ANNUAL REPORTS

OF THE

FRUIT GROWERS' ASSOCIATION,

FRUIT EXPERIMENT STATIONS

AND

ENTOMOLOGICAL SOCIETY OF ONTARIO

1902

THIRTY-FOURTH ANNUAL REPORT

OF THE

FRUIT GROWERS' ASSOCIATION

OF

ONTARIO

1902.

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FRUIT GROWERS' ASSOCIATION OF ONTARIO.

OFFICERS FOR 1903.

President.....W. H. Bunting, St. Catharines.
Vice-President.....Alex. McNeill, Walkerville.
Secretary-Treasurer.....G. C. Creelman, Parliament Buildings, Toronto.

DIRECTORS.

Agricultural Division No. 1.....A. D. Harkness, Irena.
" 2.....R. B. Whyte, Ottawa.
" 3.....Harold Jones, Maitland.
" 4.....W. H. Dempsey, Trenton.
" 5.....Wm. Rickard, Newcastle.
" 6.....Elmer Lick, Oshawa.
" 7.....M. Pettit, Winona.
" 8.....E. Morris, Fonthill.
" 9.....J. S. Scarff, Woodstock.
" 10.....W. W. Cox, Collingwood.
" 11.....T. H. Race, Mitchell.
" 12.....J. H. Hilborn, Leamington.
" 13.....G. C. Caston, Craighurst.

Ontario Agricultural College.....Prof. H. L. Hutt.
Honorary Directors:—Thos. Beall, Lindsay; A. M. Smith, St. Catharines; Prof. W. T. Macoun, Horticulturist C.E.F., Ottawa.
Editor of Canadian Horticulturist.....L. Woolverton, Grimsby.
Auditor.....J. M. Duff, Guelph.

REPRESENTATIVES TO FAIR BOARDS.

London.....T. H. Race, Mitchell; J. S. Scarff, Woodstock.
Ottawa.....R. B. Whyte, Ottawa; Harold Jones, Maitland.
Toronto.....W. E. Wellington, Toronto; G. C. Creelman, Toronto.

COMMITTEES.

Executive: President, Vice-President, and Secretary.

Board of Control, Fruit Experiment Stations: Chairman, Dr. James Mills, Messrs. W. M. Orr, A. H. Pettit, A. M. Smith and G. C. Creelman (*ex-officio*).

New Fruits: Prof. H. L. Hutt, Prof. W. T. Macoun.

Canadian Horticulturist: G. C. Creelman, T. H. Race.

Transportation: G. C. Caston, Craighurst; H. W. Dawson, Toronto; W. H. Bunting, St. Catharines; D. D. Wilson, Seaforth.

FRUIT GROWERS' ASSOCIATION OF ONTARIO.

ANNUAL MEETING.

The annual meeting was held in the Court House, Walkerton, on Monday afternoon, December 1, 1902. The chair was taken by the President, Mr. G. C. Caston, at 3 o'clock.

REPORT OF THE SECRETARY.

By G. C. Creelman, Toronto.

In presenting this, my first annual report as Secretary of the Ontario Fruit Growers' Association, I wish first to thank each and all of the officers and directors for their courtesy, kindness, and help during the year. Your Secretary must, at times, assume the responsibility of managing director, and frequently has to decide matters of importance to the Association without help from anyone. To the hearty "backing" of the Executive Committee and the approval of the Directors is due any advances that may have been made during the last twelve months.

Speaking generally, I feel that distinct advances have been made, and while the Ontario Fruit Growers' Association is the oldest society in affiliation with the Ontario Department of Agriculture, age here is no indication of lessened energy or halting progress.

1. Local Fruit Growers' Associations.

During the past spring many organizations were formed throughout the Province under the name of Local Fruit Growers' Associations. To these associations at the time of organization, or soon after, were sent experts who gave instruction in orchard management. Many of these associations were organized because it was found that the horticultural societies of the cities and towns, which were formed under the provisions of the Agriculture and Arts Act, did not apply thoroughly to practical fruit-growing conditions. The horticultural societies have devoted most of their energies to work in floriculture, and along the line of civic improvements. This dividing of the work will, no doubt, be a distinct advantage to both societies, in that each may be able to devote itself more particularly to its own line of work.

To this end the following letter was addressed to each director of the Ontario Fruit Growers' Association:

Toronto, February 12, 1902.

Dear Sir,—The question of District Fruit Growers' Associations was discussed at our last meeting, and I have since talked the matter over with the Minister and Deputy Minister of Agriculture. They have instructed me to proceed with the formation of such organizations. The proposal is to form a fruit growers' association in each district, such association, having secured fifty members, to become affiliated with the Ontario Fruit Growers' Association. It is proposed to make the membership fee of such association 25 cents, the same as that charged by the Farmers' Institutes, but any member wishing to become a member of the Ontario Fruit Growers' Association, and receive all the benefits of that organization, including the Canadian Horticulturist, may do so by paying an additional 75 cents.

The object of these local fruit growers' associations shall be, primarily, the giving of an opportunity for fruit men in each district to meet at stated intervals and discuss all matters pertaining to their business. I think it desirable that we send a good, practical fruit man to each district to co-operate with you and attend meetings which you have called in two three or more places where you think you can count upon representative gatherings of men interested in fruit culture.

You will be expected, in the interests of our association, to give your time freely to this work, but your expenses will be paid while you are engaged in it. I think I shall be able to secure from the Government a small grant to defray expenses of organization, and if you succeed in organizing a good district association, we shall have gone a long way toward bringing our fruit growers' association into closer touch with the man who grows fruit.

Such organizations, as are herein proposed, are not in any way to interfere with the horticultural societies now existing in our towns and cities. These societies have a function to perform which is quite different from that of fruit growing on the farm, and it is with the sole idea of helping the farmer to produce more and better fruit, that we are undertaking this new work.

Please let me know at your earliest convenience if you are in a position to undertake this work during the month of March, and also which points in your district would be best for meetings. If you cannot undertake this yourself, whom would you suggest among the progressive fruit men in your district to take hold of the work, call meetings, and discuss the fruit question.

When all of these letters had been replied to arrangements were made and the following circular issued, viz.:

At the last annnal meeting of the Ontario Fruit Growers' Association, the Secretary was requested to arrange a series of orchard institute meetings, particularly through the apple districts of the Province of Ontario. Since the beginning of the year the Secretary has been corresponding with fruit growers throughout the Province in reference to the best places to hold these meetings, and has finally arranged the following schedule. It is intended, as far as possible, to hold a short meeting in the hall in the afternoon at 1.30, and at 3.30 the meeting will adjourn to a neighboring orchard, where a practical demonstration will be given in pruning, grafting, etc., as well as a talk on orchard cultivation and methods generally pertaining to fruit growing.

