10	6	} (Containing after being dессicated a percentage of)	2.61	0.37	2.88	4.26
Leaves.....	5	12					
Fruit.....	15	7					

One year growth of cherry trees having 10 inches in diameter.

	lbs.	oz.		Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Wood.....	9	4	} (Containing after being dессicated a percentage of)	2.48	0.88	2.80	5.43
Leaves.....	19	14					
Fruit.....	26	7					

One year growth of plum trees having 10 inches in diameter.

	lbs.	oz.		Nitrogen.	Phosphoric Acid.	Potash.	Lime.
Wood.....	7	4	} (Containing after being dессicated a percentage of)	2.86	0.61	5.04	5.47
Leaves.....	6	3					
Fruit.....	29	12					

PROPORTION OF FERTILIZING ELEMENTS CARRIED AWAY FROM THE SOIL BY
FRUIT TREES.

These data being obtained, the doctor has found that a tree having 10 inches in diameter, and bearing fruit, draws from every square yard of the area sheltered by its foliage, area which represents that of the extension of its roots in the ground, the following quantities of the four principal elements of its growth: Nitrogen, 17 grams or 0.04 lbs.; phosphoric acid, 5 grams or 0.01 lb.; potash, 22 grams or 0.05 lbs.; lime, 40 grams or 0.09 lbs. He gives these as the lowest quantities thus drawn from the soil by the average of trees of that diameter, either stone fruit trees or others. These figures are not to be considered as strictly accurate in all cases, but are given here only to help in the calculation of the quantities of fertilizers which are to be supplied to the fruit bearing orchard.

SUPERIORITY OF CHEMICAL FERTILIZERS OVER BARNYARD MANURE FOR A FRUIT
BEARING ORCHARD.

Before going any further, it would be well to make out, why, at this period of the fruit tree growth, commercial fertilizers are better than manure alone. First, let us state that when the trees are planted in the orchard since about ten years, almost all fruit growers are of opinion that is better to stop the cultivation of the ground in the orchard and to leave it rather in grass. As it is well known that barnyard manure does not yield all its fertilizing elements the first

year of its application to grass, it has still to be shown that a tree which has been fertilized with easily chemical fertilizers is not so easily chemical fertilized by the trees which bear summer apples and cherries. At the same time, the cherry is not so easily fertilized in twelve weeks. It is well known that for the best results, much

PROPORTION OF

From the figures given above, it is seen that the elements to apply to the soil are nitrogen, 4 of potash, 5 of phosphoric acid, and 6 of lime. It is granted that trees of the orchard grow better in the two first periods of the year than in the rest. It is concluded that it is better to use commercial fertilizers than manure. The potash, 55 lbs., and the phosphoric acid, 5 lbs., and the lime, 40 lbs., are various fertilizers

Sulphate of ammonia

Phosphatic slag, 50 p. c. of lime = 6

Kainit, 420 lbs

In localities where it is not so advantageous to use them, at 100 lbs. per 2 b besides 9 lbs. of phosphoric acid, all these figures are given to the quality of the soil, and give formulas which

As to potash, it is well known that in localities where high density or hard wood trees, and soft wooded trees, are grown, the fruit is better. These two fruit growers from v

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year of its application and that, specially when it is applied as a top-dressing on grass, it has still less immediate influence, at first, it will be easily acknowledged that a tree which has to change promptly every year, a considerable part of the fertilizing elements it draws from the soil, into a crop of fruits, assimilate more easily chemical fertilizers which are very soluble and consequently readily assimilated by the tree-roots. So much the more as some fruits such as cherry, summer apples and summer plums, grow and mature on the tree in a very short time, the cherry in seven weeks and the summer apples and plums in ten or twelve weeks. It is, therefore, evident that to obtain the most immediate and best results, much advantage is found in the use of commercial fertilizers.

PROPORTION OF FERTILIZING ELEMENTS TO BE RESTORED TO THE ORCHARD.

From the figures mentioned above we find that the proportion of fertilizing elements to apply to the orchard should be of 1 of phosphoric acid for 3 of nitrogen, 4 of potash and 8 of lime, in approximate numbers. As it is taken as granted that trees of 10 inches in diameter take up with their roots one-third of the orchard ground, and that, from the manuring received by the soil during the two first periods of fertilization, the orchard is supposed to need nothing more than the restitution of the elements carried away by the trees, we may conclude that it is sufficient to apply every year the following averages of commercial fertilizers per arpent:—Nitrogen, 43 lbs.; phosphoric acid, 13 lbs.; potash, 55 lbs., and lime, 96 lbs. Those quantities would be supplied by the various fertilizers mentioned here, viz. :—

Sulphate of ammonia, 250 lbs. at 20 p. c. of nitrogen = 50 lbs.

Phosphatic slag (Thomas), 130 lbs. at 10 p. c. of phosphoric acid = 13 lbs.;
50 p. c. of lime = 65 lbs.

Kainit, 420 lbs. at 13 p. c. of potash = 55 lbs.

In localities where good ashes from hard wood are available, it is advantageous to use them in the place of Kainit at the rate of 30 bushels per arpent. At 100 lbs. per 2 bushels and at 5 p. c. of potash it yields 75 lbs. of potash besides 9 lbs. of phosphoric acid and much lime. It is well to bear in mind that all these figures are given as averages only, and would vary very much according to the quality and fertility of the soil of the orchard. It is impossible to give formulas which could agree with all soils.

SPECIAL EFFECTS OF POTASH.

As to potash, it is not generally known that it has the effect of giving more density or hardness to the wood of the trees, a very important thing in localities where high winds prevail and break easily the fruit-laden branches of soft wooded trees, and has, further, the quality of giving much brighter colours to fruits. These two qualities of potash are known from the long experience of fruit growers from various countries.

A GOOD SYSTEM OF ORDINARY MANURING.

For the guidance of farmers who can dispose of plenty manure and wood-ashes and who do not like to spend any money in purchases of commercial fertilizers, I will say here, before concluding, that we get good results from a system which consists in applying alternately 40 single loads of barnyard manure, well preserved, one year, and the following year 40 bushels of unleached hard wood ashes. The manure provides nitrogen and its other elements, while ashes give phosphoric acid, and specially potash and lime.

DISCUSSION ON THE CHAPAIS PAPER.

Mr. W. Craig—I would like to ask about Thomas's Phosphate Powder. I used it last year on corn, and it seemed to me the best I have ever tried. They recommend it on meadow orchards, but I have never tried it.

Mr. Chapais—I have used it on a small scale for two years, and I find it is the best source of lime and phosphoric acid we get.

Mr. Brodie—You would need to have a very large stock on a hundred acre farm to put on the amount of manure you suggested. Supposing you had thirty acres in orchard, it would mean 120 cattle, and you would be enriching the orchard at the expense of the rest of the farm.

Mr. Chapais—I know that you can get good results without such heavy manuring, but to get the best results you must do it.

Mr. Hamilton—I think Mr. Chapais's paper is a remarkably good one, and dealt exceedingly well with a very important subject. In my experience commercial fertilizers are of very little value unless there is a great deal of humus in the soil. With soil like mine they would leach through it. Forty loads of manure to the acre on such a soil would be absolutely thrown away. Four loads to the acre could perhaps be assimilated, and in my opinion there are very few soils which could take forty. The only soil on which it would not be thrown away would be a strong clay, which would absorb the escaping salts. The best farm I ever saw had only ten loads to the acre. In my opinion there is nothing like clover seed, eight or ten pounds to the acre, to produce a beneficial result. I think it far the cheapest, best and easiest kind of manure.

Mr. Brodie—What sort of artificial fertilizer do you use?

Mr. Hamilton—We burn a great deal of hard wood and I use the ashes mixed with phosphates and fine earth. We have had the very best results with it.

Dr. Saunders—I quite agree with what has fallen from Mr. Hamilton in regard to the importance of having a large supply of humus in the soil and also that it is better to use a little barnyard manure at a time than to apply a heavy dressing every four or five years. We get better results from giving a dressing of eight or ten tons every second year than from giving twenty or twenty-five tons every third or fourth year. The explanation is that which Mr. Hamilton

has given. The
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Mr. Shepherd

Dr. Saunders
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has given. The soil is not able to assimilate manure in wholesale quantities. It is a gradual process. There is another point in that connection I should like to refer to, that is the desirability of using barnyard manure fresh from the yard, instead of allowing it to be heated, fermented and rotted. Our experiments at the farm show that four tons of manure put into a pile, half cow manure and half horse manure, will waste away to about $1\frac{1}{2}$ tons in about six months, and in the meantime a large part of the nitrogenous matter has been lost.

Mr. Shepherd—Do you mean that the manure should be spread at once?

Dr. Saunders—We allow the liquid and solid constituents to mix and we endeavour to spread it on the fields from the barnyard within two or three days, if possible, before fermentation has set in. That is, of course, in summer. In winter our plan is to draw it to the fields, unless there is something in the configuration of the land that makes it obviously wasteful to do so. If the land is fairly level we put the manure in small heaps, about a third of a cart load. They freeze through, and in that way the liquid and solid constituents are preserved very much in the condition in which they were made in the barnyard, till the spring, when the material is spread, as soon as it is thawed, and ploughed under. In that way we find we get the very best results from the barnyard manure with the least waste. We have tried experiments during the past year, particulars of which will come out in the next report, as to preserving manure, and our chemist has shown that it is possible to preserve the greater part of the ammonia, and also the potash and phosphoric acid which is very easily leached away under ordinary conditions, such as most farmers have in the barnyard. By having a covered building and a tight box to put it in, you can preserve almost every particle of the potash and phosphoric acid, and the greater part of the ammonia; but by the ordinary method a very large part of the nitrogen is lost before it gets on to the fields, and a considerable portion of the potash and phosphoric acid drains away through the soil. There is no subject of more importance to the farmers, at the present time, than this, for at present millions of dollars are being lost through carelessness. If we could persuade the farmers to deal with their manure in the manner I have indicated, in a very few years it would go a long way towards building up the fertility of the soil throughout the country. Before I leave for Ottawa I wish to express my pleasure at being present and my hope that it may be repeated before long.

On a motion of Mr. Shepherd, seconded by Mr. Hamilton, a cordial vote of thanks was voted to Dr. Saunders for his address and his presence at the meetings, and a pressing invitation was given to him to attend further meetings of the society.

In answer to Mr. W. Craig, Dr. Saunders said: I think it is a disadvantage to spread the manure at once when the ground is frozen. There is a greater tendency to waste than if you have it in small piles, and spread it subsequently. There is less leakage, and more chance of its being taken up by the ground. The only drawback is that there are sometimes small, hard, frozen lumps, which may delay the crop a little.

Mr. Brodie—¹o scattering the manure, would not the sun take off some of the nitrogen?

Dr. Saunders—No, that is a mistaken idea. We have tested it by getting the manure perfectly dry and we find that it still contains the same elements that it did in a moist condition.

Mr. Brodie—My experience of applying large quantities of manure to the orchard annually, and especially to young trees, is that it will force too rapid growth of wood. I had a Fameuse orchard and I hardly got an apple from it till I stopped manuring and put it under grass.

Mr. Fisk—I think it is a mistake to manure an orchard late in the season, in July or August, as it produces late growth and is detrimental to the trees. I think the best plan is to manure in the fall, after the leaves have fallen, and as early in the spring as possible. As to manuring in the winter, my practice has been not to put it in small piles, but in large piles eight or ten feet high, and distribute it in the spring with a dump cart. In this way it is distributed more easily and there is less waste.

Mr. W. Craig—How do you prevent it heating?

Mr. Fisk—It won't heat in winter.

Mr. Chapais—Not if you mix horse and cow dung. We cannot put out our manure in the winter except in large heaps. For a week or ten days during the thaw we have two feet of water on the land, while it is yet frozen. The best plan is to keep it in a good shed and carry it when the snow has gone.

Prof. John Craig—There are one or two principles underlying the application of farm yard manure and of green manure, in the form of clovers, that we should consider. The matter of humus has been very well dealt with in a recent bulletin by Mr. Chapais. Humus is the soil's storehouse of nitrogen; nitrogen is in all growing matter, but it only becomes useful when it passes from nitrites to nitrates. Nitrites are not available to plants, but nitrates are. This action of nitrification will not go on if there is not a sufficient amount of humus present. When we are giving to our soils the roots of plants, we are adding the agents by which the soil constituents may be unlocked and rendered available. We should have in the soil a sufficient amount of phosphoric acid, potash and nitrogen to make it fertile, but it must be perfectly available. It has been demonstrated by practice and theory that the best way to do this is to supply humus to enable the process of nitrification to go on. Thomas's slag is a by-product in the manufacture of steel now imported into this country from England in very large quantities. It contains potash and phosphoric acid, but not in an immediately available form. If finely ground and applied to the soil it will carry its benefits over a number of years and may be considered a valuable fertilizer. I do not see why it should not be used.

Mr. Newman—Have you heard of these nitrates or bacteria being sown mechanically?

Prof. Craig—more particularly such as peas, beans, &c. a microbe which will grow the same way you have in your experiments along with the other of the Experiment Station. It is not practical.

Mr. Orr—I understand we had poor results and we had poor results. I should like to know more.

Prof. Waugh—Sulphuric acid in basic slag. In the distribution it is not so good of phosphoric acid.

Mr. Orr—They

Mr. Ewing—In the north here, they put it on the soil. There are many valuable manures. It is thought a most valuable right time.

Mr. Johnson—I understand and so far as I am concerned corn and roots. Other than car-load.

Mr. Ewing—I have heard will make clover grow better. Different things, and it is put on. In a dry season it is an expensive one you can't use manure, it does not

Mr. Johnson—T

Prof. Craig—It is not so cost was a little high. It is not tained.

Prof. Craig—A number of these bacteria have been separated out, and more particularly those which work in the little nodules on the roots of plants such as peas, beans and the different clovers. You can now buy a distinct microbe which will assist in the development of the nodules on red clover. In the same way you can buy pea and bean bacteria. Mr. Shutt has tried some experiments along this line, the results of which are contained in the last report of the Experimental Farm. They are not such as to encourage anyone to try it practically.

Mr. Orr—I used four tons of the basic slag last season, but it was very dry, and we had poor results. We want a good fertilizer at reasonable prices, and I should like to know what Prof. Waugh's opinion of the matter is.

Prof. Waugh—Our expert is of the opinion that the proportion of phosphoric acid in basic slag is so small that when you consider its solubility and cost of distribution it is not the best form of fertilizer. You can get the same amount of phosphoric acid in other materials.

Mr. Orr—They guarantee from 17 to 20 per cent of phosphoric acid.

Mr. Ewing—In Europe, where they know more about manures than we do here, they put it on at the right time, in the fall or early in the spring. There are many valuable manures that cannot be dissolved in water. In Europe this is thought a most valuable manure, but care must be taken to put it on at the right time.

Mr. Johnson—Last season, we got a car load of Thomas's slag in our section, and so far as I am concerned it gave good results. I used a ton of it on potatoes, corn and roots. Others were not pleased with it and we did not order another car-load.

Mr. Ewing—I have never seen anything, and I have tried a good many, that will make clover grow like Thomas's phosphates. I tried a large lawn with different things, and it was easy to see where the Thomas's Phosphate had been put on. In a dry season you are bound to lose some of your manure, and if it is an expensive one you lose a lot of money, but if you have a cheap artificial manure, it does not make so much difference.

Mr. Johnson—The analyst at the Farm does not recommend it.

Prof. Craig—It was sent to the Dominion Analyst and he reported that the cost was a little high as compared with the nitrogen and phosphoric acid contained.

CANNING OF FRUIT.

By W. CRAIG, JR., Abbotsford.

HISTORICAL.

The process of preserving fruits and vegetables in hermetically sealed jars was discovered by a Frenchman about eighty-five years ago. The industry has made remarkable progress since that time.

It was first applied to fruit, but the practice soon became diversified, and vegetables as well as fruits were so preserved. Fruits were canned on a commercial scale in the Old Country, as far back as 1825. In 1842 sweet corn was canned in Maine. The tomato, as a canned product, came into commerce in 1847.

The stampede across the Continent to the California gold mines in 1849 gave an impetus to the industry in America, and America as a canning continent now leads the world. For instance, the pack of sweet corn in the United States and Canada in 1891 amounted to 2,799,453 twenty-four can cases. Of tomatoes, 3,405,365 twenty-four can cases.

Over twenty thousand canning factories employed 1,000,000 persons. An extract from the Horticulturist's report of the Central Experimental Farm for 1896 runs as follows:

THE CANNING INDUSTRY—VARIETIES OF FRUITS AND VEGETABLES
PREFERRED BY CANNERS.

The growth of the canning industry in Canada has been marvellously rapid. Nineteen years ago it is said that there were but two small canning establishments in the Dominion. With the extension of fruit culture and a knowledge of the fine quality of Canadian fruits came the growth and development of the canning industry. The pack of vegetables and fruits has increased gradually each year. It is estimated that Canadian canners now pay annually to farmers \$500,000 for fruits and vegetables, and as much more to manufacturers for cans, solder, labels and shipping cases. Mr. W. P. Innes, of Simcoe, stated before the tariff commissioners recently that the canning factories of the Dominion represented invested capital in plant and machinery equal to half a million dollars and gave employment to 6,000 workers for six months of the year. Mr. Innes says:—"There are at least 27 factories in Ontario, 6 in Quebec, and at least one each in Nova Scotia, New Brunswick and Prince Edward Island and one or more in British Columbia."

PRINCIPLES OF CANNING.

The destruction of germs and the exclusion of the air are the principle on which canning fruit and vegetables are based.

Germs will not grow at a temperature below thirty-two degrees, nor after being subject to a temperature of boiling water. If the jars have been thoroughly sterilized, in other words have been boiled to destroy the germs, and the heated fruit immediately sealed, then it should keep for years without deterioration.

Sugar is not necessary in small amount for strawberries and

The first canning was done by the late Chas. Gillett.

Canning differs from pickling, and is not

A simple method (using sugar if desired), is to use a clamp to hold the jar while putting on the cover.

Another method is to use a wire support underneath the jars. The jars will be underneath the glass, breaking the glass solution into the jar.

Tomatoes are canned in any way.

My object in this home consumption of common dried products character are not suitable, healthy and economical.

Fruit is usually canned in crab, etc., and that

The cost of sugar and purchase jars to hold receptacles may be reduced by varieties of apples there

Now, apart from feeling convinced that I do not wish to infer this in this respect, but insist that frequently fed to stock the children will be the year.

Science and experiment are suited for the wants of canning fruit and vegetables in any direction.

Sugar is not necessary to the preservation of fruit put up in this way, but a small amount frequently adds to the palatability of the canned articles; such as strawberries and cherries.

The first canned peaches were brought into Canada from Pennsylvania by the late Chas. Gibb, in 1874.

Canning differs from preserving in that fruit is kept with or without sugar, and is not cooked long enough to destroy the natural flavor.

A simple means of canning is to add to the fruit the necessary water (and sugar if desired), then bring all to a boil for say ten minutes. With the aid of a clamp to hold the heated can over the boiling fruit, fill it to overflowing, screwing on the cover tightly, taking care to give it an occasional turn until cool.

Another method may be adopted, which I think is the better way, as, by it, the fruit retains its natural form. The fruit is prepared and put at once into the jars. The jars are placed in a boiler of warm water, with some perforated support underneath so they will not rest on the bottom; by this means water will be underneath as well as around them, and there will be no danger of breaking the glass. Then make a syrup of water and sugar, pour this boiling solution into the jars; cook five minutes and seal up at once.

Tomatoes are simply peeled, flavoured with salt and sealed up in the ordinary way.

My object in taking up this subject is to encourage the use of canning for home consumption on the farm, instead of preserves, sweet pickles, and the too common dried product. Summer varieties of apples being so soft and juicy in character are not suited for evaporating or drying, but, if canned, form a palatable, healthy and economical addition to our domestic economy.

Fruit is usually cheap during the season of Duchess, St. Lawrence, orange, crab, etc., and that is the time we should put up the stock for the year.

The cost of sugar required for making preserves one year will more than purchase jars to hold double the amount of fruit in canned form, and the same receptacles may be used for a number of years. Even if we have winter varieties of apples there is always a ready market for them at fair prices.

Now, apart from the question of healthfulness and household economics, I feel convinced that I am safe in advocating an advance in this direction. I do not wish to infer that members of our fruit growing fraternity are lacking in this respect, but instances have come to my notice where summer fruit is frequently fed to stock or left to decay on the ground by the busy harvester, and the children will be practically without fruit for the succeeding nine months in the year.

Science and experience leads us to believe that balanced rations are best suited for the wants of man and beast. Thus by encouraging a system of canning fruit and vegetables in season, we shall be making advances in the right direction.

INDIGENOUS PLUMS OF THE NORTH WESTERN STATES AND CANADA.

BY R. HAMILTON.

The race of plums of the North Western States, of which the DeSoto was the precursor, is rapidly becoming a very extended one and may soon rival the European plum (*Prunus Domestica*) family in numbers and variety, and is of sufficient importance to justify us in seeking to know its origin, to ask, what native species is its progenitor?

That this family of plums did not originate in the species we know in this country as the *Prunus Americana*, must be evident to every one who is familiar with our native species and who has grown the North Western kinds. I think that no one who has grown many of the five kinds that have been sent out during the last twenty years, from American nurseries and experimental grounds, or who has observed them closely, will venture to deny that they must be from another stock than our *Prunus Americana*, and if it is maintained and proved that *Prunus Americana* is the source from which they sprang, then our indigenous species will have to be renamed.

The two species are unlike in every particular; they are unlike in wood, in tree, in growth, in leaf, in blossom and in fruit, and there is from two to three weeks' difference in date of flowering.

If we place the two species side by side and examine them in detail we shall see how thoroughly distinct they are.

First, let us consider the tree.

Amongst the improved varieties from the North Western States there appears to be two departures from an original type or style of growth. One with long wand-like willowy branches forming a tall lithe tree reaching twenty feet in height, almost free from thorns or spines, the other a low spreading shrubby tree, of short stubby growth and very thorny. This approaches more nearly our species, though quite distinct from it, being much more compact.

Our indigenous plums are fairly uniform in height ranging from eight to ten feet.

Next, if we examine the wood, we find that in the North Western varieties it is soft and of open texture causing it to unite very readily with the cion in grafting. On the contrary ours is hardwooded, making a stock that is difficult to graft on as it does not unite freely with the cion.

If we now go on to the leaf the difference is more remarkable; that of the North-Western variety is thin in texture, very veiny, often obovate in shape, very finely doubly serrated and acuminate, and never at any period of its growth takes on the substantial glabrous character of the leaf of our species.

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Ours is thin and deeply tinted with crimson in early summer, but soon becomes thick and firm, and has very few veins; it is broadly ovate, only very slightly acuminate, and folds over at the edges as the season advances.

In the blossom the difference is, if possible, still more striking. The North-Western species flowers two to three weeks later than our species, the petals are very small and round, so that one can see distinctly the claw which attaches it to the calyx, they scarcely touch each other at the edges and do not overlap at all. In ours the petals are large and overlap to such an extent as to give the appearance of semi-double flowers, and in dying generally turn a deep pink or crimson before they fall. In the American species the green of the bursting leaf-bud shows at the same time as the flower, in ours the blossom precede the green buds.

The difference in fruit, too, is not less remarkable. On the North-West species it is small and round, or nearly so, often not larger than a Kentish cherry, yellow, with a pink cheek, or entirely rosy purple, covered with a heavy bloom. The flesh when quite ripe is firm, solid, not juicy-sweet and though astringent, is pleasant to the taste. The fruit on ours is never, or only rarely round, it is usually oval or ovate, sometimes flattened. The colors are generally bright red, dull red, or orange, with a dull red cheek, and rarely brown. The fruit is mostly watery and never sweet, at its best, the astringency is always apparent, and in most specimens the acidity, astringency and bitterness seem to strive for the mastery. There are exceptions, but they are remarkable by their rarity. Many of the improved American varieties almost rival the peach in sweetness. Sometimes it is like the rich sweetness of a fine melon, and though occasionally juicy even to wateriness, many of them are quite firm in flesh.

Though so decidedly different in general character, these species readily cross when some of the flowers on the American species are precocious and some of the Canadian are tardy, and the fruit of the cross distinctly partakes of the character of each of the species. The tree being mostly like the American and the fruit like the Canadian in appearance, but like the American in texture and flavor.

I have fallen in with only three varieties of the Canadian species that seemed worthy of being perpetuated. One a greenish yellow, firm-fleshed, almost sweet, and the other two brown. One quite small like a damson and the other closely resembling the Forest Garden in color and size, though not equal to it in quality.

Prof. Waugh—I have been studying this plum business for some years and have spent a great deal of time and some money in looking into this very matter. I had the pleasure a year and a half ago of giving an address to the Society at its Stanstead meeting on the same general question. As to this particular point, very clearly brought out by Mr. Hamilton's paper, there are two questions involved: First, as to distinguishing forms, and secondly, as to giving them names. As Mr. Hamilton has pointed out there is a striking difference between what is called *Prunus Americana* in the Mississippi Valley and *Prunus Americana* in New England. The latter extends through New England

and down through Northern New Jersey and as far west as central New York. It is also found in this neighborhood and in the Maritime Provinces where it is sometimes known as *Prunus Canadensis*. The American form seems to have been discovered first in Pennsylvania, and was named *Prunus Americana* by Marshall; a few years later certain plums were found growing at Kew Gardens, England, and were given the name of *Prunus Nigra*. When this matter began to be studied a few years ago one set of botanists took the view that these two things were the same, and that is the view set forth in Gray's Manual and all the text books circulated in this country. Others have held that they were different.

Now we come to the question of the name. The recent opinion of botanists is that they are separate species and the one found in this part of the country has been called *Prunus Nigra*. I have studied this matter very carefully and have called to my assistance men in whom I have a great deal of confidence, including Prof. Bailey. Difficulty has arisen because one will sometimes find that the characteristics Mr. Hamilton has pointed out run into one another. Certain plums have some characteristics of one species and some of the other. This shows that the Canadian plum is closely allied to the Western plum. It is the eastern representative of the same group. In order to preserve the idea of relationship and yet to show that in the extremes they are distinct I have given to our plum the name of *Prunus Americana Nigra*. If that view does not prevail then we must fall back on the older view presented by Mr. Hamilton. There is no doubt that Gray's idea of consolidating the two must be abandoned.

Mr. Macoun—How far north does *Prunus Americana* grow? We have one growing in Manitoba which seems identical with *Prunus Canadensis* though the fruit is lighter.

Prof. Waugh—I have examined some of those specimens, and many of them are among the puzzling intermediates of which I have spoken. It is a question whether they should be called *Prunus Americana* or *Prunus Americana Nigra*, though they are probably to be classed with the latter. They are said to grow as far north as Hudson's Bay.

COLD STORAGE.

By C. P. NEWMAN.

A barrel of apples freshly picked off the tree and a barrel turned out in a grocery shop in winter generally present a startling contrast.

The freshly picked apple is bright, hard and attractive looking, the other, at their best, dull, hammered and bruised and often soft and spotted if not partially rotten.

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To take an apple off the tree, to carry it long distances or keep it a long time and pass it to the consumer as it came off the tree: this goes hand in hand with growing a perfect apple, you keep it perfect and sell it perfect. In the economy of labour in handling fruit the grower finds it not only the quickest but the best way to pack his apples directly in the orchard. And so to avoid all danger of repacking, to be independent of any depression of the market he must have a storage that will have the best keeping conditions. If they are stored in bins they will shrink, often lose flavour and require double the labour to market them. This saving of labour will generally more than pay for the storage.

Now, as to the effectiveness of the check to ripening afforded by this storage, I have found it variable.

Considering the grower's part of the work the apple should not be picked either on the green side or too ripe, but when well colored but still hard. They should be put in directly after picking, as the ripening goes on at once after leaving the tree. The temperatures used are perhaps important. Until more trials are made we will not know just what temperature is the best. Speaking from my experience so far, I should say 32°, but it might well be 30° or even 29°. The freezing point of an apple would vary according to the variety. The freezing of sweet cider made from a mixture of fall apples is 29°, so I should think that was near the average freezing point of the apple. But there is another matter to be considered as well as the temperature; the degree of moisture is an important matter.

The chamber that I had stored my fruit in this season, I discovered to be saturated with moisture, *i. e.*, the air was saturated, it had no drying power.

In consequence I found the fruit had not kept as well, and in one case a lot of ten barrels of Plumb's cider apple had not kept as well as in an ordinary fruit house storage.

Now, I judge from this, that so well as moisture aids decay at high temperatures, it will also aid it at low ones. With all due deference to the opinion of those who think that dry air would cause the fruit to shrink, it appears to me that the absorption of the moisture in a barrel must be a very slow process. To begin with, the barrel has two sources of moisture, it is packed in warm air which, when cooled, condenses, and secondly the ripening of the fruit, which is a continuous source.

So that dry air would take time to absorb the excessive moisture of a barrel before at all drying the apple itself and I think at such a low temperature, any shrinkage arising from this is scarcely possible.

I urge the necessity for having dry air in these chambers; air that has strong moisture, absorbing powers; air that must be continuously dried by artificial driers as the fruit gives it off.

So, as the temperature is regulated by thermometers, there should be an instrument to give degree of moisture and it should be just as carefully regulated.

It should not be taken for granted; you cannot judge this by feeling. I attribute the variability of the keeping largely to this.

Storages at present are largely used for cheese, butter and eggs; with these substances, dry air may be of no moment or perhaps even an injury, so that separate chambers in my opinion should be used with careful caretakers.

Much better work may be done than has been. We may not, perhaps, effect a complete paralysis of the ripening tendency, but there is no reason why we should not come very near it.

There are some popular ideas about this kind of storage which are wrong. It is thought it injures the flavor. As far as my experience goes, flavor is injured by contact with foul air or over ripening, this may happen in cold storage, but is not peculiar to it.

The other idea, that because they have been in, they must immediately melt away afterwards, is also a mistake. This may happen but shows that bad judgment has been used in keeping them too long; they have rather a fresh appearance, which may deceive you and needs caution. So far as storing summer apples is concerned, I should recommend you always to sell at their season if you want to have a profit; if not, store them, but be very careful to lose no time either in putting them in or in taking them out.

To put these apples in for the purpose of getting high prices, is not satisfactory so far. When apples are expensive the sale of them is slow in retail shops and their limit of keeping is too short.

But for such varieties as Fameuse or Wealthy and perhaps Red McIntosh and Winter St. Lawrence, an extension of season may be made very successfully and generally with good profit.

The Wealthy has kept with me especially well and has held very well into April. But I prefer, generally speaking, not to give any limits for the variability at present may mislead one.

Mr. Hamilton—The time when we pick our apples is undoubtedly of great importance as well as the condition they are in.

Prof. Waugh—Apples are stored to a considerable extent in our neighborhood. When Rhode Island Greening ripens during hot, dry weather, it is very subject to decay at low temperature. A man I know got \$6.50 a barrel for stored apples, but he had a son in New York, and knew just when to put them on the market. In 1896 a great many of his neighbors gave their apples away. He stored his very carefully though he had no artificial refrigerator, and carried about 2,000 barrels till March. There were some Spilberg, but mostly Spies and Greenings. He was able to get from \$3.00 to \$3.50 net for the first rate apples, which amounted to 15 hundred barrels out of the 2,000. That was a pretty good price for 1896 apples.

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Mr. Brodie—How did he keep them from freezing?

Prof. Waugh—Simply by shutting the door of the cellar. During the winter he had an oil stove at night.

Mr. Macoun—I hope we shall have a horticultural building put up at the Farm very shortly, and I should be glad of suggestions from those who have kept apples, for I want to employ the best methods.

Mr. Shepherd—One of our difficulties is that we have a very large quantity of early apples thrown on the market because it was supposed twenty-five years ago that we could not grow winter apples, and the Duchess and that class were very largely cultivated. Mr. Newman has put Duchess in cold storage and sold them in winter. He might give us his experience.

Mr. Newman—The Duchess is a very good apple but it varies in its keeping qualities. One season they kept very well and were splendid in January, but the next season they did not do so well; some were good but others were not. I think it was the moisture.

Prof. Waugh—Did you realize good prices the first year?

Mr. Newman—Yes, fairly good. It is not an apple of very high quality. It will always fetch a little under what the high grade apples will fetch.

Mr. Fisk—About how long will they keep after they come out of storage?

Mr. Newman—The first year they lasted well into the second week, I should say ten or twelve days. The ten barrels of Plumb's Cider which turned out badly were put in just as carefully as the rest. They were worse than if they had been kept at an ordinary temperature; in fact they were quite rotten. I think it was the moisture, and I think that was what affected the Duchess. It is peculiarly susceptible to moisture.

Mr. Brodie—My experience has been totally different from Mr. Newman's. I put sixteen barrels of pears, Flemish Beauties, in the same room; those I kept at home rotted, but those in cold storage were all right at the beginning of December, I was afraid to risk them any longer, so I sold half of them at \$6 a barrel and the other half at \$5. The man who bought them found them so green that he put them out in his store to ripen. About Christmas time they were just beginning to get yellow. I had some Fameuse apples in too. They are as hard as bullets, and the green part of them is green still, but they have lost flavor.

Mr. Shepherd—Apples must be put in cold storage at once, and they will keep any length of time. But if you keep them in your apple house for a while you might just as well not put them in cold storage at all.

Prof. Craig—A number of us who have been together at Cornell University during the past winter have busied ourselves in forming a guide to nomenclature, which has been presented to various societies for their adoption. I do

not ask you to accept it, but simply to give it a place in your report, so that it may be useful to any one who wishes to know a new name or verify the correctness of an old one.

On motion of Mr. Shepherd, seconded by Mr. Brodie, Prof. Craig's suggestion was unanimously adopted, with thanks.

EVENING SESSION.

Dr Wood, the newly-elected Vice-President, took the chair and briefly introduced Mr. W. M. Orr, Vice-President of the Ontario Fruit Growers' Association, who contributed the following:

NOTES ON EXPERIMENTAL SPRAYING IN 1898.

BY W. M. ORR, SUPERINTENDENT OF EXPERIMENTAL SPRAYING, FRUITLAND, ONT.

One learns quickly by means of the eye, and an ocular demonstration is always the most convincing. Spraying bulletins are excellent educators, but I fear the greater portion of the bulletin is seldom read. However, let a farmer once see the work of preparing and applying the mixtures, and let him be shown the different species of injurious insects on the trees, and the best method of dealing with them—and he will remember more about it than he would if he read a bulletin a dozen times. Realizing this, the Department of Agriculture for Ontario has for the past four years conducted a series of object lessons in spraying.

This year we worked at 30 points, covering the Province from Amherstburg to Renfrew. An agent visited each point seven times, and his dates were announced by poster, postal card and in the press. The bulletin of 1897 was revised, and given to those wishing them at the orchards, besides a great many requests were received for them by mail.

That the farmers appreciate this effort of the Department to benefit them and demonstrate to them the best methods for caring for their orchards, is shown by the fact that the attendance this year was 3,538, besides many who visited the orchards, when the agent was not there, to see the results. This is about 700 more than attended last year, and almost double the number that attended in 1896.

Although the work for 1898 has only just closed, 31 applications have been received for the work next year, including two points where the work has always been done. These latter say that the farmers had not realized how important it was, and wished for another opportunity to see the work.

Only one solution was used, Bordeaux mixture, according to the following formula:—Copper sulphate, 4 lbs.; fresh lime, 4 lbs.; water, 40 gallons. To this in every case was added four ounces of paris green.

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On account of the law which forbids the spraying of fruit trees when in full bloom, and on account of rain, many applications were lost, as the work had to be done at the date and hour named, so that the agent might reach his next point on time. However, the results in most of the orchards were satisfactory.

Allow me to give you a few of the actual results from this year's report. In estimating the percentage of perfect apples a part of the tree was picked clean, and the fruit carefully examined, every specimen which had a worm spot, no matter how small, being rejected as imperfect.

In the orchard of Mr. Hugh Black, Rockwood, we had the following results:—

Snow—Sprayed, 64 per cent. clean; unsprayed, 1 per cent. clean.

Ben Davis—Sprayed, 100 per cent. clean; unsprayed, 28 per cent.

Wagner—Sprayed, 26 per cent. clean; unsprayed, 2 per cent. clean.

Spy—Sprayed, 100 per cent. clean; unsprayed, 36 per cent. clean.

Greening—Sprayed, 88 per cent. clean; unsprayed, 24 per cent. clean.

Ribston Pippin—Sprayed, 90 per cent. clean; unsprayed, 80 per cent. clean.

Canada Red—Sprayed, 72 per cent. clean; unsprayed, no clean fruit.

This orchard has never been sprayed before. Concerning the work in his orchard, Mr. Black writes as follows, under date of November 16th, 1898:—"In reference to the effect of spraying this season, I feel in justice bound to give you my impression, which is as follows:—'The effect on the foliage was plainly noticeable all season. The leaves were fresh and had that glossy appearance which indicates growth. The bark was smooth and looked like the bark of young trees, the moss and roughness on the bark almost entirely disappearing, and the trees have made more new wood than for some years past. The fruit was, on the sprayed trees, as nearly perfect as is reasonable to look for. In my experience, I never saw, even years ago, before so many enemies came to stay, so entirely good a crop of apples. I am safe in saying that in our Spys, which were sprayed, there was not one barrel of culls to 100 barrels of good fruit. I am convinced that our chances of growing apples profitably will largely be in proportion to the thoroughness with which we spray. Good cultivation, plenty of barnyard manure, and careful spraying will ensure us equally as good and abundant fruit crops as of yore. I might just add that we had in one place in the orchard, two Greening trees, well loaded, and *not a single cull apple* was found, neither worm, nor scab, nor mis-shaped. We cannot now grow potatoes without using paris green—we must also realize that we cannot grow good fruit without spraying. The first spraying will almost entirely destroy the tent caterpillar. I hope that our Ontario fruit growers will accept the situation and spray their apples and other fruits thoroughly. Excuse the length of this letter. I am so convinced and satisfied I don't know where to stop praising it.'"

In the orchard of Mr. James Gray, Bolton, we had the following results:—

Snow—Sprayed, 80 per cent. clean, heavy crop; unsprayed, 23 per cent. clean, about half a crop.

Fall Pippin—Sprayed, 76 per cent. clean; unsprayed, 4 per cent. clean, one-half crop fallen.

Golden Russet—Sprayed, 64 per cent. clean, this is the first clean fruit from these trees in four years.

Talman's Sweet—Sprayed, 64 per cent. clean; unsprayed, 24 per cent. clean.

Colvert—Sprayed, 84 per cent. clean; unsprayed, 20 per cent. clean, most of the fruit is fallen.

Spy—Sprayed, 54 per cent. clean; unsprayed, 20 per cent. clean.

Flemish Beauty Pear—Sprayed, 90 per cent. clean; unsprayed, 10 per cent. clean.

This orchard has never been sprayed before.

On June 30th, the agent writes: "Here are four *Snow* trees, two sprayed and two unsprayed, equally good last Spring and at blooming, standing side by side. Now, on the sprayed trees, the foliage is beautiful and the trees are well loaded with good-sized fruit, about 75 per cent. of which is free from scab; while of the unsprayed trees, although the tent caterpillar has been gathered three times, the foliage is almost ruined, the scab is prevalent and the crop almost a failure."

In a letter written Nov. 15th, 1898, Mr. Gray says: "We noticed a marked improvement this year on *Flemish Beauty Pears* and *Snow Apples*, especially. The foliage on the sprayed trees was more luxuriant and stayed on longer in the fall. On the unsprayed tree there was almost no fruit free from scab, and very few fit for market; the varieties of apples sprayed showed a marked improvement when picking time came. It is our opinion that if the spraying is continued, year after year, that the fruit will be much improved, and that if this is not done very soon there will be very little fruit worth gathering.

Mr. R. Govanlock's orchard at Seaforth we have the following results:

Spy—Sprayed, 70 per cent. clean; unsprayed, 20 per cent. clean, very light crop.

St. Lawrence—Sprayed, 80 per cent. clean; unsprayed 50 per cent. clean.

Snow—Sprayed, 90 per cent. clean, heavily loaded; unsprayed, heavily loaded but not a clean apple.

King—Sprayed, 75 per cent. clean; unsprayed, 50 per cent. clean.

Gravenstien—Sprayed, 100 per cent. clean; no unsprayed trees.

Greening—Sprayed, 88 per cent. clean; unsprayed, 32 per cent. clean.

Flemish Beauty Pear—Sprayed, 50 per cent. clean; unsprayed, no clean fruit.

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Under date of November 17th, 1898, Mr. Govanlock writes as follows: "With regard to my orchard prior to spraying, I may say that the fruit was badly spotted, misshaped and full of worms, but this year after spraying there is scarcely a worm in the apples and they are far more perfect in shape. I picked five sprayed Snow trees, and they packed 25 barrels, and left scarcely anything but the bruised apples, while the unsprayed trees were worthless, good for nothing but cider. There was a marked difference on all the other varieties. I consider the spraying a direct gain to me of at least \$50 in my small orchard. Of course I sprayed the balance of my orchard, but not so thoroughly. I am convinced that if every one would spray their orchard for a few years we could get rid of most of the pests."