It is expected that the members of the Farmers' Institutes and Horticultural Societies, as well as every farmer interested in the production of fruit, will be present and receive instruction and take part in the discussion.

In the evening, a general meeting will be held for the purpose of organizing a local Fruit Growers' Association. The object of these associations shall be to foster the fruit industry. Such organizations already formed have done good work in discussing methods of cultivation, and picking, packing, grading and handling of fruit, co-operative shipping, co-operative buying of packages, etc.

The following is a list of the meetings that were arranged, viz. :—

Delegates : H. Jones, Maitland ; G. W. Carson, Charleville.

Kemptville	March 24	Lyn	March 27
Roebuck	" 25	Mallorytown	" 28
Iroquois	" 26		

Delegates : Elmer Lick, Oshawa ; W. H. Dempsey, Trenton.

Wexford	March 21	Oshawa	March 25
Unionville	" 22	Bowmanville	" 26
Port Perry	" 24	Newcastle	" 27

Delegates : Elmer Lick, Oshawa ; G. C. Gaston, Craighurst.

Orono	March 31	Millbrook	April 2
Welcome	April 1	Grafton	" 3

Delegates : Mr. Vroom, Middleton, N.S. ; G. C. Caston, Craighurst ; Major H. J. Snelgrove, Cobourg.

Colborne	April 4	Brighton	April 5

Delegates : Mr. Vroom, Middleton, N.S. ; G. C. Caston, Craighurst ; W. H. Dempsey, Trenton.

Trenton	April 7	Wellington	April 10
Frankford	" 8	Picton	" 11
Consecon	" 9		

Delegates : G. C. Gaston, Craighurst ; A. E. Sherrington, Walkerton.

Port Elgin	March 21	Clinton	March 26
Walkerton	" 22	Hensall	" 27
Lucknow	" 24	Teeswater	" 28
Blyth	" 25		

Delegates: Murray Pettit, Winona; A. McNeill, Walkerville.

Georgetown	March 21	Freelton	March 25
Bronte	" 22	Rockton	" 26
Waterdown	" 24	Ancaster	" 27

Delegate: W. N. Hutt, Southend.

Stayner	March 14	Creemore	March 15

Delegates: A. McNeill, Walkerville; W. W. Hilborn, Leamington.

Belle River	March 31	Chatham	April 7
Kingsville	April 1	Bothwell	" 8
Leamington	" 2	Ilderton	" 9
Wheatley	" 3	Lucan	" 10
Blenheim	" 4	Thedford	" 11

Delegates: W. H. Bunting, St. Catharines; G. E. Fisher, Freeman.

Grimsby	April 15	St. David's	April 17
St. Catharines	" 16		

These fifty-one meetings were held without a single failure, and the daily and weekly papers throughout the Province gave good reports of them. The *Weekly Sun* in particular devoted whole pages to the work, and the energetic Editor deserves the thanks of every man with an orchard, for his most excellent weekly reports.

As a result of these meetings 36 Local Associations were formed, viz.—

Association.	*No. Members.*	*Secretary*	*Address.*
Kemptville.	11	B. F. Dangerfield,	Kemptville.
Roebuck.	24	G. C. Carson,	Charleville.
Iroquois.	35	A. D. Harkness,	Irena.
Lyn.	15	Sheldon L. Brown,	Lyn.
Mallorytown.	9	H. M. Mallory,	Mallorytown.
Bowmanville.	35	James McLean,	Bowmanville.
Newcastle.	16	Mr. Davison,	Newcastle.
Orono.	12	John Rickaby,	Orono.
Welcome.	15	W. E. Inch,	Welcome.
Grafton.	17	Thos. Hoskin,	The Gully.
Colborne.	17	G. M. Peebles,	Colborne.
Brighton.	35	T. D Sanford,	Brighton.
Trenton.	13	W. H. Dempsey,	Trenton.
Frankford.	12	A. F. Turley,	Frankford.
Consecon.	11	E. N. Wicks,	Consecon.
Wellington.	14	A. A. Morden,	Wellington.
Picton.	20	John Laird,	Picton.
Creemore.	10	F. E. Webster,	Creemore.
Stayner.	20	L. Patterson,	Stayner.
Clarksburg.	13	C. W. Hartman,	Clarksburg.
Meaford.	49	D. Havill,	Meaford.
Collingwood.	18	H. Wiggins,	Collingwood.
Ancaster.	31	James L. McNiven,	Ancaster.
Leamington.	8	W. W. Hilborn,	Leamington.
Port Elgin.	32	W. A. Mitchell,	Port Elgin.
Walkerton.	28	M. G. Dippel,	Walkerton.
Lucknow.	22	R. B. Cameron,	Lucknow.
Blyth.	28	Frank Metcalfe,	Blyth.
Clinton.	12	F. C. Elford,	Holmesville.
Hensall.	11	Alex. Buchanan.	Hensall.
Teeswater	32	Thos. A. Goodfellow,	Teeswater.
Georgetown	..	.....	.....
Bronte	..	.....	.....
Grimsby	..	.....	.....
St. Catharines	..	.....	.....
St. David's	..	.....	.....
	625		

As illustration of the nature of the work accomplished I append one report out of the many received.

Georgian Bay Fruit Growers' Association.

A very profitable and interesting series of orchard meetings was held recently in this section.

Mr. W. N. Hutt gave a series of fine practical pruning demonstrations in the orchards at Meaford, Thornbury, Collingwood, Creemore, and Stayner. At each place he was greeted by a crowd of enthusiastic fruit growers, anxious to learn everything new in their business.

The pruning demonstrations proved to be just what they needed at that particular time, as there was a large number of young trees set out which need trimming, and also old orchards which need pruning badly. The farmers are waking up to the fact that a tree in order to be profitable must be well cared for.

The value of cover crops was thoroughly discussed, and considerable objection was taken to the time as generally given by speakers for the sowing of same. In the case of an orchard which was growing wood it might be all right, but, if an orchard was carrying a heavy load of apples, cultivation should be continued until the apples had made their full growth; otherwise, in a dry season there would be a great loss in size of apples from lack of moisture.

Another interesting discussion took place on the heading of trees, the general opinion being that they should be headed not less than 4 1-2 or 5 feet from the ground. The very general height of 3 1-2 feet was condemned by most, as the limbs come out just at a distance from the ground to be barked by the team or wheels of cultivator. A number were in favor of very low heading, about 10 or 12 inches, contending that the trees would be much easier pruned, sprayed and picked, and this latter would be especially true of plums, cherries and peaches, when if headed at that height much cheaper labor could be employed in picking. There would be no barking of limbs, as at that height a team would merely brush against the outside of the branches. That the cultivation around the trunk was of little value except for appearance, and with the extension implements being put on the market a tree could be cultivated as easily as when headed higher.

One must admit that considering the high winds in this section there is considerable force in the arguments for a lower headed tree.

At Meaford, where Mr. Hutt addressed the Horticultural Society in the evening, the weather was very unfavorable, as it rained nearly all afternoon; still, nothing daunted, Mr. Hutt went out and pruned trees between showers, and in spite of the rain about fifty farmers turned out.

The next meeting was at Collingwood, in the orchard of Mr. Wm. Marshall, where about sixty-five came out to see what they could learn. Among those present were G. F. Marsh, the Secretary; W. W. Cox, Vice-President; J. A. Prentice, Local Secretary; John McKee, Secretary West Simcoe Farmers' Institute.

Here a very interesting object lesson was given on the methods of pruning the different varieties of fruit trees. In the evening a meeting was held in the court room, which was adjourned to attend a lecture given by the Deputy Minister of Education on "Our Educational System." After listening to a very instructive address, we met again in the court room, where Mr. Hutt gave a short talk on "Injurious Insects," which was much enjoyed. The Secretary, Mr. Marsh, explained the benefits to be derived from the formation of such an Association.

At Creemore we were favored by a beautiful day, warm and mild. The energetic local secretary, Mr. F. E. Webster, had arranged for the meeting at the orchard of Mr. W. Pattullo, the vice-president. Here we had some excel-

lent object lessons, including all varieties of small fruits, grape vines, pear and plum trees. A well kept apple orchard which needed but little pruning, and one old tree which looked as if it had not been touched with a pruning saw for thirty years made an excellent subject. There were about one hundred at the afternoon meeting, but not so many for the evening. Mr. Hutt spoke on "Injurious Insects" again, and Mr. Marsh on the benefits to be derived from the Association.

At Stayner the next day, in spite of the cold wave, there were about fifty out in the afternoon. Among those present were, W. B. Sanders, President; L. Patterson, Local Secretary; F. E. Webster, Local Secretary of Creemore, and G. F. Marsh, District Secretary.

Here we had another very instructive demonstration, but little practical work could be done, as Mr. Bellwood had pruned his orchard as he does everything else he sets his hand to do—that is, thoroughly.

The closing meeting was held the next morning at Thornbury, when in spite of a snow storm and the cold, disagreeable weather, about thirty gathered in the orchard of Mr. L. Donaldson. Among those present were Mr. Mitchell, President and Superintendent of the Georgian Bay Experimental Fruit Farm; R. Ferguson, Local Secretary; T. McMurchy, Vice-President, and G. F. Marsh, Secretary.

This meeting closed this series of most pleasant and profitable orchard meetings.

RULES AND REGULATIONS SUGGESTED FOR LOCAL FRUIT GROWERS' ASSOCIATIONS.

1. The object of each local Association shall be the dissemination of information in reference to the fruit industry. The officers shall endeavor to bring the rank and file of the farmers who grow fruit into touch with the most successful local men, that the masses may become more conversant with the best and most profitable methods of planting, cultivating, growing, harvesting, and disposing of their garden and orchard products.

Organization of Fruit Growers' Associations.

2. A local Fruit Growers' Association may be formed in any locality in the Province of Ontario.

3. The organization meeting may be called by the District Director of the Ontario Fruit Growers' Association, by the Secretary of the Ontario Fruit Growers' Association, or by five fruit growers in the locality.

4. The annual membership fee shall be twenty-five cents.

5. As soon as the organization is complete the Secretary of the Ontario Fruit Growers' Association shall be notified, and the names and addresses of the officers shall be forwarded to him.

6. All memberships shall terminate the thirty-first of December of each year.

7. Each Association shall be known by a distinct name.

Officers.

8. The officers shall consist of a President, Vice-President, and a Secretary-Treasurer. The President and Vice-President shall be elected annually, and together with the Secretary-Treasurer shall constitute the Executive Committee.

9. There shall be elected annually two auditors to audit the accounts of the Association.

10. If the Secretary-Treasurer resigns, or for any reason does not perform the duties of his office, or if he removes from the district, the President shall assume the office and perform the duties of Secretary-Treasurer until such time as a new Secretary-Treasurer may be appointed.

Annual Meeting.

11. The annual meeting of each local Association shall be held during the month of January of each year.

12. At the annual meeting the officers and auditors shall be elected for the ensuing year.

13. The newly elected officers shall take office at the close of the annual meeting.

14. At the annual meeting the election shall be by ballot. No person shall be eligible for office, or be entitled to vote, who has not paid his fees in full for the current membership year.

15. At the annual meeting the executive officers for the past year shall, through the Secretary-Treasurer, present to the meeting, in writing, a carefully prepared report of the proceedings of the year, in which shall be stated the number of meetings held since the last annual report, the attendance at each sesson, the total number of papers read and addresses delivered, and a statement of the financial condition of the Association. The financial statement shall first be audited and certified thereto by the auditors.

16. The annual meeting shall be advertised by mailing to each member at least ten days before the date thereof, an announcement calling the members together. Said announcement shall specify the date, place and hour of meeting, and shall contain a programme of said meeting. If the executive deem it in the interests of the Association, posters and newspapers advertising the meeting may also be employed to make it publicly known.

Order of Business.

1.—President's report.
2.—Discussion thereon.
3.—Report of Executive presented in writing by the Secretary-Treasurer.
4.—Auditors' report presented in writing.
5.—Election of directors ; election of auditors.
6.—Suggestions as to how the Association may be improved or made more useful, if this has not already been considered by the President in his opening address and in the discussion following.
7.—Addresses by District Director of the Ontario Fruit Growers' Association, and others.

17. In case an Association shall, through any cause, fail to hold its annual meeting within the time specified, the Secretary of the Ontario Fruit Growers' Association may appoint a date for holding same, the meeting to be called as provided by the regular meeting, and this meeting shall in all particulars be taken as the annual meeting of the Association.

Monthly Meetings.

18. Meetings shall be held at least once a month for the purpose of carrying out the objects of the Association, as set forth in Clause 1.

19. At the first regular meeting following the annual meeting, the executive officers shall, through the Secretary, present an outline programme of the work to be undertaken by the Association during the year. As far as possible a specific topic should be selected and someone named at this time to discuss this subject.

20. No subject shall be presented at any meeting, or discussion allowed of a political or sectarian nature ; nor shall any speaker be allowed in his lecture, essay or speech, or in any discussion, to advertise wares or schemes in which he has a direct or indirect pecuniary interest. The delegates and officers of the Association shall see that the exercises are not subordinated to any low or frivolous entertainments or to the aggrandizement of any individual, party or sect.