Under date of December 29th, Mr. Claude McLaughlin writes: "In reply to yours with reference to the spraying of my apple trees, I would say that in the fall of 1897 I was completely discouraged with the result of my apple crop, so I made up my mind to cut out all my trees (I have about 300). In fact I had cut some of them down, when I was advised by a friend to give them one more trial and to try spraying. The following spring I was making enquiries about a spraying machine, when I received a notice from Mr. Orr calling a meeting of those interested in fruit raising in this section, and stating that it was the intention of the Government to conduct spraying experiments in different parts of the Ottawa Valley. I attended the meeting and was so pleased with Mr. Orr's explanations that I immediately offered my orchard for the experiments. Part of the trees were sprayed and part left unsprayed. With the result of the spraying I am more than delighted. The apples of the sprayed trees were sound and large, the foliage a good rich color, and the trees made more growth than ever before in one season. In the fall of 1897 I had no apples fit for use, all were small and scabby. In the fall of 1898, on all trees sprayed, I had perfect, large and sound fruit, and although the past season was an off year I had some of my trees propped they were so loaded. On the unsprayed trees the fruit was poorer even than in 1897, and perfectly useless. I have bought the machine with which the spraying experiment was conducted, and I intend using it next season, when I expect even better results as my trees were in very bad shape from the many insects that affected them. This fall they looked clean and healthy. I am fully convinced that with good systematic spraying and ordinary care of the trees, we can raise as good apples in this section of Canada, and better than in most sections. The spraying experiment by the Government was of very great value to this section and was much appreciated by the people."

In the orchard of Messrs. Freels Bros., Niagara-on-the-Lake, we had the following results:

Baldwin—Sprayed, very heavy crop, 48 per cent. clean, 90 per cent. fit for barrelling; unsprayed, 4 per cent. clean, very light crop.

Snow—Sprayed, 16 per cent. clean, heavy crop, about 6 barrels fit to pack; unsprayed, no clean fruit, about half barrel to the tree.

Astrachan—Sprayed, 90 per cent. clean; unsprayed, 30 per cent. clean, dropped very badly.

Duchess—Sprayed, 90 per cent. clean, heavy crop; unsprayed, 30 per cent. clean.

Fall Pippin—Sprayed, 80 per cent. clean, good crop; unsprayed, no clean fruit and crop very light.

Harvest—Sprayed, 80 per cent. clean; unsprayed, no fruit fit for market.

Spy—Sprayed, 40 per cent. clean, good size and about 6 barrels on the tree fit for packing; unsprayed, no clean fruit and about one barrel per tree.

Mr. Freels says: "The sprayed trees were selected in different parts of the orchard, and that he had no right to expect a larger crop from the sprayed than from the unsprayed trees, and that if all his orchard had been sprayed this year with the same results as were obtained in the experimental trees it would have been worth over \$1,000 to him.

Under date of November 22nd, Messrs Freels Bros. writes: "Your letter of the 12th inst. received requesting information as to the benefit derived from the spraying of the fruit trees. In reply thereto we have to say that the spraying of the trees did great benefit to them, and the yield of fruit was much increased thereby. However, we think that the spraying this year was not a fair test, owing to the wet and rainy weather, and we are satisfied that with favorable weather, the spraying of the trees would be of incalculable benefit. Our crop this year under the most unfavorable circumstances, exhibited increased yield, and, in comparison with orchards not sprayed ours showed the benefits of spraying."

In Mr. Hugh Gourlay's orchard, at Carp, the following results were obtained:

McIntosh Red—Sprayed, 100 per cent. clean; no fruit unsprayed. This apple spotted very badly other years.

Snow—Sprayed, 105 per cent. clean; unsprayed, 10 per cent. clean.

Baldwin—Sprayed, 100 per cent. clean; no unsprayed fruit.

Under date of Nov. 17th, Mr. Gourlay writes: "Your letter received asking for information about my orchard, prior to the spraying and the result of this year's spraying. Last year and other years the foliage was often spotted and not healthy looking, and the tops of the limbs were often blighted. This year the sprayed trees presented a very healthy appearance the foliage being very green and most luxuriant, the trees making just about twice the growth they did other years. The fruit other years was more or less spotted; much of it being badly shaped from the bites of insects, more than half the Snow apples being unfit for sale. This year the sprayed fruit was much larger and better shaped than ever before, nearly free from spots, nine-tenths of it being sold as first-class fruit. I sold all my first class fruit at \$3.00 per barrel. I attribute this all to the effects of spraying. The benefits derived from spraying are almost incredible. Some of my neighbours had their orchards stripped bare by

the tent caterpillars on my trees. I marked improvement.

With a view to work is properly done last three years with same trees each year.

In 1896 the crop was as heavily loaded for two years, it was. As to the results in

"In reply to your trees sprayed by you which has never before season you have Northern Spys in two good crops in too many to get a sprayed row, and there was hardly a cent. of the sprayed would be about the orchard this fall better packing and they cleanest and brightest in my opinion as to the three years. I six applications. He pay to spray every

It is only fair to successes. I will give note-book made at the to judge of some of

In Mr. R. S. La

1st application work.

2nd application

3rd application only some of the late sprayed trees; found

4th application light. Oyster-shell his orchard.

the tent caterpillar, and were much pleased to see the good effects of spraying on my trees. I had not the faintest idea that spraying could produce such a marked improvement on an orchard in one season."

With a view to demonstrating that better results can be obtained where the work is properly and systematically carried on, year after year, we have for the last three years worked in Mr. Albert Pay's orchard, St. Catharines, spraying the same trees each year."

In 1896 the results were good. In 1897 Mr. Pay said that if all his orchard was as heavily loaded with as good fruit as were the trees which we had sprayed for two years, it would be worth \$2,000 to him with apples at \$2.00 per barrel. As to the results in 1898, writing under date of Nov. 25th, Mr. Pay says :

"In reply to yours of the 12th regarding spraying, I would say the row of trees sprayed by you showed a very decided improvement over the row next to which has never been sprayed, both in foliage and fruit. This is the third season you have sprayed the same row in my orchard, and the Greenings and Northern Spys in that row have had a good crop every year and the Baldwins two good crops in three seasons. The Baldwins had a very heavy crop, in fact too many to get a good size. I picked eleven barrels of two Baldwins in the sprayed row, and not two barrels in the next row which were unsprayed. There was hardly a marketable apple on the unsprayed trees, while fully 90 per cent. of the sprayed fruit would class No. L. The Greenings and Northern Spys would be about the same. There has been a number of buyers through my orchard this fall before the apples were picked, and some saw the fruit before packing and they all spoke very highly of the stock, and told me it was the cleanest and brightest fruit they had seen this year. There can be no question in my opinion as to the benefit of spraying, after the showing it made during the three years. I think, however, it should be done successfully with less than six applications. However, even with that many times, I fully believe it will pay to spray every year."

It is only fair that I should tell you of some of our failures as well as our successes. I will give you in addition to the results, extracts from the agent's note-book made at the orchard on the days of spraying, so that you may be able to judge of some of the difficulties we encounter and the cause of our failure.

In Mr. R. S. Lang's orchard, Exeter :—

1st application, April 22nd.—Rained all day, so that it was impossible to work.

2nd application, May 4th.—Cloudy, followed by an all night rain.

3rd application, May 16th.—Fine. Many of the trees in bloom. Sprayed only some of the later varieties. Bud moth and tent caterpillar bad on unsprayed trees ; found only one tent on sprayed trees.

4th application, June 1st.—Fine, fall apples well set, winter apples are light. Oyster-shell bark-louse, aphids, bud-moth and tent caterpillar at work in his orchard.

5th application, June 13th.—Rained all day. Scab showing badly on Snows. Agent writes on June 13th: "I am afraid that this orchard will be a failure. I have only had one good spraying here."

6th application, June 25th.—Rain in forenoon, but cleared and afternoon was fine. Found a few green fruit worms and Tussock moths. Foliage on sprayed trees decidedly better than on unsprayed.

7th application, July 9th.—Fine. Considerable scab, but not many worms among sprayed fruit.

I inspected Mr. Lang's orchard and found:—

Greening—Sprayed, 50 per cent. clean; no unsprayed trees.

Ben Davis—Sprayed, 10 per cent. clean; unsprayed, 10 per cent. clean.

American Golden Russet—Sprayed, 73 per cent. clean; no unsprayed trees.

Snow—Sprayed and unsprayed about equal.

In a neighboring orchard I found American Golden Russet unsprayed 20 per cent. clean and Greening unsprayed 20 per cent. clean. Mr. Lang says that he has never had any first-class fruit off this orchard. All the fruit has been scabby or wormy and not fit for packing. On November 15th Mr. Lang writes, "Replying to your letter of Nov. 12th, would say:—The spraying of my orchard was a success this year in the way of destroying insects and worms. There was scarcely an apple but was free from worms, something very unusual for my orchard, but as for destroying the scab the spraying was not a success this year. There was so many wet days when your operator called to spray, that that may be the cause of the scab not being checked."

We had the common insect enemies to contend with this year. They were more numerous than usual, the dry hot weather being favorable to their propagation. The tent caterpillar was reported very bad on the 23rd of April. In many sections orchards were entirely defoliated by them. At one station where no spraying was done except on the experimental plot, they stripped the trees of their foliage, although the owner of the orchards said he had gone over the trees three times and destroyed their tents. The agent reported that the sprayed trees looked like monuments of mercy in the midst of surrounding desolation. However, they were controlled without difficulty on the experimental trees.

The aphid was reported bad at some points as early as April 23rd, although it was not nearly so bad as last year. I am thoroughly convinced that to secure the best results we must begin treating the aphid and tent caterpillar much earlier than we have been accustomed to do. At Fruitland we have discovered aphid on the buds as early as April 8th and tent caterpillar on April 15th.

The green fruit worm a comparatively new comer, and but little known here, is likely to become a serious pest. Some growers report from 20 to 30 per cent. of their apples and pears ruined by it. The agent reported on June 16th that it had destroyed much fruit.

The rose-bee on the-Lake, on J ally on King tree and that he had f had been in this structive to the le working on the fr

The codling m and pear grower h few orchards in twenty miles abo twenty acres, vary codling moth could his orchard injured

The owners c exception, Mr. Cur by spraying.

In the souther continued to prop young worm, scarce through the skin of ing was done about by it. Had the wh been so numerous, a on the unsprayed tr the spraying had ce

Mr. R. A. Dewa in diameter, standi badly infested with Bordeaux mixture, ing was done before twelve to fourteen c more than five per c tree the 1st of Augu 25th of August we r Many of the apple apple. No two o they burrowed in choice as to the large coarse sack wa were going up or c but no larvæ were f about 200 larvæ were A large number of e found. We put a nu the moths began to a

The rose-beetle was reported as doing a great deal of damage at Niagara-on-the-Lake, on June 11th. The agent says they were very destructive, especially on King trees. He says there was hardly an apple without one or more, and that he had found as many as six or eight on a single small apple. They had been in this orchard three years. Prof. Saunders says that they are destructive to the leaf of the apple, plum, cherry and apricot, but here they were working on the fruit and were especially destructive on the King.

The codling moth, the oldest and most formidable enemy which the apple and pear grower has to contend with, was very numerous this year, except in a few orchards in north-eastern part of the Province, in one of which, at Carp, twenty miles above Ottawa, owned by Mr. Hugh Gourley, and comprising twenty acres, varying from ten to twenty years old, not an apple injured by the codling moth could be found. Mr. Gourley says he has never seen an apple in his orchard injured by the codling moth.

The owners of every orchard in which we worked this year, with one exception, Mr. Curwen, of Goderich, report that the moth was largely controlled by spraying.

In the southern portion of the province the moth was very numerous and continued to propagate until the first of October. Early in this month, the young worm, scarcely visible to the naked eye, could be detected just burrowing through the skin of apples that up to that time were clean. As the last spraying was done about the middle of July, these latter broods were not destroyed by it. Had the whole orchard been sprayed the latter broods would not have been so numerous, as there was nothing to prevent the moths, which had bred on the unsprayed trees, propagating on the trees in the experimental plots, after the spraying had ceased early in July.

Mr. R. A. Dewar, of Fruitland, has a black Detroit apple tree eight inches in diameter, standing near his buildings, the fruit of which has for years been badly infested with codling moths. This year he sprayed it five times with Bordeaux mixture, adding four oz. of Paris green each time. The first spraying was done before the tree blossomed, and the other four at intervals of from twelve to fourteen days, ending about the 12th of July. Up to this date not more than five per cent. of the fruit was injured by a worm; we examined the tree the 1st of August and found about 75 per cent. of the fruit wormy. On the 25th of August we made another examination and could not find a clean apple. Many of the apples had three or four, and in one case five, worms in an apple. No two of them had entered at the same place, neither had they burrowed into each other's tunnels. There appeared to be no choice as to the place of entering the fruit. On the 15th of May a large coarse sack was bound to the trunk of the tree to trap the larvæ as they were going up or down the tree. This was examined on the first of June, but no larvæ were found. It was again examined on the 11th of August, and about 200 larvæ were found, most of them in cocoons and about 50 in the chrysalis. A large number of empty cocoons from which the moth had emerged were also found. We put a number of these chrysalis into a glass vessel and in a few days the moths began to appear. In eight or ten days we had over twenty beautiful

specimens of the moth. A number of eggs, which appeared like creamy spots about the size of a small pin head, were deposited on the glass. The bandage was replaced and left until the 27th of August, when it was examined and 261 larvæ, mostly in unfinished cocoons and one chrysalis were found. It was again put on and left until the 15th of November, when 191 larvæ were found, all cocoons. After a careful examination no larvæ were found on the tree at this date, except in the folds of the sack, and in the crevices of the bark under the sack. In all 703 larvæ and chrysalis of the codling moth were taken from the bandage around this tree in addition to which quite a number escaped as could be seen from the empty cocoons. On October 11th we put socks on those trees where they were examined on the 29th of November, sixteen larvæ were found on them.

It appears from the result of experimental work carried on throughout the province that in the greater part of Ontario the codling moth can be controlled by spraying. Nowever, in the southerly sections, particularly under the mountain between Hamilton and Niagara, they continue to do much damage after the regular spraying season is over. They are much worse directly under the mountain than they are on the lake shore two miles away or on the mountain. This is probably due to the large amount of fruit grown and the shelter afforded in that district. We propose next year, after the regular spraying has ceased, to continue the work in one or two orchards until picking time, using paris green mixture, that we may ascertain whether the latter broods can be destroyed this way.

No doubt it would be advantageous to supplement spraying with bandages. It costs but little, either for material or labor. Full instructions for doing the work may be found in Prof. Saunders' excellent work "Insects Injurious to Fruit." From our own experience we would consider it necessary to continue the work until the middle of October. The first wormy apples reported were June 28th.

The black or deep spot on the limbs of apple trees is quite bad in some orchards and appearing more or less all over the province. Mr. McGurn's orchard at Marysville is very badly affected, several trees being killed by it. He expects that the orchard will be ruined in a few years.

It appears from results obtained in experimental work, that 65 to 80 per cent. of perfect fruit can be secured, when spraying is regularly and properly done, and when the conditions are favorable, such as an orchard standing high and dry or on well drained land, away from buildings or hedgerows, and the trees planted far enough apart so that the limbs do not come within ten or twelve feet of touching, that they have an abundance of sunshine and free circulation of air. It is also important that the trees be properly trimmed, all rubbish removed and the land properly fertilized for it is a fact that two-thirds of the orchards in Ontario are starving. With good apples at the price they have commanded this year and last year, the orchard, if properly attended to, would be the most profitable part of the farm.

We have a fertile soil, the climatic conditions are favorable and the apple attains a degree of perfection in Ontario, not exceeded in any part of the world. We have an unlimited market in Europe for first-class apples. All that is necessary

is that we treat our trees as they require, thus saving many years, which give more difficulty of the work and with careful attention

Mr. Fisk—I suppose you have had two seasons?

Mr. Orr—We have had them then we have seen the hole and goes straight

Mr. Macoun—I have seen oyster shell bark holes for it.

Mr. Orr—We have had scraping the trees in

Mr. Brodie—I have seen green in June killed

Mr. Orr—That is but generally speaking use kerosene or some

Mr. Chapais—I

Mr. Orr—No, no

Mr. Shepherd—

Mr. Orr—Have

Mr. Shepherd—

Mr. Orr—You are entirely killed with it you find the bark loose would think very little of it to generation.

Mr. Ewing—Perhaps they not have them.

Mr. Orr—If we give the same care and attention we can make more money.

Mr. Ewing—If they had some of these insect

Mr. Orr—I doubt they would not get the

is that we treat our orchards intelligently and give them the care and attention they require, thus securing the annual crops and avoiding over-production alternate years, which gives inferior fruit and taxes the trees. Then there will be no more difficulty of the market being glutted by an over-production alternate years, and with careful and honest packing our success is assured

Mr. Fisk—I suppose the green apple worm has only appeared in the last two seasons?

Mr. Orr—We had something of it twelve or fourteen years ago. Since then we have seen nothing of it up to four years ago. It makes a little round hole and goes straight through.

Mr. Macoun—I should like to ask Mr. Orr whether he has found the oyster shell bark house troublesome and whether he has discovered any remedy for it.

Mr. Orr—We have found it in every orchard in Ontario. The treatment is scraping the trees in the spring and washing them with strong lye in June.

Mr. Brodie—I have found that spraying with Bordeaux mixture and paris green in June killed them.

Mr. Orr—That is just when the young are running, and possibly it might, but generally speaking, it is not effective with insects that suck. You need to use kerosene or some alkaline application.

Mr. Chapais—Is there any danger from using too strong lye?

Mr. Orr—No, no danger at all.

Mr. Shepherd—All that I know of are near Montreal.

Mr. Orr—Have you never had any?

Mr. Shepherd—No.

Mr. Orr—You are lucky, for a few miles north of you there are many trees entirely killed with them. The more healthy and vigorous trees are, the less you find the bark louse. If a farmer had lice in his cattle in the stable, people would think very little of him, but a fruit grower may have them from generation to generation.

Mr. Ewing—Perhaps if the trees were kept in good condition they would not have them.

Mr. Orr—If we had half the number of trees in Ontario and gave them the same care and attention that we do now to all, we should get more fruit and make more money.

Mr. Ewing—If the orchards were well looked after they would throw off some of these insect pests.

Mr. Orr—I doubt that, but I think if they were kept in good condition they would not get them.

Mr. Brodie—A friend of mine took the precaution to plough up his plantations and manure heavily. Still, he has not got a crop of apples on account of this fungus growth, because he did not give proper attention to spraying. This year I had to thin out my fruit, the trees were so heavily laden, while on the other side of the fence he had so few apples that he did not trouble to hand-pick them.

Mr. Hamilton—Last year I visited the orchard of a gentleman named Mathews in Eastern Ontario. He had been in the habit of selling two or three hundred barrels of fine Fameuse yearly, but last year he did not sell an apple. At his request I went into his orchard and found his trees were absolutely covered with scale. I drew his attention to it, and he said he did not think it of any consequence. I got a microscope, showed him the eggs and advised spraying. I heard since that it was perfectly effectual, that there was not a living scale left and the fruit this year was first rate. I think that the alkaline nature of the Bordeaux mixture is sufficient if applied at the season when the young insects are just hatching out.

Mr. Orr—Have you black spot or canker spot on apples?

Mr. Shepherd—We have it in patches on the limbs. It is the same on trunks of trees. I cannot account for it.

Mr. Orr—It is spreading very much in Ontario, and all over the United States. We have supposed it to be the same as the pear blight, and that we were not able to control it, but Prof. Paddock has been investigating it this last year, and he finds it is a fungus growth and it can be treated with Bordeaux mixture. They took out the piece affected fourteen inches, shaving down to new wood, and applied Bordeaux mixture. It has grown up to six inches. He says that where orchards are sprayed there is very little of it.

Mr. Hamilton—I drew attention to this trouble here in Montreal six or seven years ago, and recommended this very plan. If you cut down through the bark in three or four places the trees seem to recover, to a certain extent, when the disease is not far advanced. Fully eight years ago I found a couple of trees of Wealthy badly damaged in that way, and in a day or two after scoring them they began to improve, both in the leaf and the fruit. The fruit had begun to discolour, but instantly recovered, when the bark was scored.

Mr. Orr—What time do you usually begin to treat the tent caterpillar?

Mr. Fisk—Some time in the latter part of March, sometimes in April, sometimes not till May, according to the season.

Mr. Brodie—I treat them well on in May.

Mr. Orr—They are hatched before there is a sign of green leaf. Every fruit grower should have a glass, and detect them before he can see them at all with the naked eye. They talk about its being necessary to spray in blossoming time to destroy the tent caterpillar; they ought to be destroyed long before, and then the bees would not suffer.

Mr. Shepherd

Mr. Orr—Yes.

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Mr. Shepherd—Do you use Paris green at the first spraying?

Mr. Orr—Yes. The insects are there ready for the green leaf to appear.

Mr. Brodie—A number of years ago the tent caterpillar was very bad in our section and I gave them a good dose of paris green. My neighbour had one of his orchards completely stripped.

Prof. Waugh—This apple canker that Mr. Orr speaks about is more important than was at first supposed. I had the pleasure of going over Mr Paddock's experiments at Geneva with Mr. Paddock himself. This fungus is an old, old enemy of ours. It is the same which causes the black spot on fruit. It lives over winter in the bark, and causes this canker spot. Usually where it exists you find also the scab and similar diseases, and the same treatment which prevents them will prevent it. Many men who have sprayed conscientiously have received benefit from it that they could not explain because without knowing it they have prevented the growth of the fungus. It attacks a tree very severely and does great injury. It is very wide-spread and in Western New York some orchards have been practically destroyed by it. I have never found an orchard where it did not exist.

Mr. Hamilton—Would washing with lye have a tendency to overcome it?

Prof. Waugh—Yes, slightly, but I don't think it would be as good as Bordeaux mixture.

Mr. Fisk—I would like to ask Mr. Orr about sprayed trees shedding their leaves in mid-summer?

Mr. Orr—Were they suffering from drought?

Mr. Fisk—No.

Mr. Chapais—We have had that trouble with our plum trees, and last year it was beginning again, but I put on a good mulch of cut straw, and there has been nothing more of it. I cannot account for the cause of it.

LANDSCAPE GARDENING.

BY PROF. F. T. WAUGH, BURLINGTON, VT.

Prof. Waugh gave a very interesting address on "Landscape Gardening," illustrated by lantern views. He said: I have some diffidence about presenting this subject to the society, because it does not appear to be a practical subject, and I know how anxious men in a society of this kind are to deal with something practical, relating to the business of every day life. I appreciate that feeling and try to respond to it. If any justification is needed for dealing with this subject, I cannot give it better than in the words of the President of our Vermont Agricultural Society, who is a very successful commercial fruit

grower and by no means a sentimentalist. He said: "You may think ornamenting the farm yard is a matter of sentiment, of pride, but let me tell you that the man who does not take any pride in his business does not make any money out of it."

I know that even the most hopelessly practical of horticulturists have a love for nature and for their land. They like to see their grounds looking well, and a matter of public compliment in the neighborhood. I shall not try to lay down any rules or regulations as to landscape gardening, but to get at a few of the fundamental principles underlying it. Landscape gardening to my mind means the assemblage of all sorts of ornamental materials in order to make the best general effect. The production of an organized general effect is the aim of landscape gardening, whether it is practiced in a backyard with a few canvas or on hundreds of acres at a cost of thousands of dollars.

There are five fundamental principles to which I wish to draw your attention. The first is unity—oneness. You must not try to have an arctic garden here and a tropical garden next to it, or your place will be a mere museum of curiosities, a mixture of idiosyncrasies. You must have one conception and carry it out. In order to do that you must have a plan to begin with, and it is better to put it down on paper before you start.

There are a great many styles which you might follow, and of these you must select one. There are two great leading styles—the English or natural style, and the Italian, which is more regular and geometrical, following straight lines and symmetrical curves. Straight lines are not natural, and if you begin in this artificial manner you must follow it out.

Speaking of the English or natural style, let us notice a few things which contribute to unity of effect. First, there is the open lawn. That is the foundation of the whole business. You must have some sort of an open place in order to see things. Then you must go in for the curved line, which is the line of nature; nature does not work in straight lines. When we see them we recognize something unnatural, and in the English style they are to be avoided.

The next point is that trees must be grouped, as they are in the fields, generally several of one species together, and shrubs even more so. Trees do not arrange themselves in a row, and if your place has solitary trees and shrubs, so that it looks as if it were pitted with the smallpox, the natural effect is spoiled. I am not recommending the natural style, though I prefer it. But if you begin on this plan, you should stick to it, in order to secure unity.

Then you ought to avoid all sorts of artificial constructions. A rockery is a very nice thing in a garden if there are out-cropping rocks present in the beginning; but if you have to drive five miles and get rocks to dump in your garden, it is artificial. I know an enterprising man who had a geranium bed in the front yard hedged round with telegraphic insulators and another with beer bottles; that was obviously artificial, for they did not grow there.

There are a great many places where fences are necessary, and in some cases they are ornamental, but it is easy to make a mistake in this respect. It is

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better to have some nice horticultural material, and not trim it down too smoothly, because that produces straight lines. The whole scheme of pruning and trimming trees and shrubs into a particular shape is not in accordance with the natural style.

If we take up the architectural or Italian style, we have altogether a different idea in mind. Straight lines are what we are after, but we do not want crazy straight lines; they must be organized in acceptable symmetry. They must go somewhere and frame a picture in an orderly manner. In this style it is difficult to get a plan which is entirely harmonious. Lawns should be smoothly shaved. Trees should be of the same species and of uniform growth so that when set in a row they make a straight line. One of the most ordinary methods of ornamentation in architecture is the repetition of the same simple unit of design. The trees and shrubs may be clipped, and architectural features, summer houses, statues, etc., may be introduced by way of decoration. Contrasts in colour should be strongly marked, whereas nature loves soft delicate tints, and these are more suitable to the natural style. You may use the hemlock and arbor vitæ to make a heavy background, and plant flowers in front. Terraces are useful in this style, because they give straight lines. They should be parallel to the buildings, or with the walks adjacent.

A landscape of any size is improved by water. In the natural style we use lakes and brooklets; in the architectural style fountains and pools blocked out with stones are not inappropriate. A smooth water surface which reflects the colour contrasts and geometrical lines doubles the effect and adds beauty to the general scheme.

But with unity we must not have monotony. It is desirable to have some variety in the picture. Variety may be obtained in several ways. You may have concave, rolling or sloping ground. Trees and shrubs placed upon one or the other have a different effect on the mind. Then we may have variety of form. The drives and walks may turn, some in one direction, some in another. It is difficult to devise a new sort of approach, and that is one of the problems to be dealt with. Perspectives give great variety. Trees which are exactly alike have different colours and textures at different distances. Open vistas are desirable in any sort of scheme.

You may also have variety in materials. The landscape gardener has thousands of varieties of trees, shrubs and flowers to choose from. You can have variety in color, which seems to appeal to a good many people. To my mind too much color and too strong contrasts do not produce the most pleasing effect, but the love of color is a natural taste, and we must keep it in mind. We may also have variety in texture. This is a matter of much importance. If you see a tree, even at a short distance, you do not see the shape of the leaves, but if they are large and coarsely cut, like the sycamore or sugar maple, it gives a different effect from when they are small and fine, like the cut-leaved birch or honey locust.

Then there is a difference in season. A garden does not look the same in the fall as in the spring. In the winter we have another picture. If we keep

these things in mind and make provision for them, we may get pleasing effects all through the year.

We can also get difference in composition. Suppose we have ten different trees, we can group them in hundreds of ways, or you can put a tree by itself as a specimen.

Besides unity and variety, we want character, as in all other artistic productions—the personal impress of the man. Two men may write to you on the same day about the same thing, but if you know them well you will be able to recognize whose letter it is you are reading before you come to the signature. Both may express themselves correctly, but they will write differently. A man who works in a garden year after year ought to put some character into the place. Gardens that you see as you go by reveal character. You feel "there is the place of an honest man—or of a gentleman," and you tell by the look of the garden.

Propriety is a very important point, and is often disregarded. A large scarlet geranium seems to me a little too gay and gaudy for a cemetery. The man who had insulators and beer bottles in his garden furnished another instance of impropriety.

The next and last thing I shall speak to you of is finish, or polish. After the garden has been well planned so as to secure unity, variety, and propriety, and considerable character has been put into it, it needs to be kept clean and smooth. The wheelbarrow must be kept off the lawn, and the calves turned out of the garden. Everything should be kept clean and tidy.

On the motion of Mr. Shepherd, seconded by Mr. Moore, the following resolution was unanimously passed:—

"That the Members of this Association desire to put on record their deep sympathy with their ex-President, Mr. Auguste Dupuis, in the sudden serious illness that has overtaken him, thus preventing our having the pleasure of his presiding care of this convention, and our sincere hope that he will soon recover and be restored to perfect health. We recognize in Mr. Dupuis an ardent horticulturist and fruitgrower who, during many years, has energetically striven to advance and promote fruit growing in this province. We missed him very much, both on his own account and also because he was commissioned to represent the Honourable Commissioner of Agriculture of this province at this meeting."

The proceedings concluded with a vote of thanks to Prof. Waugh and Mr. Orr, moved by Dr. Peterson, Principal of McGill College.

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SUMMER MEETING.

The sixth summer meeting of the Pomological and Fruit-Growing Society of the Province of Quebec was held at Joliette on the 28th August, 1899.

AFTERNOON SESSION.

Mr. Chapais, the chairman—I am sorry to have to tell you that through a combination of unforeseen circumstances the gentlemen we expected to have with us at this afternoon's sitting have not arrived. Some of them have sent us their papers; the others will probably come by this afternoon's train. As the meeting is not numerous I think we should put both our misfortunes together and simply adjourn the meeting to this evening. I am sure the gentlemen here present will understand the situation, that they will excuse us and be good enough to come back to the meeting which will be held in any case because we have prepared something for the magic lantern which will be shewn you. As I myself have to speak on the subject and Mr. Castel is to show the views, we are sure to be here. The meeting will be held at eight o'clock this evening.

EVENING SESSION.

At the opening of the meeting an address was presented by Mr. Renaud, the mayor, to Mr. Chapais, the president of the society, who replied as follows:

MR. MAYOR AND COUNCILLORS

OF THE TOWN OF JOLIETTE:

We have had much pleasure in meeting you here to-day and this evening and if you are happy to see us among you, you may rest assured that we are no less happy to be with you.

Last autumn when we had to decide where our summer meeting was to be held—as it is pretty well understood that our winter meetings are to be held in an English locality and our summer meetings in a French locality—knowing your district thoroughly and having always taken a great interest in it, I asked our directors to fix upon the town of Joliette as the place of our present meeting. I have already gone through nearly the whole of your district and have been in a position to observe the prosperity that reigns in it. You have good farms and farmers who know how to take advantage of them. I found, however, one thing wanting and that is fruit-growing and I said to myself that the same prejudice must exist in your district which formerly existed in mine. I live below Quebec and there we thought that it was an extravagance to grow fruit, especially certain kinds of fruit, such as apples. In our local horticultural society of L'Islet we have for some years striven unceasingly to remove that prejudice and at present a good deal of fruit growing is carried on in our district of Kamouraska, L'Islet and Montmagny. We have especially very fine apples. I was convinced that here you were in a better position to do the same thing and I wished to fill this void in your excellent farming in the district of

Joliette. I hope you will turn to advantage the information we are about to give you and do here what is done elsewhere and that you will derive from fruit-growing the same profit you have obtained from other kinds of cultivation. Such is the reward we ask of you.

PLANTING AND CARE OF APPLE TREES.

By R. BRODIE, *St. Henri*.

The most favorable soil for apple trees is a limestone soil but they will grow well on a soil well-drained either naturally or by artificial drainage, provided, however, varieties suited to the climate are chosen.

Prepare the soil the previous autumn, ploughing the land in deep and straight furrows with a drill-plough at a suitable distance from one another. The action of the frost on these furrows will pulverize the soil and make it suitable for covering up the roots of the trees planted in the spring.

The space to be left between the apple trees varies according to locality; the further north we go the more we can diminish the space. In the vicinity of Montreal most of the orchards are planted too closely and the branches overlap one another. Thirty feet is the smallest space that can be allowed in the vicinity of Montreal and in the Eastern Townships.

If I had to plant another orchard I would have a space of thirty feet between each row and eighteen feet between the trees of each row. And when the branches began to overlap I would remove every second tree, thus leaving my orchard spaces of 30 feet by 36. One of our directors told me that it would take a courageous man to remove the trees. For that purpose I would select early bearing varieties such as: Yellow Transparent, Duchess, Scott's Winter and Wealthy and arrange the varieties of large trees to remain permanently such as Fameuse, St. Laurent, Golden Russet, McIntosh Red, Winter St. Lawrence and Alexander.

In arranging the trees, plant them at the same depth as in the nursery, spreading the roots comfortably and covering them with surface earth, pressing the soil down well around the roots and leaning the trees to the west for the prevailing winds from that direction will make them grow crooked. In dry seasons like last spring, it is important to lay litter on them. When trees are planted, a man should follow with a water-cart and another man with a load of half-rotted straw to lay a litter eight inches thick of the circumference of a cart-wheel around each tree. With such care a tree is seldom lost.

For beginners it is preferable not to choose too many varieties; select those that grow best in your locality. Do not try all the newly introduced varieties, leave them to model farms. I think there are as many as 600 varieties under trial at the Central Model Farm, Ottawa.

Benefit by the experience of experts such as Mr. Dupuis, Mr. Shepherd, Mr. Chapais, Mr. Fisk, Mr. Hamilton and finally—which is of no less importance—become members of the Pomological Society of the Province of Quebec.

Thanks to our Minister of Agriculture, Honorable Mr. Fisher, we can now, with the facilities of cold storage afforded us, cultivate for export varieties of apples which it was useless for us to think of shipping some years ago.

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For the first ten years, weed your orchard well, putting enough manure to give a good crop of potatoes or Indian corn. Do not sell your wood ashes but keep them for fertilizing the trees.

Pruning—Trees should be pruned when a year old to give them the required shape and so as to leave them open and clustered, like hawthorn trees. The branches and shoots that are removed should be cut off close to the trunk.

As a preventive against mice, put tarred felt around the trees in the autumn. To destroy the caterpillars, codling moths, bud moths, spray your trees with Paris green and Bordeaux mixture.

To prevent spots on apples spray with Bordeaux mixture.

Do not allow cattle or other animals in the orchard, especially while the trees are young.

Mr. Chapais.—Mr. Brodie's paper is one of the most important from the standpoint of your district. Some persons have already put questions to me with reference to the value of various soils for orchards. Now if you wish to put any questions on this or any other subject you will get from Mr. Brodie—I hope so, at least—satisfactory answers which will be very beneficial to those who wish to engage in fruit-growing. Those who require information as to the choice of soil, if they have not quite understood what Mr. Brodie has said, may now apply to Mr. Brodie who is prepared to give all the explanations you wish.

Mr. Tellier, M.P.P.—I take the liberty of accepting your invitation to put questions to the interesting lecturer whom we have just heard. We are dealing with apple trees. I have observed this: About the month of July the branches of an apple tree that seems quite healthy and is covered with fruit, begin to wither here and there but chiefly at the top. The tree is vigorous but these branches dry up and injure a portion of the tree. In the next and following years the same thing is observed. There is certainly a disease in the tree which I cannot find out but for which there must be a remedy. Can I obtain any information as to this particular case? I have observed this on the only apple tree in my garden but I have spoken of it to several persons who told me they had noticed the same thing.

Mr. Brodie—To what variety does your apple tree belong?

Mr. Tellier—It is a Siberian.

Mr. Brodie—The disease of which you speak is very rare around Montreal. but in many instances when branches wither, on examining the root, borers will be found. These are worms that enter the tree near the root. On examining the foot of the tree a kind of sawdust will be found issuing from a small hole in the tree. This is frequently the reason why branches wither.

There is another disease that withers the branches: scalding. Not much is known about the prevention of this disease. Spraying with Bordeaux mixture is resorted to because it helps to arrest this disease. For my part I have not had much experience of scald in trees.

Mr. Chapais—If it be the borer worm, in the paper I shall read shortly I treat specially of all the insects that bore fruit trees so that you will find there all the remedies against borer worms.

Mr. Joseph Massé (of St. Thomas).—I am happy to meet you in order to obtain information respecting the growing of apples and the treatment of apple trees. For two years I have been planting apple trees and I have succeeded by taking all the necessary precautions according to the information I have been able to obtain. But last year I thought of putting barnyard manure on the foot of the trees; I put piles of manure, somewhat decayed, in heaps along the trees. Last year I found that a portion of the bark to the height of the manure was burned so that the sap could not circulate from the foot of the tree to the top. I said to myself: "the manure has injured the tree." What was to be done? Having no information on the subject, I removed the bark which had suffered and was soft; I scraped the wood of the tree to remove the blackened part. Then I said to myself: "They are dead. I run no risk and the season is too far advanced. I have no time to learn better so I will try this." I took some paint and put a thick coat of it on the foot of the tree to make a sort of imitation of bark and I found that the sap circulated between the paint and the wood, the trees were varnished and some of them even have fine branches with the exception of three that have become a little yellow. As I tell you, the tree may have been nearly six inches in diameter. I reduced it to two or three inches; it is cut but in spite of this the tree bore leaves, some small branches have even come out and I think it will bear apples next year.

Another accident happened to me later in connection with another variety of apple trees. I had some that had always done well and were in good condition. All at once during the summer the leaves began to wither and I said to myself: "These trees are going to die." I observed that the ends of the branches and the leaves were withering. I cut off the head of the tree and left nothing but the trunk. After I had done this the sap ran up and new branches grew. At present there are branches nearly a foot and a half and others nearly a foot long.

On examining the foot of the tree I found an insect and as you said just now, something like sawdust falling out. I had the curiosity to look into the small holes where the sawdust was and I found a reddish worm. I then removed the bark, carefully scraped away what the worm had touched and scraped the wood; then I painted it; I put on a thick coat of paint to make it even with the line of the bark.

As to the accident that happened to my other trees, I know not whether it was due to the manure, to there being too much acid in it; but my trees were very hardy; they were fine trees and this accident happened to about thirty of them. I thought it might be due to the manure but I do not know.

Mr. Brodie—It is never good to pile up manure around the trees. The roots of a tree run as far underground as the branches spread out in the air. To manure an apple tree the manure must be spread over as large a space as that covered by the branches over the ground.

Mr. Masse—I had done this the year before. I had spread a layer of manure as you say and had mixed it with earth. My trees did well last year.

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Mr. Brodie—To destroy the worms of which you have spoken, instead of removing the bark and scraping the wood, if you introduce a piece of wire into the hole where you see the saw dust you will kill the worm and prevent its injuring the tree.

Mr. Masse—I acted differently. I scraped the affected part with my knife and gave it a coat of paint.

Mr. Brodie—There is something better than paint ; it is grafting wax ; it does more good than paint.

Mr. Masse—I have observed various kinds of insects on the apple trees ; there are small flies, plant lice, that suck the under part of the leaves. They grow wings and may be an eighth of an inch long when their wings grow.

Mr. Chapais—We will give you the description of all the insects that attack our trees ; we will show them to you with the magic lantern ; you will see those you have and wish to fight against.

OUR ORCHARDS' CHIEF FOES.

By J. C. CHAPAIS, *St. Denis.*

The subject I have chosen for this paper is not a new one. A good many among those who are listening to me will perhaps be tempted to say to themselves : "See this has been repeated until we are tired of it," and from their standpoint they are right. On the other hand it has come to my mind that many among those who will hear me and who will see through the medium of the magic lantern the insects I have to describe to them, will say when they leave here that I have enabled them to account for many accidents that have happened to their orchards, for many ravages among their fruit trees and to remedy these evils, to reduce the extent of these ravages and above all to prevent them. Such is the motive that has led me to select the subject I am now about to deal with.

LIST OF THE CHIEF FOES OF OUR ORCHARDS.

I will therefore begin by showing you, through the medium of the magic lantern, worked by my able and kind friend Mr. Emile Martel, the chief foes of our orchards of which I shall speak in the series of descriptions I am about to give, as follows :

- Apple-tree plant louse, green fly,
- Apple-tree tent caterpillar,
- Autumn canker-worm,
- Codling moth,
- Currant geometer or span-worm.
- Eye-spotted bud-moth,
- Flat-headed apple-tree borer,

Forest tent caterpillar,
 Grape vine flea beetle,
 Imported saw-fly and currant-worm,
 Oyster-shell bark-louse,
 Pear-tree slug,
 Plum curculis,
 Spring canker-worm,
 Striped round-headed borer.

I shall proceed in the following manner in speaking of the numerous foes of our fruit-trees. While my hearers will have before their eyes, in the pictures, the insect in its various forms, I shall describe it in the first place as the perfect insect, then its larva which is most frequently the form in which it practices its ravages and I shall conclude by indicating all the remedies against its ravages.

1. GRAPE VINE FLEA BEETLE. *Grapdotera chalybea*, *Altise dela vigne*.—Figure No. 1, represents at *a* the insect much magnified and at *c* at its natural size; at *b* the larva also magnified and at *e* the same at its natural size on leaves; at *d* a perfect insect on a bud and at *e* several others attacked by a parasite that destroys them. The small black lines beside the magnified objects in all the pictures accompanying the descriptions indicate the natural length or width. This insect is of a shiny bluish black and a quarter of an inch long. It sometimes appears in great numbers on the vine at the moment when the buds open and it feeds on the plant for a month. It lays its eggs; which are greenish yellow in color, in small groups on the young leaves. The worm is a dirty yellowish brown; its body is covered with black, shining and hairy tubercles. Like the perfect insect it eats the leaves in which it makes holes. It hatches a few days after the eggs are laid and attains its full size in four weeks. It is then three-tenths of an inch in length. On reaching this size it burrows into the earth, becomes a chrysalis, turns into a perfect insect at the end of three weeks and commences its ravages, which seem less serious at that moment because the vine is all in leaf. This second generation, which attacks the vine in the autumn, hibernates as a perfect insect.