21. Should any local Association require the services of an outside speaker or demonstrator for any meeting or orchard gathering during the year, application shall be made for same to the Department of Agriculture, through the Secretary of the Ontario Fruit Growers' Association, Parliament Buildings, Toronto. The Department will pay the services of such a man for one meeting each year for each local Association, but the local Associations shall pay all legitimate expenses of such speaker or demonstrator from the time he leaves home until he returns thereto. When a speaker or demonstrator addresses meetings of more than one Association, the expenses will be equally divided between said Associations and collected from each.

22. No one should be named on a programme who has not agreed to do the specific thing he is advertised to do.

DUTIES OF OFFICERS.

President.

23. It shall be the duty of the President to preside at all meetings of the Association and of the Executive Committee. In the absence of the President, the Vice-President shall preside, and if both are absent a chairman shall be appointed by the Committee.

Secretary-Treasurer.

24. The Secretary-Treasurer shall have the power of a managing director, acting under the control and with the approval of the executive.

Secretary.

25. It shall be the duty of the Secretary to call all meetings of the Executive Committee upon the authority of the President or any two officers, to give notice of all meetings as required by these rules, and keep correct minutes of the proceedings.

26. All official correspondence relating to the Association shall be conducted by the Secretary or in the name of the Secretary.

27. In all correspondence relating to the Association, the name of the Association shall be given in full after the signature of the officer, except in cases where an official heading is used giving the name of the Association.

28. All reports and returns required by the Department shall be made upon forms especially provided and in the manner indicated.

29. It shall be the duty of the Secretary to prepare and submit to the executive the annual report, as set forth in Clause 15, and to present the financial report to the annual meeting.

30. On or before the 10th day of February of each year, the Secretary shall send a revised list of members for the current membership year to the Secretary of the Ontario Fruit Growers' Association, and on or before the 10th day of each succeeding month he shall forward the name and address of each additional person who has since the previous return become a member of the Association.

31. On or before the 20th day of December, the Secretary shall report to the Secretary of the Ontario Fruit Growers' Association :

(1) The name of the place selected for holding the Annual Meeting, also the name of the hall in which it will be held.

(2) The decision of the Directors as to whether or not they wish the Secretary of the Ontario Fruit Growers' Association to arrange that a speaker address their Annual Meeting.

(3) The date chosen for holding the Annual Meeting.

32. The Secretary shall, when possible, retain the manuscript of all papers read at meetings of the Association by local talent, that he may, when required, furnish the Secretary of the Ontario Fruit Growers' Association with the same. Secretaries or essayists are not required to rewrite papers before sending them to the Secretary of the Ontario Fruit Growers' Association ; forward them as read at local meetings.

Treasurer.

33. It shall be the duty of the Treasurer to receive and account for all moneys belonging to the Association, and disburse the same under the instructions of the executive, without whose order no money shall be paid out. He shall also prepare in detail and present to the Annual Meeting a duly audited statement of the receipts and expenditure.

34. The funds of the Association, as received by the Treasurer shall, when possible, be deposited in a chartered bank to the credit of the Association.

General Rules.

35. At all meetings of the Association ten members shall form a quorum. At an executive meeting two members shall form a quorum.

36. Each member of the Association whose name is sent in by the local Secretary to the Secretary of the Ontario Fruit Growers' Association shall be entitled to a copy of the Annual Report of the Ontario Fruit Growers' Association, the Annual Report of the Fruit Experiment Stations, and such bulletins relating to fruit culture as may from time to time be issued by the Department of Agriculture.

2. Fruit Institutes.

The work of our Farmers' Institute system, which formerly applied to dairymen, stockmen, fruit growers, and farmers as a whole, has been specialized into different departments, so that sections of the country engaged al-

most entirely in one branch of agriculture may receive special attention, and the people residing therein the information which they require. For this reason in our fruit sections the Farmers' Institutes have become more or less fruit institutes, where speakers are supplied who are experts in the fruit business, and capable of giving the fruit growers practical and definite information. When it was decided to organize Local Fruit Growers' Associations we took advantage of the Farmers' Institute machinery, and solicited the co-operation of its officers. To the Institute secretaries we wrote:

TORONTO, March 13, 1902.

DEAR SIR,—I am pleased to announce to you that we have arranged to hold Fruit Institute meetings in your district this spring. The Ontario Fruit Growers' Association, at its last meeting, decided to co-operate with the Farmers' Institutes and, as far as possible hold meetings to assist the local fruit growers in their work. The meetings in your district will be held at and the speakers will be

I shall expect you to advertise the meetings, arrange for halls, and pay for the same out of the Farmers' Institute funds, as it will be largely your members who will receive the benefit at this time. The speakers will not cost your Institute anything. I will write a personal letter to each of the members in your district naming the place of meeting and the date, but I would like you to bill the district as far as possible, so as to ensure a good meeting. The idea is to call the meeting as usual at 1.30, and at 3.30 to adjourn to a local orchard for a practical demonstration in pruning, grafting, etc. In the evening a general meeting will be held for discussion and organization. You will please arrange with some one near the hall for the use of his orchard.

I would like you to look after this matter personally, but if you find you cannot do so, please appoint one of your directors, or a member who is particularly interested in fruit, to act for you.

The Institute officers responded with a will, and to their efforts are largely due the facility with which many of the Associations were organized. The Institutes also supplied the necessary funds for advertising, rent of halls, etc., and so made possible many gatherings which could not otherwise have been held.

In addition to securing the co-operation of the Institute officers, a personal letter was addressed to every member of the Farmers' Institute living within the township where a meeting was to be held. The letter read as follows:

LETTER TO INSTITUTE MEMBERS.

DEAR SIR,—At the last meeting of the Ontario Fruit Growers' Association I was instructed to arrange for a series of orchard meetings throughout the Province of Ontario. The object of these meetings is to bring the work of the Ontario Fruit Growers' Association into closer touch with the farmers who produce fruit, and also to bring together the fruit men in every district that they may talk over their work before spring opens. We have arranged to send you two good fruit men, who ought to be able to help you by suggesting improved methods of cultivation, pruning, and grafting, and the general care of the orchard. Your nearest meeting will be at and I trust you will find it convenient not only to be present yourself, but to bring others with you who are interested in this most important industry.

It is intended, where possible, to hold a short afternoon session, commencing at 1.30. At 3.30 the meeting will adjourn to a neighboring orchard for practical demonstration in pruning, grafting, etc. In the evening the speakers will take up the different phases of fruit culture and at the same time discuss the advisability of organizing a local fruit growers' association, the object of which shall be the meeting together of fruit growers to talk co-operative shipping, co-operative buying of packages, the best methods of picking, packing, grading and handling of fruits, etc.