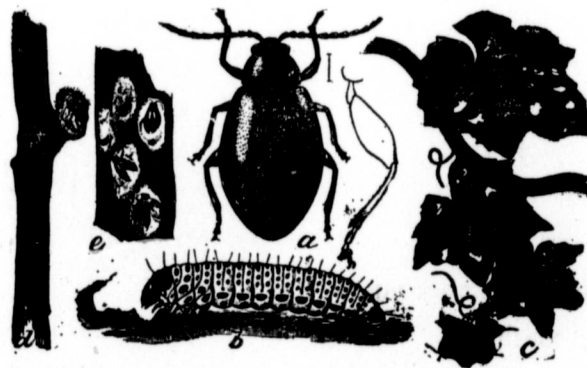


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Remedies—Sprinkle over the vine early in the spring when the insects appear, some Paris green and lime in the proportion of a pound of Paris green to 50 lbs of lime or else a quarter of a pound of Paris green in 50 gallons of water. Carefully hoe the surface of the soil with a hand or horse-hoe. Burn all the leaves and refuse. Keep the surface of the soil even. By this means the insect which hibernates in its perfect state will be prevented from hibernating at the foot of the vine.

2. AUTUMN CANKER-WORM, *Anisopterix pometaria*, *Arpenteuse d'automne du pommier*.—(Figure No. 2 shows at *a* and *b* an egg seen sideways and on end; at *c* a segment of the body; at *e* a group of eggs close together; at *f* the cater-



Fig. 2—Autumn Canker Worm.

pillar. The moths begin to appear about the middle of October. The females lay their eggs, which are flat on top; in regular masses deposited to the number of about one hundred eggs at a time on the outside of the bark. They pass the winter in this state, hatch in the spring and form caterpillars which, when they attain their full size, are brownish and about an inch long. They are thin and move by raising the body like a bow from the head to the tail as shown in the picture; they can also let themselves fall to the end of a slender thread which they themselves spin out as they fall, when they think themselves in danger. Figure No 3 shows at *a* the male and at *b* the female perfect insect; at *c* an

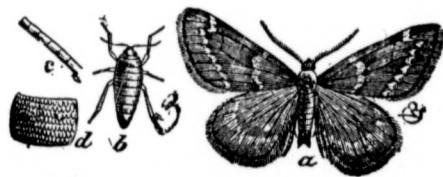


Fig. 3.

antenna of the female; at *d* a segment or ring of the male. The females are wingless and look like spiders but the males are moths of an elegant shape, with grey wings transparent like gauze.

These insects attack apple, plum and cherry trees and eat their leaves in the spring.

Remedies—As the females which are wingless as stated above, climb the trees to await the male, a good way to get rid of them is to fasten a strip of tarred felt paper from 4 to 6 inches wide around the trunk of the tree and to

smear it with printers' ink in which the females stick. This is for the autumn attacks. The caterpillars in the spring are fought with Bordeaux mixture to which Paris green is added and the use of which is recommended against all insects that eat leaves and against fungous diseases. Its composition is well known but I repeat it here for the convenience of those who may not remember it. Sulphate of copper (blue copperas) 4 lbs.; fresh quick lime 4 lbs.; Paris green 4 oz.; water 40 gallons.

3. CURRANT GEOMETER OR SPAN WORM. *Eufitchia ribearia*, *Arpenteuse des gadeilliers*.—Figure No 4 shows at 1 and 2 the caterpillars and at 3 the chrysalis of this insect. The moth is of a pale yellow and has several dark spots sometimes forming irregular stripes across the wings. The latter when spread measure about one inch and a quarter. Towards the end of summer, shortly after attaining the perfect state, the moth lays its eggs on branches and they



Fig. 4.—Currant Geometer or Span Worm.

remain there throughout the autumn and winter. They hatch in the spring when the bushes are in blossom and the larvae attain their full size in three or four weeks. They are then a little over an inch in length, are whitish, have a wide yellow stripe along the back, another on the sides and black spots on each segment. As the eggs are laid only once a year, the larvae are easily destroyed. They chiefly attack black currant and gooseberry bushes which they quickly denude of their leaves.

Remedies.—Hellebore is not strong enough to destroy these caterpillars unless employed in heavy doses, and as the caterpillar appears long before the fruit is ripe they are exterminated without any trouble by using Paris green in the proportion of a quarter of a pound with a quarter of a pound of lime in 50 gallons of water applied twice at an interval of ten days.

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4.—SPRING CANKER WORM. *Anisopterix vernata*, *Arpenteuse du printemps*.—Figure No 5 represents at *a* the caterpillar; at *b* the egg greatly magnified, beside it a small group of eggs, natural size; at *e* a side view of a segment and *d* a back view of the same. Figure No 6 shows at *a* the male, at *b* the female of the perfect insect; at *c* a part of an antenna, at *d* a segment seen from below and showing two rows of small stiff spines; at *e* the female's oviduct



Fig. 5.—Spring Canker Worm.

fied, beside it a small group of eggs, natural size; at *e* a side view of a segment and *d* a back view of the same. Figure No 6 shows at *a* the male, at *b* the female of the perfect insect; at *c* a part of an antenna, at *d* a segment seen from below and showing two rows of small stiff spines; at *e* the female's oviduct



Fig. 6.

The moth appears in the spring and lays its oval and whitish eggs in irregular masses under projecting pieces of bark. Everything else that I have said about the autumn canker-worm applies to this one.

Remedies.—The remedies recommended for the autumn canker-worm are successfully used against the spring one.

5.—FLAT-HEADED APPLE TREE BORER. *Chrysobotris femorata*, *Bupreste ou ver rongeur à tête plate du pommier*.—Figure No 7 shows at *a* the larvae; at *b* the perfect insect; at *c* the head of chrysalis; at *d* the chrysalis itself seen from below, the whole being about twice the natural size. This insect in the perfect state is about half an inch long. It is of oblong form, somewhat flat and

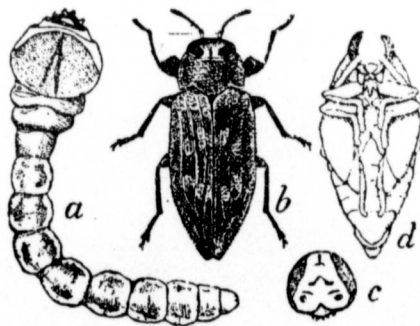


Fig. 7.—Flat-Headed Apple Tree Borer.

of a shiny greenish black color. It has three raised ridges on each elytron, the two outer ones being interrupted by two copper colored transversal spots dividing each elytron into three nearly equal parts. The under part of the body shines like burnished copper. The feet are a bright green. It appears in June or July and lays its eggs, which are very small and ovoid in form, most frequently under raised pieces of bark or in cracks in the bark, sometimes isolated one by one, sometimes in groups. The young larvae soon hatches and after penetrating the outer bark by gnawing, it works in the sap-wood on which it feeds, cutting wide and flat channels in it.

Without being positively certain, entomologists think they have ascertained that the insect undergoes all its changes in the tree in a year until it comes out a perfect insect. The growing larvae is pale yellow, one inch long, with a very well developed flat head, much larger than the body. Its presence in trees is discovered by dust resembling saw-dust coming from the channels it is cutting. It cuts out these in the higher branches as well as in the trunk.

Remedies.—Wherever saw-dust is observed falling out as above stated the place must at once be cut open with the sharp point of a good knife. If the worm has penetrated further a thin piece of wire, like an ordinary knitting-needle, is pushed into the hole to destroy the worm. It must not be forgotten that this worm works as well in the branches as in the trunk, which is not the case with the white round-headed borer to be described further on. To prevent the insect from depositing its eggs on the tree this is what must be done: The trunk, to a height of an inch from the surface of the soil, and the larger branches are smeared with a mixture of washing soda and home-made soap, which is prepared by melting a pound of soda in a gallon of water and putting into this solution sufficient cut up soap to allow it to assume the consistency of thick paint. This mixture is applied with a brush. It hardens on the bark, stands the rain fairly well and keeps off the insect when it wishes to lay its eggs. It is very important to watch orchards so as to prevent the attacks of this insect which has caused the destruction of thousands of trees.

6.—PLUM CURCULIO. *Conotrachelus nenuphar*, Charançon du prunier.—Figure No 8 shows at *a* the larvae; at *b* the chrysalis; at *c* the perfect insect; at *d* the curculio, life size, on a plum near the spot where its egg is laid. The perfect insect is about one fifth of an inch long and consequently small, of coarse appearance, greyish black in color; it has a shiny black protuberance on each

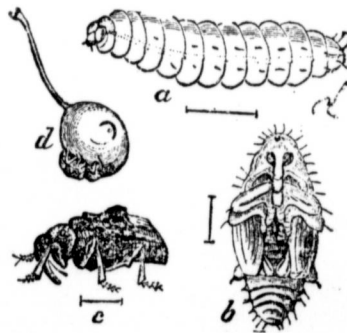


Fig. 8.—Plum Curculio.

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of the elytra and behind that protuberance a yellow stripe more or less apparent with some whitish spots in the middle. The female lays its eggs on the young green fruit shortly after it is formed after first making an incision in it. It thus lays from 50 to 100 in the proportion of from 5 to 10 per day. The egg is an oblong oval in shape; pearl white and large enough to be quite visible to the naked eye. As the insect generally lays only one on each fruit it is easy to see what damage can be done by this curculio if its ravages be not prevented. The young larvae issues from the egg between the third and eighth day, according to the temperature, and attains its full size within a period varying between three and five weeks. It is then about two-fifths of an inch in length, is of a bright whitish yellow, the head is pale brown and has a pale line on each side of the body, a row of small black spines below these lines, a less distinct row above and a few pale hairs at the posterior end. The fruit on which it hatches becomes out of shape and gummy and falls prematurely to the ground. The larva completes its second transformation there, buries itself from five to six inches in the soil and becomes a perfect beetle within a period varying from three to six weeks. It hibernates in a sheltered spot above the soil and appears in the spring about the time when plum-trees are in bloom. It lays but once a year. It also attacks cherry and occasionally apple trees.

Remedies.—In the first place a great many curculios may be gathered by violently shaking the tree, by a sharp blow, morning and evening after first spreading white sheets under the tree. In the second place many larvae are killed by gathering and destroying all the fruit attacked as soon as it falls. The best remedy consists in spraying with a mixture of one pound of Paris green, two pounds of lime and 450 gallons of water, once immediately before the tree blossoms as soon as the leaves are well developed; another time after the fall of the petals and a last time the week after. This will prevent much damage.

APPLE TREE TENT CATERPILLAR. *Clisiocampa Americana*, *Clisiocampe d'Amérique* ou chenille à tente du pommier.—Figure No. 9 shows the moth of the apple-tree tent caterpillar. The moth called *Clisiocampa* measures about



Fig. 9.

an inch and three-quarters, it is of a reddish brown with the front wings transversally divided into three nearly equal parts, the middle part being lighter than the two others. It flies only in the evening or during the night. It passes into the perfect state solely for reproduction of the species. In the neighborhood of Quebec it is found in the winged state at the end of July or in August. Figure No 10 shows at *a* the caterpillar; at *c* a group of eggs and at *d* a cocoon. Immediately after fecundation the female lays its eggs to the number of 200 or 300 which it glues together around a small branch in the shape of a ring, covering them with

a kind of gum which it exudes, to protect them from the winter cold. As soon as the leaves begin to develop in the spring, the eggs hatch out small caterpillars which at once climb to the ends of the branches, in order to eat the tender leaves. When satiated they gather together to spin the tissue of the tent that is to shelter them. These caterpillars change their skins four times, increasing their size at each change, also increasing the size of their tent each time until the latter forms a package about 15 inches long by from 6 to 7 inches in diameter. They return to the nest every evening. After their last change they have the appearance of a caterpillar with a black head, with a white stripe on the back from one end to the other; this white stripe is accompanied on each side by a line of black dots, then a white stripe with another reddish one on the sides. The underneath part is brown. Their length is then two inches. At this moment the caterpillar spins a cocoon and turns into a chrysalis and after a fortnight, about the end of July it makes its appearance as a moth as above stated.

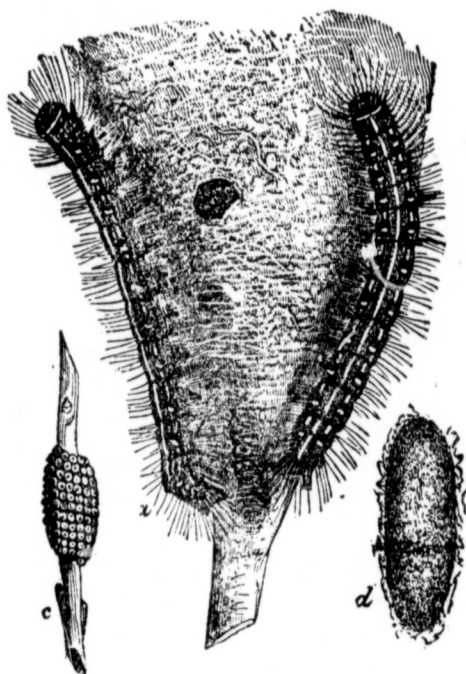


Fig. 10.

Remedies.—In the first place it is necessary immediately after the fall of the leaves or in winter, to gather all the eggs forming rings around the branches as shown at *c* in Figure No. 10. Then in the summer mornings before sunrise, or in the evening about eight or nine o'clock, the tents should be crushed in which all the caterpillars are gathered at those hours or else the branches bearing them should be cut off and burned. Finally to prevent the trees being denuded of their leaves by the caterpillars they should be sprayed with a preparation of Paris green, lime and water in the proportion indicated for the currant geometer.

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FOREST TENT CATERPILLAR, *Clisiocampa sylvatica* or *disstria*, *Clisiocampe des forêts* ou *chenille à tente des bois*.—Figure No. 11 shows at *m*, the male moth; at *f*, the female moth; at *p*, the chrysalis; at *e*, a ring of eggs recently laid; at *g*, the same ring when the eggs are hatched; at *c*, the caterpillar. The latter and the moths are life-size, the eggs and chrysalis are slightly magnified. The moth of this *clisiocampa* is of the same color as that lastly described but paler or yellower. The caterpillar differs from that of the *Clisiocampa Americana* by its dorsal stripe divided into white spots separated into two unequal parts by a contraction. Each segment has one of these spots. Another difference in connection with these caterpillars is that instead of spinning a tent between the branches like those of the other *Clisiocampa*, they spin on the

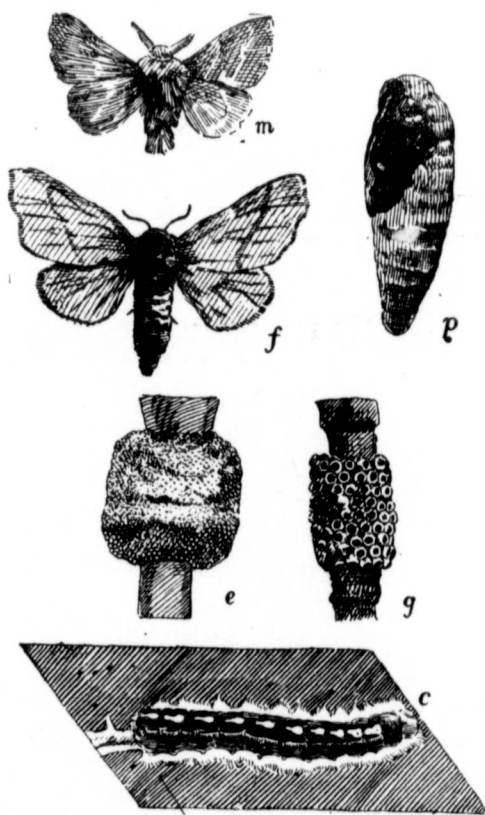


Fig. 11.—Forest Tent Caterpillar.

trunk itself a silky web under which they take refuge. Apart from these details all that I have said about the *Clisiocampa Americana* applies to this one. The forest tent caterpillar is found in orchards at the foot of mountains covered with forest trees in the Province of Quebec.

Remedies.—These are the same as those indicated for the *Clisiocampa Americana*. It is right to mention another which is rendered effective through the wandering mood of this species we are now speaking of and which

leads it to move about in procession through the orchards and to change trees during its wanderings. A strip of felt paper placed on the tree, of the dimensions and prepared as indicated in the case of the Autumn canker-worm, stops them in their visits to trees other than that on which they were born.

9.—IMPORTED SAW-FLY AND CURRANT-WORM, *Nematus venticosus*, *Némate ventrue et fausse chenille de la mouche à scie importée*.—Figure No. 12 shows at *a*, the male and *b*, the female of this insect. In its perfect state it has the shape of a fly with membranous wings. The male is a little smaller than the female, about the size of a horse-fly, black with some yellow spots on the back while the body of the larger female is almost all yellow. The insect lays its eggs early in the spring, in rows on the underneath surface of the leaves along

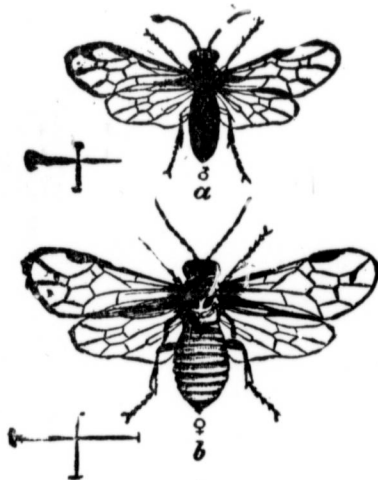


Fig. 12.—Imported Saw-Fly and Currant-Worm.

the mid-rib. These eggs hatch in about ten days and the larvae begin at once to eat cutting holes in the leaf that was their cradle. The larvae, which is a false caterpillar, has 20 feet, while true caterpillars never have more than 16. Its length is three-quarters of an inch when full-grown. It then turns into a chrysalis and becomes a perfect insect at the beginning of July. (Figure No. 13 shows at *a*, the false caterpillars of this insect.) It lays and then produces a new brood of caterpillars, which, like the first also ravage currant and gooseberry bushes of all kinds except black currant. The second generation of larvae, hibernates as cocoons.

Remedies.—For the first brood of larvae, spraying with four ounces of Paris green in 50 gallons of water; for the second brood, as the fruit approaches maturity, Paris green might be dangerous, one ounce of hellebore in three gallons of water is substituted for it. Where there are only a few dozen currant or gooseberry bushes one of the surest ways of getting rid of the insect is to remove two inches of soil along the entire length and width of the row of bushes in the autumn. The larvae are then in their cocoons under the surface

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Fig. 13.

of the soil. By removing the latter, they are all removed. Only care must be taken to bury the earth so removed deep in the ground to prevent the larvae from hatching elsewhere.

10.—EYE-SPOTTED BUD-MOTH, *Tmetocera ocellana*, *Pique-bouton ocellé*.—Figure No. 14 shows at *a* the moth; at *b*, the larva; at *c*, the chrysalis. The moth is light gray in color with a milk white spot on each wing. With wings spread, it measures half an inch. The eggs which are remarkably flat, are laid in July and the young caterpillars grow very slowly; they spend the winter half-developed on the branches. In the spring they are found on apple, pear and plum-trees, the buds of which they gnaw, in the shape of small dark-brown caterpillars about a quarter of an inch long, with a black head and neck, having

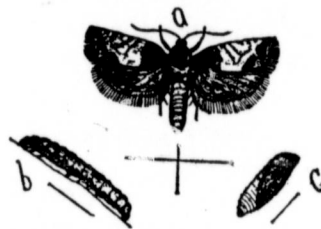


Fig. 14—Eye-Spotted Bud-Moth.

scattered over the body small protuberances each bearing a short thin hair. When full-grown the larvae shut themselves up in a tube which they construct by rolling up a leaf and fastening it strongly with silky threads that they spin. They line the inside of the tube with similar threads interlaced. They remain there ten days, then change into perfect insects which lay their eggs in July as stated above.

Remedy.—The Bordeaux mixture with Paris green added, as already mentioned, should be sprayed over the trees immediately before the buds open.

11.—APPLE TREE PLANT LOUSE, *Aphis mali*, *Puceron ou pou du pommier*.—Figure No. 15 show the winged male, and the wingless female, both magnified and the male, life-size. The apple-tree plant louse is a small insect, about a tenth of an inch long when full grown, pale and dull yellowish green. The females are usually wingless. This louse comes from an almost microscopical egg deposited in fissures in the bark in the autumn. In the spring it invades the young shoots, the half-developed leaves and the buds of the apple-trees. It multiplies in a prodigious manner and from a single female may come in seven generations more than 700,000,000 individuals. Remember that it may be the parent of 10 or 12 generations in a single season. All the insects of this species born in the spring are females which they produce alive and not in the shape of eggs, at the rate of two per day for 12 days after which they die. It is only in the autumn that a fresh lot of eggs are laid and these produce males and also females; the latter in their turn lay eggs that hatch in the spring and produce the generation of females only which have to propagate the species during the summer. The male is winged. The apple-tree plant louse secretes, by two

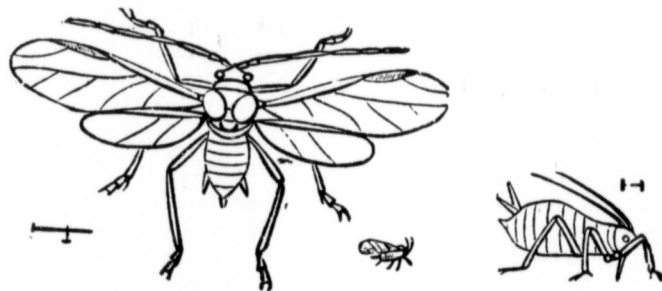


Fig 15—Apple Tree Plant Louse.

tubes situated behind, a sweet liquid which serves to feed the young ones from the first day from their birth and gives the leaves the appearance of being varnished. Ants are very fond of this honey-dew and are always to be found on trees infested by lice.