I hope, therefore, that you will keep the date of this meeting in mind, and that you will appreciate our efforts by being present and taking part in the discussions.

This personal appeal met with such a hearty response that from first to last the Fruit Institutes were a splendid success.

3. Pruning Demonstrations.

In the March series of meetings, wherever practicable, an adjournment was made to a neighboring orchard about 3.30 p. m. The delegate or delegates gave a short talk on the necessity for good pruning, and then proceeded to show how it should be done. In almost every case this method provoked a lively, practical discussion, which was especially appreciated by the farmers' boys. Fifty-one such meetings were held.

4. Thinning Fruit.

Still later in the season, when the fruit was pretty well advanced, requests came from orchard meetings, in the apple sections, for instruction in summer orchard management and the thinning of fruit. Here again the Dominion Fruit Inspectors helped us out, and the splendid work of Messrs. Lick and Carey is evidenced by the many complimentary letters from farmers who had received instruction. As it was not possible to cover all of the Province, nor yet any one section thoroughly, we picked out the County of Prince Edward and placed an orchard meeting within the reach of every farmer. Meetings were arranged for and advertised as follows, viz.:

Delegates:—Mr. Elmer Lick, Oshawa; Mr. P. J. Carey, Cobourg.

Albury	Stephen Dempsey's orchard,	July		22
Rossmore	W. Anderson's	"	"	22
Ameliasburg	Nelson Giles'	"	"	23
Bethel	Samuel Crawford's	"	"	24
Fish Lake	W. C. Gorsline's	"	"	24
Picton	John Laird's	"	"	25
Cressy	Geo. Hulbert's	"	"	26
Waupoos	Gilbert Walmsley's	"	"	26
West Lake	Isaiah Tubb's	"	"	28
Bloomfield	G. V. Christie's	"	"	28
Wellington	Walter Chadsev's	"	"	29
Consecon	Alb. McDonald's	"	"	29
Black River Bridge	E. Grimmon's	"	"	30
Port Wilfrid	Benj. Palmatier's	"	"	30
Cherry Valley	G. M. Knox's	"	"	31

5. Object Lessons in Spraying.

Following up the orchard meetings of March, at which pruning, grafting, budding and orchard management generally were discussed, we arranged for demonstrations in spraying, and the following letter was issued to the new secretaries of Local Fruit Growers' Associations:

Believing that you were pleased with the orchard demonstrations in pruning, we have made arrangements to follow up that work with a similar demonstration in spraying of orchard trees. Through the kindness of the Dominion Government we have been able to secure the services of some of the fruit inspectors, Mr. Elmer Lick, of Oshawa, and Mr. P. J. Carey, of Cobourg, among the number. One or both of these gentlemen have arranged to visit your Association on the date mentioned on the accompanying list, and are prepared to give a practical demonstration in spraying, together with a talk leading to a general discussion on orchard cultivation and management, and matters generally pertaining to the fruit business.

It will be necessary for you to supply a spray pump, some Paris-green, and materials for the Bordeaux Mixture, and select an orchard for the work.

Though the time is short and the farmers generally busy, still, this is the time when spraying ought to be done, and I would be glad if you would advertise the meeting as generally as possible. At the same time I would not have you put the meeting off because you thought there would not be a large crowd. Without any further intimation, therefore, I would be glad if you would make arrangements for this meeting. If you cannot do this yourself, please see that some one else takes hold of it in the right way.

The following twenty meetings were then held in May, as advertised, with a good attendance at each meeting :

Whitby,	Coldsprings,	Picton,
Oshawa,	Grafton,	Belleville,
Bowmanville,	Wicklow,	Maitland,
Orono,	Brighton,	Iroquois,
Newcastle,	Smithfield,	Campbellford,
Welcome,	Trenton,	Warkworth.
Garden Hill,	Consecon,	

Spraying for the San Jose Scale.

The San Jose Scale Commission in their report to the Minister of Agriculture, in October last, recommended the use of the lime and sulphur application for winter treatment of the scale. The great difficulty, however, seemed to be the cooking of the sulphur. In talking the matter over with the Minister and the Inspector, it was decided to assist the orchardists in the matter by conducting practical demonstrations in cooking the sulphur and applying the mixture. St. Catharines, Niagara, Grimsby, Blenheim, and Kingsville were the points selected as being centres of scale infestation. At the first two places good meetings have already been held. Winona is advertised for this week, and the others will follow before the first of the year. These meetings are held under the auspices of the Ontario Fruit Growers' Association, and letters were sent to every fruit grower in the vicinity, as follows:

DEAR SIR,—The report of the San Jose Scale Commission, which has just been received by the Ontario Department of Agriculture, strongly recommends the lime and sulphur mixture for winter spraying. Its effectiveness has been proved by exhaustive experiments carried on last season. The only difficulty in its preparation is the boiling of the sulphur. This material requires two hours boiling in open kettles, and this being too slow a process where large orchards are involved, the Department has experimented with other means, and finds that steam from threshing engines may be economically used for the purpose.

Arrangements have been made whereby the process will be in operation at the farm of on when the wash will be both prepared and applied.

The Department is convinced that this remedy will be effective in controlling the Scale entirely, and hopes that the fruit growers who now see the destructiveness of this pest will make use of these washes for the coming winter, with the hope of stamping out the Scale entirely. Several of the other sprays, including crude oil, kerosene, etc., have been used with good results on other fruits than peaches, especially in the vicinity of Niagara, but the Department is sure the lime and sulphur wash will come into general favour on account of its extreme cheapness, viz., about two cents per tree. The Department feels that it has now reached a stage where the fruit growers must take an active part themselves in this war against the Scale, and hopes that all who can will attend the demonstration.

6. Fruit Experiment Stations

In our orchard demonstration work we found we could make our work still more valuable to the people by having the annual meetings of the Farmers' Institutes take the form of a basket picnic on the grounds of the local Fruit Experiment Stations. In this way the different varieties under cultivation could be seen growing side by side, and it could be easily seen which were the best varieties to grow for market or home purposes. To make the work still more valuable we were assisted by some of the professors of the Ontario Agricultural College, who gave addresses and answered questions in reference to the growing of fruit, the destruction of insects, fungous diseases, etc. It is proposed to continue these meetings again next year. Scores of letters have arrived at our office since the meetings were held, all telling of the practical information received. Our Fruit Stations should be known to

every farmer in their district. The experimentalist should be the district authority on what and when to plant, and what and when to graft, prune, and spray. If the Ontario Fruit Growers' Association by these and other means brings every fruit farmer in the Province in close touch with the work of the Fruit Experiment Stations it will do more for the industry than, in our opinion, can be accomplished in any other way.

7. Judging at Fall Fairs.

The past season has seen quite a revolution in the work of our Fall Fairs. Last spring a Superintendent of Fairs was appointed, and correspondence was at once carried on with the different Agricultural and Horticultural Societies in reference to Fair Improvement. The most marked result has been the arranging of Fairs in circuits and the request for expert judges for the different classes of exhibits. A number of the members of our Association were asked to judge the fruits, and most of our directors, had other engagements permitted, might have been kept busy judging fruit most of the fall.

I would suggest that this Board make out a list of persons who are known to be good judges of fruit, and also a list of those who could judge flowers, and place the same in the hands of the Superintendent of Fairs, that he might know whom to recommend to the different Fair Boards.

8. Model Prize Lists.

Last spring, at the request of the Canadian Association of Fairs and Exhibitions, a model prize list was prepared and sent to every Agricultural Fair Board in Ontario. This list was meant simply to be suggestive, and should be revised from time to time. Prof Hutt also prepared and recommended a prize list for flowers and vegetables. A number of the Fairs adopted the list as a whole ; quite a number adopted it with modifications, and some replied that their Board knew best what was wanted in their own county. A number of the prize lists from these same counties, however, when examined, showed that prizes were still being offered for useless varieties, solely because they were grown in that neighborhood. The professional exhibitor also came in for some punishment this year. Fruit judges were instructed at several Fairs to cut open the exhibts, that the color of the flesh might be seen, that worms or decayed centres might be exposed, and that the fruit might be observed all the way through. Incidentally the fruit was destroyed, so far as further exhibiting was concerned.

I think this work should be pushed forward. Fair Boards should be further corresponded with, and our directors should, as far as possible, advise with different societies in their districts with a view to improving the fruit and flower prize lists of these Fairs. I am convinced, for I have examined every prize list in Ontario (and there are more than 400), that thousands of dollars are being thrown away annually in prizes for useless varieties. The fruit judges ought also to be prepared to give their reasons for the awards, and should be at the fruit exhibit at least one afternoon during the continuance of the Fair to give information on fruit matters to all enquirers.

Sixty Fairs were this year arranged in circuits, and judges supplied to place awards on all the classes of live stock, and I see no reason why the fruit exhibits could not be treated in the same way. An expression of approval from this Board, emphasizing the importance of the work, might help the new Superintendent to promote the work more rapidly.

9. Apple Packing and Grading at Fall Fairs.

At a number of fairs this fall practical demonstrations were given in apple packing and grading. Here again the Association profited by the services of the Dominion Fruit Inspectors. Wherever they went they were surrounded by enquiring fruit growers. Questions were asked on all phases of the fruit business, and the demonstrations were watched and criticized by the eager onlookers.

10. Horticultural Societies.

Nearly two years ago the Ontario Fruit Growers' Association requested the Minister of Agriculture to provide funds for supplying lectures to the different Horticultural Societies in the Province. It was finally arranged with the Superintendent of Farmers' Institutes that this department take over that portion of the work, and in 1901 all of our affiliated societies were corresponded with, and such as desired it were provided with a lecturer. This year the same arrangement was made, and $434.80 was used out of the Farmers' Institute grant for lecturers' work in connection with our affiliated societies. In this connection I would suggest that the Minister be requested to add to our Fruit Growers' annual grant hereafter an amount sufficient to cover this expenditure.

The following correspondence will explain what steps were taken and what meetings were held :

Dear Sir,—At the last annual meeting of the Ontario Fruit Growers' Association, Mr. Woolverton, who had been acting in the dual capacity of Secretary and Editor of the *Canadian Horticulturist*, asked to be relieved of part of the work, and I was appointed Secretary-Treasurer of the Association.

It is my wish to assist the local Horticultural Societies in every way possible, and I write to ask if your society would like to have us send one or more speakers for a meeting in March.

Last year the experiment was tried of adding, in some instances, a lady speaker to the delegation, and having both delegates speak on "Nature Study" to the school children in the afternoon. We found this to work admirably, and the advertisement given the Horticultural Society at the school almost invariably assured a good meeting at night.

As in former years, the only expense your society will be put to is the entertainment of the delegates while in your town. This Department will pay their railway expenses, as well as their wages.

In order to economize as much as possible, we are anxious to have the speakers have engagements each day, and we hope it will make no difference to you what day they are billed for your society. On hearing from you we will begin at once to arrange our programme for the March series.

Yours very truly,
(Signed) G. C. Creelman.

Meetings were then arranged for as follows :

Lecture Course for Horticultural Societies.

Lecturer : Prof. W. T. Macoun, Central Experimental Farm, Ottawa.
Subjects : "The Best Hardy Annuals and Perennials," "The Lawn and Garden," "Fruit Growing at the Central Experimental Farm," "The Fruit and Vegetable Garden."

Date.	Society.	Date.	Society.
March 10th.....	Cayuga.	March 13th.....	Grimsby.
March 11th.....	Niagara Falls.	March 14th.....	Hamilton.
March 12th.....	St. Catharines.		

Lecturer : W. N. Hutt, Southend.

Subjects : "Birds in Relation to Horticulture," "Insect Friends and Foes," "Pruning of Trees and Plants," "Beautifying the Home," "Spraying Mixtures and Their Application."

Date.	Society.	Date.	Society.
March 3rd	Perth.	March 11th	Owen Sound.
March 4th	Smith's Falls.	March 12th	Meaford.
March 5th	Kemptville.	March 13th	Thornbury.
March 10th	Orillia.		

Lecturers : A. Gilchrist, Toronto Junction ; Mrs. E. M. Torrance, Chateauguay Basin, Que.

Subjects : A. Gilchrist, "How to Plan the Home Grounds on Natural Lines," "Village Improvement," "Improvement of School Grounds with Native Plants Along Educational Lines," "The Best Trees and Shrubs for a Suburban Lawn," "The Care of House Plants."

Mrs. Torrance, "Every-day Plants for our Gardens and Homes."

Date.	Society.	Date.	Society.
March 3rd	Port Hope.	March 10th	Paris.
March 4th	Napanee.	March 11th	Woodstock.
March 5th	Stirling.	March 12th	Chatham.
March 6th	Lindsay.	March 13th	Norwich.
March 7th	Brampton.	March 14th	London.

Lecturers : E. B. Stevenson, Jordan Station ; Mrs. Torrance.

Subjects : E. B. Stevenson, "The Strawberry : The Promising New Varieties," "Verandah Decoration," "Winter Window Gardening," "Bulb Growing for Young Amateurs."

Mrs. Torrance, "Every-day Plants for Out Gardens and Homes."