Remedies.—In the first place, it is a good thing to scrape away during the winter the dead and scaly bark of the trees which shelters the eggs of this insect and to paint it with the preparation of washing soda and home-made soap mentioned in connection with the flat-headed apple-tree borer. For destroying the louse itself when once its presence is ascertained, the coal oil emulsion is strongly recommended. This is prepared by melting half a pound of home made soap in a gallon of boiling water and mixing these boiling soap-suds with two gallons of coal oil by means of a pump with a spraying nozzle. The mixture must be shaken with the pump for at least five minutes so that the emulsion may not separate. To use it, a quantity is diluted in 9 times its volume of soft water. It is an advantage to substitute whale oil soap for home-made soap. The emulsion must be applied two or three times at intervals of two or three days and the operation must be carefully done so as to reach the underneath part of the leaves everywhere.

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12.—CODLING MOTH, *Carpocapsa pomonella*, *Pyrale ou ver de la pomme*.—Figure No. 16 shows at *a*, the channel made by the worm in the apple; at *b*, the hole by which it enters; at *c*, a cocoon; at *d*, the chrysalis; at *e*, the larva; at *f*, the perfect insect with closed wings; at *g*, the same with wings spread; at *h*, the larvae. The perfect insect which bears this name is from one-half to three-quarters of an inch wide with outspread wings, and although it is one of the prettiest insects one can see, it is nevertheless but seldom recognized as it appears only at night. Its color is brown or striped with grey and brown stripes and on the front wings there are bronze or golden stripes. It makes its appearance in the spring, about the time when the blossoms fall from the trees, and some days afterward it lays its eggs on the outer surface of the small apple or on adjacent leaves. It was long thought that these eggs were laid only one by one in the calyx of the fruit because it is always through these that the young worm when hatched penetrates into the apple; but recently the contrary has been established and eggs are found like very small drops of milk in appearance over almost the entire surface of the fruit (*Slingerland*). These eggs hatch

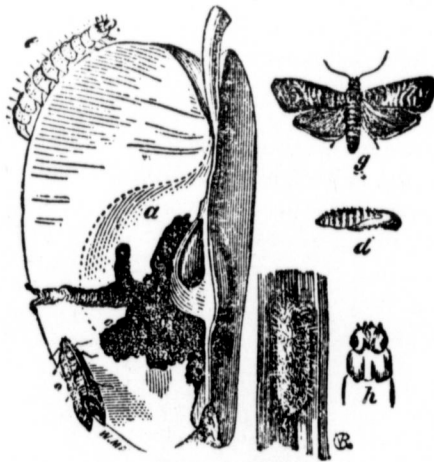


Fig. 16.—Codling Moth.

in a week and the small worm at once proceeds to the calyx where it begins to eat and thus penetrates into the fruit. It attains its full size in three weeks and then appears in the shape of a small larva three-quarters of an inch long, flesh-colored, with three pairs of feet and five of false feet. The head, the first and the last rings are brown. Some short and sparse hairs on blackish spots that are barely visible, appear here and there are the body. When full-grown the larva comes out of the fruit, which very frequently, owing to its presence, falls prematurely—and proceeds to the trunk of the tree where it spins a cocoon under raised scales of the bark and hibernates there. In western Ontario and the United States there are two generations of this insect which causes so many ravages in the orchards throughout America.

Remedies.—By carefully picking up day by day all the fallen apples infested by the codling moth a great many larvae may be destroyed. This is what should be done in the first place. In the second place when the pre-

sence of the codling moth has been ascertained in a locality recourse must be had to spraying Bordeaux mixture always with Paris green added to in the usual manner. But to reach the worm in the apple, spraying must be done within the week following the fall of the petals and not later. This is the moment when the small apple is raised on its stalk with the calyx turned up and open. At that moment the poison easily penetrates into the calyx and is eaten by the worm when it comes there. A little later the calyx shuts up and the poison can no longer penetrate into it but it preserves what has been introduced into it a few days previously. The word calyx used here is not the right word, but it is the expression commonly used to designate that depression in the apple at the end opposite to that where the apple hangs by a stalk.

13. STRIPED ROUND-HEADED BORER. *Saperda candida*, *Saperde blanche*. Figure No. 17 shows at *a* the larva; at *b* the chrysalis; at *c* the perfect insect. This borer is about three-quarters of an inch long; it is round, covered underneath by a whitish villosity or coating, while on top it is nut-brown. It has two milk white stripes from the top of the head to the end of the elytra; the antennae are a little shorter than the body. The larva, which is known as the borer worm, is a yellowish brown, without feet, a little larger in front, with a brown head and black mouth; it is about three-quarters of an inch when full-grown. The egg is laid on the bark of the tree near the collar, in June and July. The worm hatches two or three weeks afterwards, eats a channel through the bark with its mandibles which are already quite strong. In these channels cut by it in the fresh layers of the sap-wood to procure food and shelter, it hibernates and manifests its presence only by a few grains of saw-dust at the opening of the hole by which it has effected its entrance. The borer undergoes all its transformations in these channels and lives thus two or three years before coming out as a perfect insect.



Fig. 17.—Striped Round-headed Borer.

Remedies. All that I have said with reference to remedies against the apple-tree flat-headed borer, apply to this borer with the exception of what I have said as to the penetration of the flat-headed borer into the branches and trunk of the tree. The larva of round-headed borer penetrates into the trunk only at the foot.

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14. OYSTER SHELL BARK LOUSE, *Mytilaspis pomorum*, Tigre sur bois ou kermès coquille.

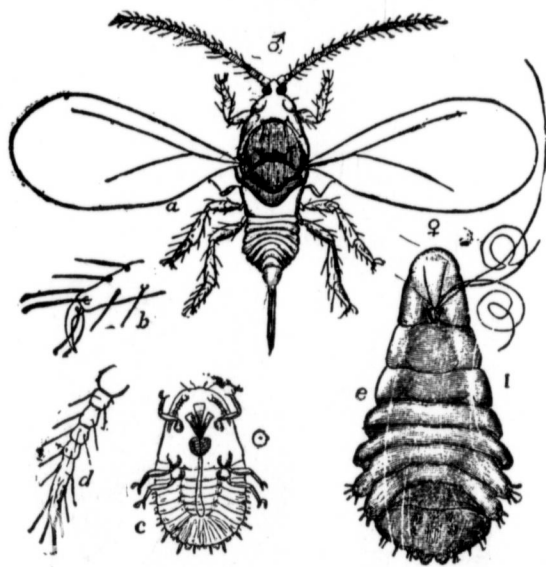


Fig. 18—Oyster Shell Bark Louse.

Figure No. 18 shows at *a* the male insect with outspread wings; at *b* one of its feet; at *c* the larva; at *d* an antenna of the larva; at *e* the female insect; the whole considerably enlarged; the point enclosed in a circle beside the larva represented at *c* shows its life size. Figure No. 19, shows at *a* the female with its egg in its shell as seen from underneath; at *b* the same as seen from above; at *c* shells of females as seen on the branches, the whole much magnified—(Howard). Small brownish scales frequently found on apple and pear-trees and also on plum trees and currant bushes are nothing but the females of this insect under their shells. The male alone is winged; the female is always wingless. Immediately after it is hatched, there is nothing to distinguish it from the male; like the latter, it is all white and walks freely on the branches; two or three days afterwards it fastens itself to a branch by its mouth, which it sinks into the bark and never draws out again. It at once begins to exude a secretion which continues to exude for several weeks and in the end, by hardening, becomes a kind of shell which completely covers it and sticks to the bark. Under this shell the insect lays its eggs to the number of from 10 to 50, and then it dies. At the beginning of June the eggs hatch after having been laid in August of the previous year and passing the winter under the protecting shell. This shell is 0.12 to 0.13 (twelve or thirteen hundredths) of an inch long, and the insect measures five hundredths of an inch. The male is very small. From the moment it is fastened to the branch, like the female, it no longer grows but its skin hardens and forms a kind of covering under which it lies as a nymph. When transformed the latter shows an insect much

smaller than the female and differing greatly from the latter through having wings. It flies to seek the females and dies immediately after fecundating them. According to Riley the following is the evolution of this insect, which chiefly attacks weakly trees: 6th June, the eggs hatch but still under the shell; 8th June, the little ones walk on the branches; 11th, they fasten themselves on the bark; 12th, the substance of which the shell is made begins to exude from their bodies; 22nd, the insect has grown considerably and the shell is formed; On the 12th August the shell has reached its full size, 0.12 of an inch; on the same day the insect begins to lay its eggs; on the 22nd the laying is over and the insect dies. At the beginning of the following June, the eggs are hatched. There is but one generation of this insect in a season in this province.

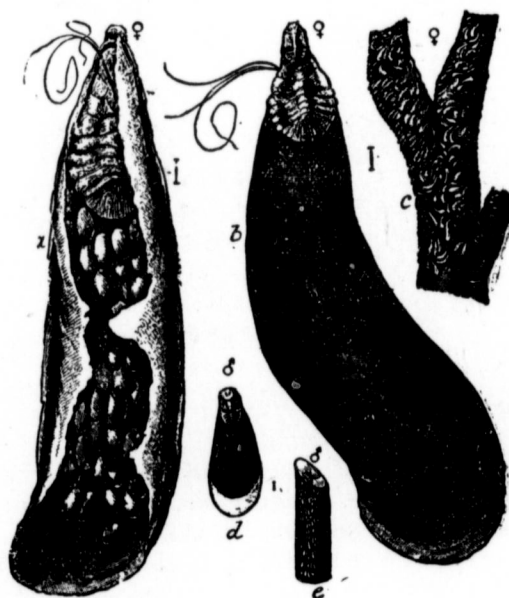


Fig. 19

Remedies. As the insect chiefly attacks trees of weakly growth, as stated above, the first remedy—which is a preventive—is to keep up the fertility of the soil in the orchards so that the trees may always be in a flourishing condition. In the second place, early in the spring, at the end of April or beginning of May, the trees should be scraped with the back of a knife or other suitable instrument, to remove the shells with eggs not yet hatched; then the trunk and branches attacked should be washed with a solution of one pound of concentrated lye in 5 gallons of water. Finally when the eggs hatch at the beginning of June, spray the tree with the coal oil emulsion, the preparation given for the apple-tree plant louse, and repeat the spraying with an interval of 8 or 10 days.

15. PEAR-TREE SLUG, *Eriocampa cerasi*, *Ver limace du Poirier*. Figure 20 shows at *a* the female of the perfect insect; at *b* the larva covered with viscosities; at *d* the larvae, life-size, on the leaves. Figure No. 21 shows at *a* the incision made by the female in the parenchyma or cellular tissue of the leaf to

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deposit its eggs; at *b* the cell containing the egg in the parenchyma of the leaf; at *c* the same after the larva has come out. (Marlatt). This insect is also a saw-fly, bright black in color, with four transparent wings, and dark yellow feet. The female is a fifth of an inch long; the male is a little smaller. The female

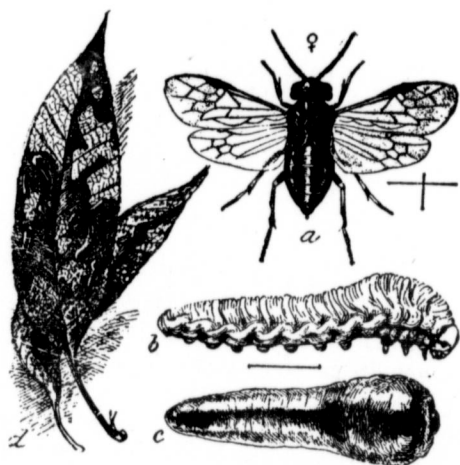


Fig. 20.—Pear-Tree Slug.

lays its eggs in the month of June, one by one, in a small semi-circular incision in the parenchyma of the leaf, sometimes on top but more frequently underneath. They hatch at the end of about a fortnight. The small larva is at first white but soon the viscous matter exudes from the skin and covers the upper part of the larva with a sticky olive-colored substance. After changing its skin four times, the larva when full-grown is a little more than half an inch long. It is then in appearance a disgusting looking, viscous black or dark olive slug, with the fore-part of the body much developed and exhaling a disagreeable odor. A few hours after shedding its last skin, it falls to the ground and burrows to a depth of three or four inches where it turns into a chrysalis which in a fortnight becomes a

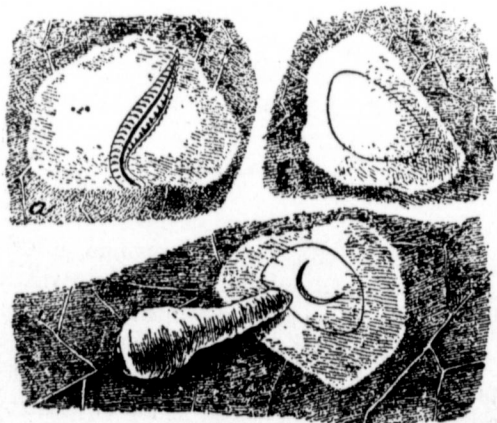


Fig. 21.

perfect insect. About the third week of July the insect commences to lay a second lot of eggs which become new larvae at the beginning of August. The latter at the end of four weeks, burrow in the soil and remain there in the chrysalis state until spring. These larvae, which look like slugs, eat the upper part of the leaves of pear, plum and cherry trees which in a short time look like lace work consisting of the denuded ribs left intact.

Remedies.—When the larvae appear on the leaves, about the 20th June and 8th August, sprinkle powdered quick-lime on them twice at three days' interval. Bordeaux mixture with Paris green, as described above, applied on the same dates but in one application at each date, may also be used with excellent results.

My hearers will pardon me if my paper has seemed somewhat lengthy. I deemed it advisable to make it as long as it is in order to bring together all information of interest to those who wish to learn about the chief foes of their fruit-trees. This information is not new but it is scattered everywhere, especially in English works. Now I have written my paper above all for my French-speaking countrymen who cannot read English. It is true that we have copious notes in French on these insects in the learned reports made by the gentleman who has pre-eminently spread the knowledge of entomology, Dr James Fletcher, who is attached to the Ottawa Central Experimental Farm. But in order to consult them it is necessary to look over eight or ten thick volumes of official reports which are not accessible to all, and which those who possess them have not always the patience and above all, the time to look over.

It has cost me so much labor and so many searches, for my own satisfaction, whenever I have wished to study and identify every new destructive insect I found in my orchard that I thought many who are still novices in fruit-growing would be pleased if I spared them the same labor.

Of course, as I have no intention to pass myself off for a first-rate entomologist, I have obtained my information a little from my personal observation but in a great measure from the works of Ormerod, Saunders, Fletcher, Riley, Slingerland, etc., and also of our lamented French-Canadian entomologist, the late Abbé Provancher. I knew that I could not have done better or even as well as they and thus I took what was needed to elucidate my subject from the best sources. I thought also that I would make it more intelligible by illustrating it with appropriate pictures, which I have been able to exhibit to you through the kindness of Mr. Castel.

Mr. Brodie.—I have found that the insects which do the most damage are the curculios. It is true that the caterpillar has done much damage, but these caterpillars can be destroyed with Paris green while the curculios have attacked the apples and made them no longer saleable.

The directions for destroying caterpillars are to put four ounces of Paris green in Bordeaux mixture. This may destroy them when young but when full-grown it will take much more Paris green. The quantity should be doubled and eight ounces used.

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Mr. Hamilton.—To destroy caterpillars I think we should destroy the moths. One of my friends, Mr. Newman of Lachine, has taught me a way which seems an excellent one, to catch and destroy the moths during the night time. You have no doubt observed that if you put a candle on the table when all the windows are open, in a short time the candle or lamp will be surrounded by moths. My friend has taken advantage of this; in the orchards he put a vessel full of water with coal oil on top—you know that coal oil floats on water, and in the vessel he put a small piece of wood with a candle-end on it. The moths seeking the light, fly around the candle and fall into the water and coal oil; in the morning there are hundreds of dead moths in the water.

It seems to me that is a much easier way to destroy caterpillars and that a much larger number are destroyed.

I myself have tried to destroy them in another way. I built fire of dry wood in several places in my orchard and the moths were destroyed by thousands, I believe, in the fire. They fly into the flames, their wings are scorched, they fall in by thousands and die.

After hearing what my friend Newman told me, and from my own experience, I find it very strange that nobody thought of it before. If we had done this ten years ago I believe we would not have had the millions and millions of caterpillars that have ravaged our orchards.

Before sitting down I would like to add that this custom of meeting together from time to time to relate our experiences, what we have done and what has been done by others, is the best way for us to learn and to make progress.

Mr. Chapais—Mr. Hamilton, who is a fruit-grower of Grenville, will give us an interesting lecture on the varieties of apples that can be grown in the northern districts. This will interest you particularly as you live in the north. As we would like to be able to introduce apples that would stand your climate, I hope you will listen attentively to Mr. Hamilton's remarks. He will tell you the experience he has gained from the apples grown in his own orchards.

Mr. Hamilton—Before beginning I must crave your indulgence for the manner in which I will express myself in French for, as you may see, French is not my mother-tongue.

I live in Grenville and when I went there twenty-two years ago there were very few plantations of apple or fruit trees of any kind. When I wished to begin my friends and neighbors said to me: "Oh, we have tried: we have planted and planted and planted and we have no apples; we have no fruits." But I was not discouraged by this. I said to myself: "I will have apple, plum and cherry trees; I will have fruit of all sorts, and although I am living in the north, in a district where it is considered almost impossible to grow fruit, I will prove that it is possible to plant and grow, if not all sorts, at least some kinds of fruit-trees." The first I planted were some apple-trees that I obtained from the state of Wisconsin, from a place nearly as cold as here. Nevertheless nearly all these trees died. The first year I planted fifteen hundred apple-trees that I got from Wisconsin; of all these trees I do not believe twenty now remain. All the others died and even some kinds that were said to be hardy, did not succeed.

I do not know why ; whether it is because the trees brought up in other districts are not suited to our district ; but in any case the fact is that in three or four years but few trees remained. Many of those that died were of kinds now considered hardy enough to be planted anywhere in Canada especially in this part of Canada were we live. But I must repeat what my friend Mr. Brodie said : "It is better not to plant too many kinds."

At my place I think I have nearly a hundred and fifty kinds, but I would not recommend others to plant more than five or six kinds, chiefly three kinds. At present there are only three kinds that I would absolutely recommend people to plant. For an early apple I would say the Yellow Transparent. It is one of the apples brought from Russia by the American government in 1870 and which is now spread everywhere in the colder parts of the United States and many also in Canada. It is an apple tree as hardy I may say as the maple. I think that wherever the maple will grow this apple-tree may be planted. Not only is it an early apple but it is a good apple, an apple that yields enormously, and the trees begin to bear in the third or fourth year. I have seen some bear often in the second year. But it is not good to let them bear so soon, because if allowed to bear apples too young the tree will become weak. It is better at the beginning to put all the strength in the tree instead of trying to get fruit. It is perhaps advisable to let one or two trees bear fruit to ascertain the quality and kind of fruit but, as a general rule, is much better not to let trees bear fruit at the beginning.

For a second season apple there is none equal to the Duchess. This apple has all the good qualities of the variety I have just described, the Yellow Transparent. It is as hardy as the maple and begins to bear early. It has very few foes and in my orchard I do not think there is a single caterpillar or insect that attacks it, while the others are greatly attacked and many trees have suffered much damage. It is a very fine apple and sells well. If one has more than he needs for his family, this kind sells easily. To-day before leaving home I sent eighty baskets of these apples to market and the gentleman in Ottawa who gets them always says he is satisfied with them and sells them without any trouble. It is a kind that does not bear every year like the Fameuse, but it yields well frequently for two or three years running, and then rests for a year.

Before leaving these two kinds I must say that these apples do not keep. A friend of mine, now dead, used to say, in speaking of the Yellow Transparent, that if it be ripe in the morning it should be eaten before noon ; it keeps such a short time. The Duchess is a little better in this respect ; it lasts longer ; it is shipped to England in barrels and gets there in good order.

Now, for a third season apple, which may replace the Fameuse where the latter does not succeed, I would advise people to plant the variety called Wealthy. This apple greatly resembles the Fameuse : it is somewhat larger and in my opinion much more productive and of nearly of the same season, that is to say that the apples keep well until the beginning of February ; with care they may be kept until April, and I have sometimes even had them at the beginning of May. But it cannot be said on this account that they keep to the beginning of May : I would rather say the middle of March, and I think that in most instances they will keep longer than that.