Date.	Society.	Date.	Society.
March 17th	Mitchell.	March 20th	Kincardine.
March 18th	Seaforth.	March 21st	Mount Forest.
March 19th	Clinton.		

Mrs. Torrance also attended a meeting at Toronto Junction on February 28th.

Lecturers : Dr. C. J. S. Bethune, London ; Mrs. A. Gilchrist, Toronto Junction.

Subjects : Dr. Bethune, "A Talk About Insects : Noxious and Beneficial," "Common Garden Insects Affecting Flowers, Fruit and Vegetables," "Domestic Insects Affecting Flowers and Property."

Mrs Gilchrist, "Nature Study," "How I Grow My House Plants," "Our Native Plants for the Home Grounds."

Date.	Society.	Date.	Society.
March 4th	Elmira.	March 10th	Port Dover.
March 5th	Waterloo.	March 11th	Simcoe.
March 6th	Guelph.	March 12th	Hagersville.
March 7th	Hespeler.		

Dr. Fletcher also addressed the Society at Cardinal later in the season.

When arrangements were completed the following letter was sent to the Secretary of the Horticultural Societies :

DEAR SIR.—Enclosed you will find a list of meetings to be held in your district under the auspices of the Horticultural Society. We have selected speakers this year from a long list of applicants, and hope that your members will not fail to ask questions and get as much information as possible from the lecturer.

Last year the lecturers visited the schools in the afternoon, and addressed the school children upon some topic connected with horticulture. This seems to have been appreciated, for we have had many applications for similar instructions We hope you will make arrangements to have this feature of the work repeated, for, besides the interest which the scholars may take in it, it will be a good advertisement for the evening meeting.

Wishing you a successful meeting and a prosperous year in the work of your Society.

Relation of Horticultural Societies to Fall Fairs.

I believe that the Horticultural Societies could profit by the assembling of people at the Fall Fairs to advertise their work, and at the same time impart much instruction. Instead of giving money to Agricultural Societies to be used in the prize list, the local society should first suggest to the Fair Board the propriety of revising the list each year. The society should then select those varieties of fruit and flowers that they wish to encourage, and specify that the society funds must be used for those classes or sections only. The Societies might also have one of their members present near the flower and fruit exhibit who could give the visitors information as to how to plant, cultivate and grow the flowers displayed. The Societies might also advise the Fair Board regarding the selection of judges for fruit and flowers.

The School Children.

If we wish to have the men and women in this country interested in fruit and flower culture, we must first attract their attention while yet children.

School Children at the Fairs. In the fall of 1901, Mr. Barlow Cumberland, of Toronto, offered a special prize to the old County Fair at Port Hope. This prize was to be awarded to the boy who could properly name the greatest number of varieties of apples in a miscellaneous assortment. Quite a number of contestants entered, and in 1902 several other shows took up the work. Such work as this should stimulate the young people to a greater interest in farm work.

A number of Fairs this year also offered special prizes for the children of a school section who would work together and make an aggregate exhibit.

The following are the classes for which prizes were offered and the rules governing the same:

Exhibits by School Children.

Rules Governing Class A.

1. All plants, flowers, leaves, fruits, roots, vegetables, weeds, and weed seeds, mentioned in sections 2 to 6 of Class A, must have been grown and gathered in the school section making the exhibit, and in the case of section 7 caught within the Province.

2. Each plant shown in sections 2 and 3 shall be separately tied to admit of individual inspection. The plants of each variety shall be neatly bound together and labelled. In section 1, each variety shall be bound and labelled.

3. All the work in connection with each of the exhibits in Class A, must have been done by the pupils under the direction of the teacher, and with his or her assistance or supervision.

4. The prize money awarded to a school shall be paid to the teacher, who shall retain 25 per cent., the remaining amount to be equally divided among the children who have taken part in making or preparing the exhibit.

Class A.

1. To the teacher and pupils of a public school section making the best and best arranged exhibit of cut flowers grown in the school grounds.

Prize:—1st. 2nd. 3rd. 4th.

2. To the teacher and pupils of a public school section making the best and best arranged exhibit of grain in the straw the growth of the current year, showing stools, branches and part of roots, consisting of six complete plants of each variety, with not more than three varieties of each kind of grain.

Prize:—1st. 2nd. 3rd. 4th.

3. To the teacher and pupils of a public school section making the best and best arranged exhibit of clovers and grasses, the growth of the current year, showing all branches and part of root of each plant. This exhibit to consist of at least six plants of each variety shown. At least six varieties must be shown in each exhibit in this section.

Prize:—1st. 2nd. 3rd. 4th.

4. To the teacher and pupils of a public school section making the best and best arranged exhibit of roots, fruits, and vegetables.

Prize:—1st. 2nd. 3rd. 4th.

5. To the teacher and pupils of a public school section making the best and best arranged exhibit of wild flowers and leaves of trees, pressed and mounted, each specimen to be properly labelled.

Prize:—1st. 2nd. 3rd. 4th.

6. To the teacher and pupils of a public school section making the best and best arranged collection of weeds, cured and mounted, and weed seeds, in ounce bottles, each specimen and bottle to be properly labelled.

Prize:—1st. 2nd. 3rd. 4th.

7. To the teacher and pupils of a public school section making the best and best arranged collection of beneficial and injurious insects, mounted and properly labelled and arranged in groups according to their habit or the fruit, grains, etc., which they attack.

Prize:—1st. 2nd. 3rd. 4th.

Our sympathies should be with this work.

THE CANADIAN HORTICULTURIST AND OTHER LITERATURE.

The Horticulturist during the year has very much improved. Your committee, appointed at the last annual meeting to assist the editor in his work, met each month in the Secretary's office. All matter for publication was read to the committee and commented upon. The Executive Committee believe that it would be in the interests of the Association to continue the work of that committee.

The Department of Agriculture has also issued two publications during the year of interest to the members of our Association. The first is a hand book of Women's Institutes. This contains illustrated articles on floriculture which are practical and up to date. The second is just out and is in line with a resolution passed by the Association last year. It is entitled "Nature Study," and will, I think, be very helpful, in disseminating truths in reference to elementary science.

SUGGESTIONS.

1. I would respectfully suggest that a committee be appointed to revise the Constitution.

2. That a resolution be passed requesting the Minister of Agriculture to permit the Association to fix its own boundaries for representation of directors.

3. That the clause in your Constitution in reference to Auditors be amended by striking out the words, "and two auditors," and that a new clause be added to read as follows: The accounts of the Association shall be audited by an expert auditor or accountant appointed by the Executive and approved of by the Minister of Agriculture.

G. C. CREELMAN,
Secretary.

Mr. Murray Pettit: This report should not be passed over without some expression from the Association. I think it would be well to refer it to a committee to report upon, as there are so many valuable suggestions contained in it. I am sure the Secretary is well deserving of the thanks of the Association for the energy he has displayed, and I have much pleasure in moving the adoption of the report.