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Well, if you want to plant apple-trees I will tell you that you should not hesitate to plant at least these three kinds. I will not say that there are absolutely no others that you can plant, but there are many persons who hesitate to commence planting; they are afraid of failure. Perhaps you have planted some that have not succeeded and you are afraid. But if you can plant some I say to you: Plant those three kinds and you will not regret having planted them; you will have apples early and in quantities.

For my part I prefer the Fameuse to all others. I do not think the Fameuse has its equal in the world; but with me, the Fameuse planted at the same time as the Duchess and Wealthy have not yet borne fruit, while the Duchess and Wealthy have yielded five dollars worth. I do not tell you not to plant Fameuse but I say this: You are not so certain to have apples by planting Fameuse as by planting Duchess, Yellow Transparent and Wealthy. If you plant these varieties you will have many apples of good quality, apples which will give much pleasure, especially to the children. I am sure you will do your families no harm by planting these kinds.

Mr. Brodie—You do not like the Alexander?

Mr. Hamilton—I like the Alexander, but as I wish to encourage people to begin planting, I advise them to begin with the two or three varieties I have just indicated, because I am certain they will obtain good results and be satisfied. I know very well that if we wish to have several varieties, we can plant the Alexander. This is a fairly hardy apple, a variety that resists the inclemency of the climate as well as insects but, at the same time, I do not consider it equal to the varieties I have already mentioned.

After you have begun to plant the varieties I have just mentioned and have succeeded, and have had much pleasure from them for your families and your neighbors, you can then take another step and plant other kinds, but I do not think it right to advise beginners to plant a great many varieties, because the more varieties you have the greater risk you run of having some that will not succeed, and you are aware that failure at the outset is often discouraging and leads to the abandonment of cultivation which, without such checks, might have been carried on with success and profit. Let us try to induce beginners to adopt a few varieties, but the safest and surest.

Before I sit down, you will permit me, Mr. Chairman, to say something which does not seem connected with my subject. If a man is a farmer should it not be a religious and patriotic duty for to him to plant apple-trees? I think so. He owes it not only to himself and to his family, but to his friends and the neighborhood, to make his house and its surroundings pleasant and cheerful. When I came to my place there was not a single tree on the twenty-five acres that are now planted with apple-trees. While there were no trees there were no birds; on rising in the morning we did not hear the singing of the song sparrow and other birds that now afford us so much pleasure. Even before we get up in the morning, if the windows are open, we have a concert of the singing of all these little birds which makes us happy and enables us to begin the day with feelings of joy and happiness that cannot but exert a salutary influence over the whole day. Is it not a patriotic duty to contribute within the measure of one's means to make the country beautiful and attractive

for everybody? Why do a great many of our children wish to go to the United States and elsewhere? It is because their homes are not beautiful, while there are so many attractive things elsewhere.

Efforts of all kinds are made to prevent our young people from going to other countries and to bring back to our soil those who have abandoned it. I tell you that if you wish to keep your children at home one of the best means is to make the country as attractive, as agreeable as possible. Have apple-trees which the little children may climb and get good fruit from to eat while listening to the singing of the birds; these are impressions of joy and happiness that are never effaced from your children's hearts, and if, later on, the necessities of life compel them to expatriate themselves, in whatsoever country they may be they will always retain a tender recollection of their paternal home and return to it if they can to enjoy what they have earned abroad and to end their days there.

Mr. Chapais—I think there are some people here who have already tried planting apple-trees. They should take advantage of the information just given by Mr. Hamilton to know what varieties have been planted by those who began long ago and the success they have had with some as well as their want of success with others.

Mr. Joseph Masse—I planted six varieties: Wealthy, Duchess, Alexander, Yellow Transparent, Russian Transparent and Scott's Winter and as I said just now, I succeeded, except that the manure I put on the foot of the apple-trees did them some damage; but that was an accident.

Mr. Chapais—I am informed that your mayor had recently made a trip to the fruit country *par excellence*, California, and I am quite sure that he must be in a position to give us very interesting information on this subject. I would beg him to say a few words.

THE MAYOR, MR. J. A. RENAUD.

MR. CHAIRMAN AND GENTLEMEN,

I regret exceedingly having been guilty of an indiscretion in speaking with my friend Mr. Richard. When he gave me the good news, some days ago, that your society intended to hold its meeting in our town. I had a chat with him about fruit and I made some remarks about the oranges grown in California. This probably led him to make the suggestion you have just laid before this meeting. Since you are good enough to ask me to communicate these remarks to you, I have no objection to say a few words respecting what I saw during my trip.

I have no practical knowledge of fruit and I speak of it pretty much as a blind man might speak about colors. Nevertheless, in crossing that beautiful country, California, and seeing so great a difference between its vegetation and that of this country, one's eyes are opened and one is led, in spite of oneself to take notes. For my part I could not refrain from noting some of the things that struck me most. When you reach Southern California, you see nothing but flowers; timber is very scarce; there are no fences; the farms are separated by

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great hedges of flowers. There are orchards of all kinds: plums, apricots, peaches, lemons and, above all, oranges. I took a particular interest in this fruit. I have always had a very strong liking for oranges and I took some notes about their cultivation which I shall communicate to you as you are good enough to ask me. They are taken hastily as one takes notes while travelling.

The varieties of oranges chiefly grown in California are five in number; these were mentioned to me in the following order: in the first place the Riverside Navel; in the second the St. Michael; in the third the Maltese or what is known here as the Blood orange; in the Fourth the Mediterranean South; in the fifth the Seedling.

I made inquiries as to the length of life of the orange tree and how long it can bear, and was astonished to find how long it lives. As you are aware the Spaniards formerly owned California; well, here and there, orange-trees are found that were planted by the Spaniards over a century ago, that have been completely abandoned and still bear fruit. This shows in the first place the vigor of the tree and it may also be said that the climate has a good deal to do with it, for the climate of that part of the United States is the very one for orange-growing. Those who know claim that the orange-tree with proper care will bear fruit for about a hundred years.

Fruit-growing is the chief industry of Southern California. I made inquiries as to the average price of land suitable for orange-growing. I was given a pamphlet which I brought with me and in which it is stated that land suitable for orange-growing is sold for from four to five hundred dollars per acre. I mean land without any improvements but suitable for orange-growing. I find for instance in this pamphlet a report of the horticultural society of Southern California. A question was sent to the leading orange-growers of Southern California as follows: "What is the value per acre of unimproved orange-land with water in the Riverside District?" The first answer is: "Good orange land can be got here at from \$300 to \$400 per acre." The second answer is: "Unimproved orange land in Riverside District with *good first class* water right can be had for from \$250 to \$400 per acre, the difference in price depending on location."

Of course the facility of procuring water has a great deal to do with the value of the land. As you know, it never rains in Southern California, that is to say it rains a couple of times a year in the winter season, but from spring to late in the fall there is no rain; the sun shines bright without a cloud and the value of the land depends upon facilities for irrigation.

The third answer, the last I will quote to show the average value of orange land, comes from St. Michael. "Good orange land with water right can be bought at from \$300 to \$400 per acre."

The information given in this pamphlet entitled: *The Profits of Orange Culture in Southern California* show I am fairly correct in stating that the value of orange land in California is from four to five hundred dollars per acre.

I asked some owners of orange orchards whether the care of the trees and the irrigation of the orchards were expensive. I was given figures which cor-

respond exactly to those contained in this pamphlet published by the Horticultural Society of Southern California. I will read a short extract to show what it costs to cultivate an orange orchard.

"The Twenty-eight District Agricultural Association sent out to orchardists printed blanks in March, 1890, asking for detailed information on citrus fruits. Seventeen reports on oranges were received from Riverside. The average of these reports show cost of cultivation, irrigation and fertilization to be \$41.37 per acre. The net profit per acre for the seventeen orchards was \$455.77."

So that orange land costs from four to five hundred dollars per acre and then an average sum of \$40 for cultivation.

Now what is the average profit from an acre of this land bought for from four to five hundred dollars and cultivated at a cost of some forty dollars? It is really wonderful. As a general rule, and as the general result of the observations I have made and the information I have obtained, based on the official statistics contained in this pamphlet, I may say this: Let us take for instance the variety I mentioned first, the Riverside Navel; but let us take a five years' old orange-tree. Well one acre of these orange trees at five years should have brought in and does bring in an average net profit of \$300, all expenses paid, putting aside a sufficient amount for interest on the capital invested and an amount sufficient to represent the expenditure for cultivating that acre. Now this profit increases at the rate of \$100 per acre per year until the orchard is fifteen years old. Thus we saw at Riverside an orchard belonging to Mr. Barney, and I have here the picture of one of his trees that I saw myself. His orchard yields an average net profit per acre of \$1,500.

With your permission I will read a paragraph referring to Mr. Barney's orchard, one of the finest I saw during my trip.

"Mr. Barney has several acres of these trees, now fifteen years old, and they have produced for the last two years fifteen hundred dollars per acre. The record of this orchard answers the questions as to what this choice variety of orange will do with first-class care."

Of course this is a very well cultivated orchard; this revenue of \$1,500 can be obtained only under the best possible conditions and evidently one cannot always count on such a yield. But I am told that, even under conditions below the average, an acre of land, taking an ordinary orchard throughout its whole extent, will yield a net profit of over \$500. Thus a ten acre orchard will yield \$5,000.

Now these orchards do not require extraordinary care. It is estimated that for a ten acre orchard a man with one horse is sufficient for all its needs. So that, as somebody said to me out there, take ten acres of land here on which orange-trees are planted and compare it with the yield of 320 acres of the best Indian corn lands of Illinois and Kansas for instance—we went through hundred of acres of corn lands—or with 320 acres of the best wheat lands of Minnesota or Dakota or with 300 acres of cotton land in Kansas and you will find an immense difference in favor of the ten acres planted with orange-trees.

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In Southern California, where there are six counties. (I do not remember them all but there are: San Diègo, Los Angeles, Santa Bernadino, Riverside, St. Michael and another whose name escapes me) the population is not dense. The same proprietor has a considerable extent of land. Here an ordinary farmer may have four or five acres frontage by 25, 30, or 40 in depth, but out there some proprietors have a frontage of ten or fifteen miles, ten, fifteen, twenty-five thousand acres of land. Thus for instance we saw what is called the Baldwin Ranch. Mr. Baldwin's orchard is at Santa Ainta, seven or eight miles from Los Angeles. I say orchard, but there are a number of orchards on this property. That gentleman has 50,000 acres of land, and as I have just spoken of the yield of an acre, and have made comparisons, I find in this pamphlet the opinion of Mr. Baldwin who has properties in various parts of the United States. He is a millionaire who farms as an amateur. This is what he says:

"I have a farm of 160 acres of as fine land as there is in Indiana, sixty-five miles from Chicago. It is farmed as well as they know how to do it but I get more clear money from one acre of my orange orchard in the San Gabriel valley, than off my Indiana farm of 160 acres."

Now I may say pretty much the same thing about lemons as about oranges. It is generally admitted among fruit-growers in California that the yield of the lemon-trees is about equal to that of the orange trees. The cultivation of the former is considered more difficult and more expensive but the yield is greater because the lemon-tree bears fruit throughout the year; you may gather lemons every day in the year while the orange-tree bears chiefly from December to the end of July.

When I went there, about the middle of July, there were many oranges but I was told that if I had gone a couple of months earlier, in the spring, or in January or February, I should have seen three or four times the oranges I saw. If the lemon-tree costs more to cultivate, on the other hand, owing to its bearing throughout the year the profit is about the same as from the orange-tree.

Now I will, in passing, give you approximately the yield of some fruits. I find here in my notes that in a report to the Los Angeles Board of Trade the average yield of peaches to the acre was said to be \$380, of plums \$280 and of apricots \$350.

I have given you an idea of the profits that may be raised from orange growing; some orchards yield \$1,500, some \$1,100 to the acre, but it may be stated that, except in a case of universal disaster in the country, oranges never yield less than from four to five hundred dollars to the acre. It is chiefly to the enormous profits from the orange groves that the great value of land in Southern California is due.

The explanation given for the fact that these lands are so suitable for fruit-growing is that the country is broken, with enormously high mountains as at Los Angeles, a country where there is never any snow, where the temperature is always the same. It is a city of 110,000 souls and yet at a quarter of an hour's walk from it one can take the elevated railway, propelled by cable, and ascend a mountain from fifteen to twenty thousand feet high. These mountains are so high that they serve as a natural barrier against the north winds which never

penetrate here. These mountains keep winter a perpetual prisoner. We went on them in the month of July and snow lay there to the depth of a couple of feet. I am told that these mountains are so high that they protect the whole valley from north winds. On the other hand the sun is very hot but the breeze comes from the ocean—Los Angeles is eighteen miles inland from the Pacific Ocean. The breeze from the ocean counterbalances the heat of the sun and the result of both these elements is that the temperature is always uniform and suitable for the growth of fruit.

Los Angeles is the most important centre of Southern California where oranges are grown, and there is an exhibition of fruit there every year. I saw the plan of a palace that is to be built all of flowers and fruit; every variety of flower and every variety of fruit grown in Southern California will be represented there. Just as here we make ice-palaces to give an idea of our country, in that country next year there will be a palace of flowers and fruit to give an idea of the variety of fruits that grow in that part of California.

One word more with reference to the quantity of oranges gathered in Southern California in the few places I have mentioned: San Diego, Riverside, etc. Last year statistics were obtained from all the railway agencies in those places and it was found that 4000 car loads of oranges had been shipped for export apart from local consumption. Now these cars were estimated to contain 1,000,000 boxes of oranges. Taking the average price of \$3.50, the average price for oranges there, we have a total of \$3,500,000 for the oranges exported from that part of California.

This information seemed to me very interesting. It may perhaps not be of practical use in this country because unfortunately our climate is not as favorable as that of Southern California but since you have been good enough to ask me to communicate these few notes, I thank you and hope you have not found them too tedious.

Mr. Chapais.—We have have been greatly interested by the remarks made by Mr. Renaud and I beg to express my thanks to him. We have here, Mr. Marsan, professor of L'Assomption Agricultural School, who should be the most competent man to instruct us as to the nature of the soils most suitable for the growth of apples.

SOILS FOR ORCHARDS.

J. A. MARSAN, Professor of Agriculture, L'Assomption.

MR. CHAIRMAN AND GENTLEMEN,

The Chairman has introduced me to you in rather too flattering a manner, at least under the circumstances. I regret that I find myself in a somewhat unfavorable position on this occasion. Since the secretary of the Pomological Society did me the honor of inviting me to contribute my slight share to this convention, I have been unfortunately attacked by illness and to-day I had to start without my physician's knowledge in order to have the pleasure of meeting you here. It was in one sense a sacrifice I had to make but an agreeable

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sacrifice since it enables me to meet my Joliette friends and the members of the society here present and also gives me an opportunity of obtaining instruction from their learned lectures.

On the other hand I regret having to speak to you without preparation. This is not a lecture ; it is not even a discussion ; it consists of some remarks I have had occasion to make, in the course of my wanderings since I have occupied myself with agriculture, on the soils in which I have seen apple-trees growing. I therefore crave your indulgence.

I am willing to be called a professor of agriculture, but I have never ventured to assume the title of professor of horticulture. I have always liked fruit, and apples amongst others. Had I been Adam I would have certainly failed to resist his temptation. I should have succumbed before the attractions of the apple. Mr. Hamilton showed us a charming picture of an orchard ; it gave us a foretaste of terrestrial paradise and Mr. Renaud spoke to us of the terrestrial paradises of California. Now, gentlemen, we will content ourselves with cultivating a taste for apples, for I hope that in this part of the country we can, as Mr. Hamilton has said, grow apples, successfully ; we have the soil but we lack experience. I will first endeavor to describe to you the soils I consider suitable for growing apples in this region.

I have seen apple-trees in various places which seemed to thrive very well, which bore an abundance of fairly good fruit, and this convinces me that it is possible to grow apples here as they are grown elsewhere. It is sufficient to know how to choose soil suitable for the growth of the tree, a soil which can supply the natural wants of the apple-tree. The requirements for growing apple-trees must be looked at from a twofold stand point : the physical conditions of the soil and the chemical composition of soils suitable for apple-trees.

What physical conditions are required for apple-trees ? The soil must be porous and permeable ; it must be deep and possess sufficient retentive properties as regards humidity for the nourishment and transpiration of the tree, for the apple-tree is one that evaporates greatly ; it needs a soil retaining humidity. On the other hand stagnant humidity must be avoided. Thus a wet soil inundated by springs in which the roots would be in contact with stagnant humidity, would be unsuitable for the growth of apple-trees. Soils in such conditions are usually a little gravelly, frequently containing a certain proportion of pebbles ; the earth constituting them is of soft texture ; they are generally drained to a rather considerable depth ; there should not be any dampness at a lesser depth than three or four feet. If the soil be suitable on the surface, but with a bed of clay at a certain distance beneath, drainage alone will make it suitable, drainage to a depth of four or five feet between the rows of trees.

As a physical condition we have also the exposure. The apple-tree is a hard wood tree which, as Mr. Hamilton said just now, will grow wherever our hard wood trees grow, such as white maple, bass-wood, ash, white oak and even red oak ; wherever these trees grow without being mixed with soft-wood trees, I am convinced some varieties of apple-trees will also grow in the same soil. We have proof of this : wherever orchards succeed, the places are abundantly covered with those trees. The apple-tree, like all hard wood trees, grows well on the banks of rivers, the banks of which are naturally drained, provided the

sub-soil be sufficiently deep. Strips of land covered with hard-wood trees were formerly generally, and are still to be found, in the wooded districts; I have observed water-courses, even rivers, along the St. Lawrence of somewhat considerable size, on the banks of which there was red oak, in soil that was apparently sandy but with some alluvium.

We see fine apple-trees at Lavaltree, I think they are wildings but I am convinced that grafted trees could succeed as well. The soil is sandy and yet maple, red and white oak grow on it. The apple grows well there. I saw some trees in gardens that were thriving and bore excellent fruit.

The Laurentian region contains localities very favorable for the cultivation of fruit. Not far from here, on the slope of the Laurentides, we find that land on which hard-wood trees grow, produces good orchards. To the north, in St. Ambroise, are orchards doing well. I do not say that all the varieties, but the hardiest varieties give satisfaction. Some years, nearly twenty years ago, I saw in Chertsey two fine large apple-trees loaded with fruit; I think they were still wildings but they were fine thriving trees. It was a valley in the upper part of Chertsey which must have been covered with maple-trees before it was cleared. I then said to myself. If one or two apple-trees produce excellent fruit here, why should not thousands? There we had an instance of success; all that had to be done was continue in the same path; those apple-trees could be multiplied infinitely.

We have many places in this district suitable for fruit-growing, which possess the requisite physical conditions, where the land is sufficiently high. Thus, in St. Thomas on the banks of L'Assomption river; in the north, in the county of Montcalm, St. Alexis, St. Jacques, St. Esprit, all have excellent sites with the requisite physical conditions. No great improvements are needed to make fruit trees grow in those places. In the north, in St. Jérôme and still further north in St. Adèle, I have seen trees do very well under the same conditions.

Now there is the chemical composition of the soil which also has to be considered, because land may possess the suitable physical conditions and nevertheless have a defective chemical composition.

The apple-tree is one that, as I have just said, grows wherever the best hard-wood trees of the country grow and in soils that are generally rich in lime, potash, phosphoric acid and magnesia. All these soils possess the proper chemical composition. Moreover the very composition of the apple-tree indicates it. The leaves, for instance, contain from 2 to 4 per cent of ashes; from 17 to 28 per cent of lime; from 10 to 12 of potash; from 4 to 10 per cent of magnesia; from 2 to 3 per cent of nitrogen, of dry organic matter. This proves that it is necessary to have soils naturally rich in lime, in potash and in phosphoric acid, also sufficiently rich in organic matter and nitrogen.

Soil for fruit-growing must be a naturally warm soil; and by warm I do not mean a dry soil; warm soil should not be confounded with dry soil. At L'Assomption we made experiments in planting orchards in dry soil which did not possess the requisite physical conditions; the result was that more than half the trees dried up every year, notwithstanding the fact that we put on clay and lime that is to say the mineral elements considered necessary for nourishing the apple-tree.

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As to the fruit itself the apple is largely composed of organic matter and but little mineral substance, but one-half the latter is potash. All these mineral elements make good soils.

Now, if a soil possess suitable physical conditions, but lack the chemical composition necessary for the composition of the apple, we have to fertilize it, that is to say supply it with the indispensable elements for its nutrition in order that it may yield excellent fruit. The elements I have just mentioned are those which should be supplied by means of fertilizers; soils lacking lime should be fertilized with lime and so on.

As to the organic matter, nitrogen, which the apple-tree derives in great quantities from the soil, we supply it by fertilizers, by the preparation of the soil, by preparatory cultivation of manured hoed crops and afterwards by growing clover. Clover is of great assistance in supplying nitrogen to the soil of orchards. Clover is a plant that you all know, the properties of which you all know: that of nourishing the soil. So that by growing clover in orchards you enrich the soil with nitrogen which afterwards helps to nourish the apple-trees and their fruit. This is the most economical way of supplying apple-trees with this fertilizer.

It must also be observed that the best apples, such as the Fameuse for instance, are always those which grow in soils containing the most mineral and the most organic substances and which grow best on soils that are richest in lime and potash. We have a proof of this in the island of Montreal, the home of the Fameuse, which grows on the limestone plateaux in the environs of Montreal.

Just now I indicated in a summary manner the regions in which apples may be grown. There are doubtless many farms on which orchards could not be planted to advantage owing to drainage being too difficult and too costly. People with plenty of means could alone attempt to plant orchards. I am of opinion, like the others who have addressed us, that we should endeavour to cultivate fruit more than we do, at least for our needs. The district of Joliette could supply its own needs and even more. Of course all might not be successful but a great many would, sufficiently so to supply the market of the district. You know that we must have recourse, not to a foreign market, but to adjacent counties for our supply. We are frequently obliged to content ourselves with very inferior fruit from better favored parishes like St. Joseph du Lac which sends us great quantities of inferior apples and sells them for the same price as good ones. I think we could succeed as they do in having apples and even have better ones by improving the soils suitable for their growth, not only here but throughout the Laurentian country.

The way to do this has been suggested in a rather summary manner: Grow the proper varieties; establish nurseries; raise trees according to the conditions of the soil in which you wish to grow them. That is the important point. Trees become acclimatized like animals, and we can easily increase the hardiness of certain trees by raising them in the region in which they are to grow.

Now, as regards soils which are not of a very favorable nature, these must of necessity be broken up to mix up the various layers, because sometimes soils

contain a little sand and a little clay, and it is important that the whole be mixed up.

In order to have a good orchard, especially in a soil that is at all clayey, it is important that the soil be well drained. In many soils that are even clayey and sufficiently porous, success would be assured by drainage. The experience of fruit-growers on the island of Montreal, shows this: the best orchards of Coteau St. Pierre are in calcareous soils that have been drained; the orchards are drained. I myself have seen drained orchards in many places, and the apples certainly grew better there, at least so I was told by the best fruit-growers of that region, among others Mr. Jérémie Décary.

I have seen splendid land for fruit-growing in the county of L'Assomption, especially in the valley of the Achigan, on the north side; in the county of Montcalm are slight eminences, containing many boulders and plenty of limestone; on the sheltered plateaux on the north side in the county of Montcalm, are many suitable spots. St. Alexis contains many hill-sides suitable for fruit-growing. Forty, and even fifty years ago, there were splendid orchards in St. Alexis, planted by old Acadians, who had brought this cultivation from old Acadia. At present these orchards have fallen into decay, and the apple trees are eaten up by insects. If trees were grown intelligently by putting into practice the information given by those who have preceded me this evening, I am sure that there would be orchards there like those in existence twenty years ago. We may say: "*Ab uno disce omnes.*" Where one apple tree has grown successfully why should not thousands grow? We must grow them in suitable soils, and if we do so with judgment I am sure we will be successful. Then we shall have the advantage of eating apples grown in our own district by our own farmers, and better, I am sure, than those sold to us by strangers, who often bring us wormy apples.

The state of my health does not allow of my speaking more at length. I ask your pardon for having inflicted my address on you under the circumstances, but if those who have heard me are able to take advantage of what I have said, I think it will have a beneficial effect in the future.

NOTES ON THE CULTIVATION OF STRAWBERRIES.

By J. J. GAREAU, St. Roch de l'Achigan.

The season of 1899 has been a rather favorable one for strawberries in this place. Nevertheless they suffered a little from drought while in blossom and this prevented much fruit from ripening, especially on high and clayey land.

From an experience of several years in the cultivation of strawberries I have noticed that light soils (generally called yellow soil here) are better than strong clayey soils for this fruit. In a light soil that retains humidity the fruit becomes larger but its color is not so bright as that grown in heavy soil.

To get an abundant crop of strawberries it is necessary to choose a piece of ground from which a hoed crop has been raised and which has been thoroughly

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manured the previous year. I always prefer to plant in the spring in soil that has been well ploughed and then spread wood ashes or sulphate of potash; this gives the fruit a better color.

In the spring, as soon as the earth can be worked properly, I prepare it with the disk and the Acme harrows; then I trace my rows with a marker with intervals of three feet, and I plant my strawberry plants in the row at a distance of $1\frac{1}{2}$ or 2 feet from one another, according to the variety planted. I always select young plants of the previous year, coming from a plantation which has not yielded any fruit; I take them out with a garden trowel with the earth adhering to the roots and fill up large boxes with narrow sides conveying them in a garden wheel-barrow to the place where I intend to plant them. I then place the plants in a trench dug beforehand and pack the earth around each plant. In this manner the plants are not checked in their growth. But if the plants have been bought from a nurseryman and come from a distance, I raise a cone in the bottom of each trench and after cutting off the end of the roots I put the strawberry plant on this small mound, spreading the roots out in all directions and pack the earth around the plant. As soon as weeds begin to appear the horse-hoe must be run between the rows and the field be kept clear of weeds; it must continue to be cultivated in this way throughout the season, by using the horse-hoe at least once a week and even twice if the season is dry, to retain humidity. About the end of August I cease to use the horse-hoe to give the runners time to take root; in a short time they take possession of nearly the whole ground. Should any more weeds come up by accident I weed them by hand.

When winter comes if there are any portions of the field that are swept by the wind I plant young fir trees to retain the snow.

In the following spring I continue to keep the field free from weeds by hand. After the strawberry crop is gathered I mow all the plants and allow them to lie on the field for two or three days; then I spread some straw over them and set fire to it. I thus destroy a multitude of insects and weeds without injuring the crown of the plant which grows again more vigorously and the field gives another good crop the following year, after which I plough it up to plant vegetables in it.

Every year I begin a new plantation to succeed the one that has been ploughed under.

Of all the varieties I have grown the following have given me most satisfaction in the order in which they are described: Bubach 5 is one of the largest strawberries; yields abundantly and does as well in heavy as in light soil; it is the best for a near market.

Warfield No. 2. Fruit of average size; color, a bright dark red; ripens early; the fruit is firm and can be conveyed long distances, it is much liked for making preserves.

Haverland. Fruit larger and longer than the Warfield; produces abundantly and for a long time.

Woolverton. A large strawberry, which retains its size until the last are picked. Very hardy.

Gardner. Produces abundantly; fruit of average size and attractive color. I have also some other varieties under trial but they must be tested for another season before they can be recommended.

With the above varieties we have the advantage of a longer season for gathering the strawberries. This year I gathered the first berries of the Warfield variety for market on the 12th June and the last of the Bubach No. 5 on the 25th July.

We can thus obtain very remunerative prices with the first and last fruit gathered.

SPRAYING FOR THE TENT CATERPILLAR.

By J. M. FISK, Abbotsford.

The ravages of the tent and forest tree caterpillar during the summer of 1899, will not soon be forgotten by many an orchardist throughout the Province of Quebec.

Not since the years of 1874 and '75 have our orchards suffered to any great extent until during the past season, when thousands of trees, both fruit and forest, have been stripped, and incalculable injury done to both apple and sugar orchards.

At our summer meeting last year I called attention to the fact that the indications were that we were on the eve of another caterpillar scourge, and it is quite possible, nay, almost certain, that this insect will be more numerous during the summer of 1900 than it has been this summer, for there is a large deposit of nits already on the twigs of our trees, beautifully arranged in rings, and protected from frost and weather, awaiting the congenial warmth and influence of the sun next May to develop another starving horde of caterpillars to devastate our land. These rings should be gathered wherever found, and destroyed; the best time for this is during the winter, or any time after the leaves have fallen.

If the country were threatened with invasion by a foreign foe there would at once be an appeal to arms, and men and money sacrificed to protect our honor and homes, and justly so. The caterpillar should be equally dreaded, for though his work is not to destroy human life, it means death to our trees, which are worth thousands of dollars and should be protected. We cannot meet him with trained and uniformed men marching to the beat of fife and drum, but we can meet him with the spray pump, and at the point of the nozzle deal death at every stroke.

There are those who claim that spraying does not keep the caterpillar down. My answer to that is, that your work was not well done; either you allowed the caterpillar to get the start of you, or your pump is out of date, or your solution improperly mixed, or you fail in the application. See to it that you have an up to date pump with a proper agitator, plenty of hose with a first-class nozzle, and for large trees an extension rod with stop-cock attached, so as to

have perfect control in throwing the spray to cover every leaf on the tree, whether the wind blows or not, and that the applications are made at the proper seasons.

The mixture with which I have been successful is the old formula, with the exception of an increased quantity of Paris green; that is 4 lbs. copper sulphate, 4 lbs. lime, and 8 oz. Paris green to the ordinary coal oil barrel full of water. For the caterpillar the first application should be made as soon as the leaf opens and the caterpillar begins to feed, and repeated every eight or ten days until he has done feeding, so timing the applications as not to spray when the trees are in full bloom, or the bees will be killed and the fruit crop impaired.

I never had a tree stripped by the caterpillar when the foliage was kept covered with the Bordeaux containing 8 oz. of Paris green. One of my orchards was subjected to a severe test during the past season. It was bounded on the north and south by my neighbors' orchards, and on the east by a sugar bush, which was infested by the forest tree caterpillar. My neighbors' orchards were not sprayed and their trees were stripped, and as soon as this was done they moved in large numbers to my orchard and there met death without impairing to any great extent the foliage of the sprayed trees. This was an object lesson to all who saw it, and was a convincing proof that it pays to spray for the caterpillar, and that it can be controlled by the pump when properly used.

Mr. Bazinet, M.P.—I am sure that what has been said to us to-night about apples and other fruit interests us greatly in the district of Joliette and will be carefully followed by the farmers engaged in that kind of cultivation. I tender my thanks to the President and the gentlemen who have addressed us this evening.

Mr. Tellier, M.P.P.—I was not aware, Mr. Chairman, that my name was on the programme. In any case I did not expect to have to respond to the kind invitation you give me, and I must beg respectfully, with your permission, to decline it. I accept it merely in order to express in a few words all the pleasure and satisfaction I have had in being present at this interesting meeting. I came here for instruction, not to instruct others, and for my part I hope I will carry away something with me. I hope the information given this evening will bear fruit in the district of Joliette.

Mr. Richard, President of the County of Joliette Agricultural Society, said:—

GENTLEMEN,—

I thank you very much for inviting me to address you. I do so in the name of the few farmers who are here. There are but few, I regret to say, but you who belong to the trade know under what circumstances you find us; you know that we are in the midst of our harvest, and that it is the most important time of the year for us. I know all that are absent regret exceedingly that they have been unable to come to Joliette to benefit by the learned lectures and good advice you have given us.

In the name of the farmers who are here, and those who, I regret it, are not here, I tender my sincerest thanks to you, Mr. Chairman, and to the other

lecturers who have been good enough to visit us and to interest us to so high a degree.

Mr. Chapais—In bringing to a conclusion this meeting in which you seem to take much interest, I must tell you that in view of the circumstances just mentioned by Mr. Richard, we have decided not to continue the meeting to-morrow morning, as we had at first intended to do. I think it is the best thing we can do under the circumstances. Moreover, on our side, some of our friends have, for very valid reasons, been unable to come, and we are compelled to shorten our programme. We will, therefore, say good night and at the same time *au revoir*. It remains for me, before leaving, to thank the mayor and the town councillors, who have given us such a kind and cordial welcome. Our thanks are also due to the gentlemen who have kindly assisted in organizing this meeting and especially to Mr. Richard, the President of the Agricultural Society. We are working in the public interest, and if we have succeeded in inducing some farmers to grow fruit trees, a culture that has hitherto been too much neglected, we shall consider that we have attained our end.

REPORT OF THE HORTICULTURAL SOCIETY OF THE COUNTY OF LISLET.

S. SYLVESTRE, ESQ.,

Secretary of the Department of Agriculture of the
Province of Quebec :

SIR,—

In the spring of 1897, the Horticultural Society of the County of l'Islet represented to the Honorable Commissioner of Agriculture the extensive damages suffered by the orchards of this and adjacent counties during the winter of 1896-97, and the honorable minister allowed the society to spend its funds, with a special grant of \$200.00, in purchasing fruit trees with the view of encouraging orchard owners to repair the damage caused during the previous winter. He exempted the Society from holding an horticultural exhibition in the autumn. In giving the special grant the honorable minister imposed the condition that farmers of the districts where orchards had suffered should have the right to benefit by the grant as well as those of the county of l'Islet.

The Secretary published a notice in the Journal of Agriculture and Horticulture and in several other papers.

I enclose a list of members of the Society with their addresses.

The Society purchased over three thousand apple and plum trees from Brown Brothers, of Toronto, whose prices were lower than any other.

The members had to pay eight cents each for the apple and twelve and a half cents for the plum trees, all six feet high; the balance was paid by the Society. Unfortunately, these trees were sent from Ontario to St. Louis, County of Beauharnois, where they remained three weeks. They reached here heated,

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mouldy and nearly all in bad order. Messrs. Brown came down here to ascertain whether the trees had really reached here in bad condition, and they undertook to replace those that had not taken. In fact they sent this autumn :

- 728 assorted apple trees
- 1,557 assorted plum trees
- 57 assorted cherry trees
- 1,200 Downing & Houghton gooseberry bushes.

They sent us very fine trees, which gave full satisfaction, although it was a complete loss to them.

This distribution of trees has been a great impetus to the planting of fruit trees east of Quebec.

We observed when the Horticultural Exhibition was held on the 20th September last, that the farmers had regained courage and hoped in a few years to have as much and even finer fruit than formerly.

Several thousands of apple trees have been planted in the country, especially of the early and hardy varieties, that produce excellent fruit for the market.

The yearly exhibitions of fruit in the county—at which each variety must be correctly named to allow its entering the competition—have greatly contributed towards educating the public on the varieties that can be successfully grown. Farmers are guided by the samples when they purchase trees instead of relying upon the catalogues of agents.

The Damson and Reine Claude plum trees (the blue and white plums of the country) suffered more than the apple trees in 1897, but it is observed that efforts are being made everywhere to restore these orchards of plum trees that were formerly so productive.

Great care is taken of the shoots and seedlings in transplanting them in the orchards and providing them with the necessary manure and protection.

The Society proposes to encourage these new plantations by offering prizes to the most successful.

REPORT ON THE HORTICULTURAL EXHIBITION OF THE 20TH SEPTEMBER, 1898.

The Exhibition was held at St. Jean Port Joli, under the patronage of Sir Henri Joly de Lotbinière, one of the founders of the Society, and Honorable F. G. M. Dechène, Commissioner of Agriculture, who has been one of its promoters for many years. His father was one of its founders in 1880, and also a zealous director.

The Honorable Minister and his brother, Mr. Arthur M. Dechène, member of the House of Commons, were present at the exhibition. They spoke encouragingly to the farmers, congratulated the county on the progress it has made in agriculture and horticulture and gave them excellent advice. Among

other things they said that the breed of horses needed to be greatly improved. In the first place horses should be bred for the requirements of the county. (Horses to the value of over eight thousand dollars had been imported into the county that year). The honorable commissioner recommended the introduction of selected stallions and promised all the assistance the law allowed him to give.

He said: "Improve your breeds of horses and farm stock, improve the quality of butter and cheese; choose trees that produce the fruit most in demand and pack it carefully. You will find profit in so doing and the county will maintain its reputation for the excellence of its fruit."

The meeting highly appreciated this wise counsel.

The directors of the Horticultural Society of the county of L'Islet are:

Rev. Mr. Frenette, parish priest of St. Jean Port Joli; Messrs. P. G. Verreault, St. Jean Port Joli; Eugène Bourgault, P.L.S., St. Jean Port Joli; Arthur Talbot, farmer, L'Islet; Alexis Blais, St. Aubert; Thadée Francœur, St. Roch; A. M. Dechène, M.P., Village des Aulnaies; Auguste Dupuis, fruit-grower, Village des Aulnaies; Antoine Gustave Verreault, registrar, secretary-treasurer, St. Jean Port-Joli.

We cannot too frequently repeat that the exhibition was a success.

The exhibition of fruit, flowers, vegetables, bees, honey (extracted and in the comb) was remarkably fine and the exhibits were numerous. There were 534 entries on the lists of the indefatigable secretary, Mr. A. G. Verreault, registrar.

Amongst the hundreds of varieties of apples were observed: the Alexander, of prodigious size; the Red Astrachan; the Duchess, ever most attractive which, with the Russian Transparent and the Wealthy, form a trio of trees most profitable to the farmer. They are very productive and bear fruit two or three years after grafting. All who cultivate these varieties agree in saying that they resist cold well and are suited to the light soil and soil mixed with clay of the district. The delicious St. Laurent, the luscious Fameuse, the Pearmain, Reinette, Russet, Summer and Winter Colville, Ben. Davis, and Scott's Winter all appeared to advantage. We observed a green apple of very large size and fine shape. It is a keeping variety; its name was given on a card as "Cellini," but this name is not correct according to the description given by authors. This variety deserves to be propagated and disseminated as it attains such a degree of perfection in the county of L'Islet.

We observed large collections of apples; one contained twenty-eight varieties. I have rarely seen such fine and such numerous varieties of crab-apples as those on the table. The Whitney crab-apple, which is inferior as regards bright color to the Montreal Beauty, is far superior as regards size and quality. The Transcendent and Hyslop are first as regards productiveness. They are large, fine, produce abundantly and every year. The exhibits were fine and numerous. Many seedling apples seem to have good points as to merit and should be propagated by grafting.

The plums made a fine appearance on the tables and notwithstanding the heavy losses suffered by orchards in 1897 a great many varieties were shown such as: Lombard, Bradshaw, Bavay's Reine Claude, Yellow Egg, Pond's Seed-

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ling, Jefferson and other foreign varieties which grow to perfection in the county. There were plums as large as eggs.

The exhibits of the plums of the country, the Damson and Reine Claude, were much admired and we ask ourselves why such fine and good plums are shipped green and hard to the Quebec markets. I heard that traders buy them and have them gathered ten or twelve days sooner so as to convey them in barrels without injury.

Producers would always get better prices by gathering the plums when they begin to ripen and by sending them to market in baskets holding from one to three gallons. Such good fruit should never be shipped in barrels. The Horticultural Society will no doubt continue to show the public that the barrel system is out of date and that the California packing boxes and baskets should be used instead. An enormous quantity of foreign fruits fill our markets. To compete with them to advantage and realize a profit the producer must have fine fruit, the best of fruit carefully packed in small boxes or attractive baskets. The consumer does not care for plums that have gone through three or four hands. He prefers paying 50 cents a gallon for plums carefully gathered and put in a small basket; the bloom that will be seen on the fruit on opening the baskets will prove that it has not been handled but has been gathered without touching anything but the stalk. The consumer who can afford to pay for first class fruit will be pleased at this.

The fourth class of exhibits was very interesting. There was an abundance of fine exhibits: currant jelly, jellies made from apples and other fruits, home-made wine and cider; choice maple syrup.

The pears were not what they should have been.

The Compton model farm exhibited some of its famous creamery butter. The butter was first class, put up in one pound prints, on small drawers in a well finished box. This box gave a good lesson in packing. Most honorable mention was awarded it by the Judges. The fruit evaporator of the Grimm manufactory, Montreal, attracted a great deal of public attention. Honorable mention was awarded Mr. Grimm for this evaporator which is destined to be of great use to those who desire to dry apples, plums, etc., in years when fruit is abundant. This evaporator exhibited was presented to the society by Hon. Louis Beaubien.

The vegetables were all fine and in great variety. We saw vegetables there as perfect as can be seen anywhere else.

Over three hundred pamphlets on fruit-growing were distributed to the members of the Society in 1898 by the Department of Agriculture. This will be a safe guide to many families in planting and growing fruit as well as in gathering and preparing the same.

Generous prizes were given by several members to exhibitors of remarkable products.

When the Society was founded in 1880, many persons who wished it success did not think it could maintain itself for any time; that it was impossible to comply with the law governing horticultural societies in the Province of Quebec.

Nineteen years have elapsed and the Society is stronger; it has extended its operations in more counties than the five horticultural societies receiving Government aid, which are all established west of Montreal, where the climate is more favorable for fruit-growing. This Society would at the present day be entitled to the name "Provincial." The list of members proves this, and it proves also that it is composed of men the more devoted to the progress of remunerative horticulture. The Society's reports have been published by the Montreal Horticultural Society; some have been published in France, where distinguished horticulturists have acknowledged that they were of great importance, as they made known the trees, bushes and varieties that the members of the northernmost society of the American continent had succeeded in acclimatizing.

The Society hopes that the number of its members will increase from year to year, and that each one will labor for the development of fruit-growing in his own locality.

I have the honor to be, Sir,

Your obedient servant,

(Signed) AUGUSTE DUPUIS,

President of the Society.

Village des Aulnaies, December, 1898.

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