Mr. Race: The report is so suggestive that we might well spend all the time allotted to us in discussing it. I do not think it necessary, however, to refer it to a sub-committee. I do not see that any committee could make the suggestions any clearer than they are, or that the recommendation of such a committee is necessary.

Mr. W. H. Dempsey agreed with Mr. Race.

The motion for the adoption of the report was seconded by Mr. A. M. Smith, and carried.

FINANCIAL STATEMENT.

Receipts.

Cash on hand	$ 375 03
Members' fees	4,447 67
Legislative grant	1,800 00
Advertisements	283 65
Samples	8 32
Binding volumes	5 30
Total	$6,919 97

Expenditure.

Canadian Horticulturist	$2,296 93
Salaries, editor and secretary	1,216 66
Commissions	719 14
Premiums	436 77
Illustrations	435 60
Annual meeting	453 57
Bookkeeper	202 00
Reporting	225 80
Postage and telephone	151 69
Printing and stationery	151 63
Affiliated societies	119 30
Committees and delegations	143 09
Express and freight	31 58
Auditing	21 50
Collection and interest	4 65
Bookbinding	11 50
Rent	24 00
Miscellaneous	12 40
Typewriter	16 00
Fruit Institutes	4 60
Total	$6,678 41
Balance on hand	241 56
	$6,919 97

G. C. Creelman, Treasurer.

Audited and found correct.
A. H. Pettit,
W. M. Orr, Auditors.

Mr. Race: I see $476 for premiums. Are they worth that amount to the Association? Could we not keep up the Association as well without them?

Suppose we allowed the affiliated associations to retain a little more of their mon y and provide their own premiums?

Mr. Woolverton: I assure you they increase the work of the Secretary very much.

Mr. Snelgrove: Would you reduce the price of the magazine in that way?

Mr. Race: I scarcely see how we could do that, and do not think it would result in any more subscriptions.

Mr. Creelman: Could you not improve the magazine?

Mr. Race: Certainly; and I think the Board will admit that it has been improved during the past year. Mr. Race then suggested that it should be made optional with the local associations as to whether they would take the p emiums sent out by the Associations or supply their own and remit a smaller amount per head to the central Association.

Mr. Creelman did not think it would be well to cut off the premiums altogether, as they had already been promised in many instances.

Mr. McNeill said that the premiums were highly thought of by most societies, and that there was no better method of securing subscriptions to the Horticulturist. He endorsed Mr. Race's suggestion to make it optional, b it thought that a majority of the societies would prefer the premiums to a reduction in the rate.

Mr. E. Morris did not think that small fruit plants should be sent out. These could be obtained from the nurseries. He thought that newer varieties o' shrubs and herbaceous plants for ornamental purposes should take their place.

Mr. R. B. Whyte said that last year the varieties sent to his section were worthless for that part of the country, and suggested that there should be a bett r selection.

The Secretary said it would not do to have too many options, as it made the matter too expensive to handle. He thought it would be well to decide on tw or three varieties which would be likely to give general satisfaction, and which the Association would like to see introduced in every home plot in the Province.

The President said that the distribution of small fruits was begun as a sort of experimental work, but that this had given way to the Experimental Stations.

Mr. Morris thought that the committee should make provision not only for this year, but for succeeding years, so as to give nurserymen a chance to supply the number of plants that would be required, otherwise they might be difficult to procure.

On the motion of Mr. Whyte, seconded by Mr. Dempsey, it was decided to appoint Messrs. Hutt and Macoun a committee to prepare a list of shrubs and herbaceous plants from which premiums might be selected.

It was moved by Mr. Jones, seconded by Mr. Scarff, that the Treasurer's report be adopted. Carried.

The minutes of the last annual meeting were read and adopted, after which the Secretary read communications from the towns of Collingwood and Leamington inviting the Association to hold its next annual meeting at those points.

On motion of Mr. McNeil, seconded by Mr. Race, it was resolved that the invitation of the town of Leamington be accepted.

LIST OF PLANTS RECOMMENDED FOR HOME AND SCHOOL GROUNDS IN ONTARIO.

By Arch. Gilchrist, Toronto Junction.

Native Herbaceous Plants that will Transplant Well.

Columbine	Aquilegia Canadensis.
Liver-leaf	Hepatica tribola and acutiloba.
Bloodroot	Sanguinaria Canadensis.
Cardinal flower	Lobelia cardinalis and syphilitica.
Harebell	Campanula rotundifolia.
The Lily Family	Lilium Canadense, Philadelphicum, and superbum (Turk's-cap lily).
Phlox	Phlox divaricata.
Wake-Robin	Trillium grandiflorum and erectum.
Solomon's Seal	Polygonatum biflorum and giganteum.
Dog-tooth Violet	Erythronium Americanum.
Spurge	Euphorbia corollata.
Butterfly-Weed	Asclepias incarnata and tuberosa.
Wind Flower	Anemone nemorosa, Virginiana and Pennsylvanica.
Meadow-Rue	Thalictrum dioicum and Cornuti.
Sneeze-Weed	Helenium autumnale.
Cone Flower, purple and yellow	Rudbeckia laciniata and hirta.
Sun-Flower	Helianthus divaricatus.
Beard-Tongue	Pentstemon.
Mayflower-Ground Laurel	Epigaea repens.
Squirrel Corn	Dicentra Canadensis.
Dutchman's Breeches	Dicentra cucullaria.
Violets	Viola cucullata, pubescens and Canadensis.
Lupine	Lupinus perennis.
Geranium Cranesbill	Geranium maculatum, Robertianum (Herb Robert).
Wood Sorrel	Oxalis acetosella and stricta.
Saxifrage	Saxifraga Virginiensis.
Blazing Star	Liastris spicata and cylindrica.
White Snake-root	Eupatorium ageratoides.
Elecampane	Inula Helenium.
Golden Rod	Solidago Canadensis.
Starwort	Aster multiflorus and Novae-Angliae.
Oswego Tea, Horse Mint	Monarda didyma.
Wood Betony	Pedicularis Canadensis.
Waterleaf	Hydrophyllum Canadensis.
Dogbane	Apocynum androsaemifolium.
Skunk Cabbage	Symplocarpus foetidus.
Bellwort	Uvularia grandifolia.

Native Shrubs.

Sweet Fern	Comptonia asplenifolia.
Dwarf Shadbush	Amalanchier botryapium.
Chokeberry	Pyrus arbutifolia.
Maple-leaved Viburnum	Viburnum acerfolia.

Native Apple	Pyrus coronaria.
Common Elder	Sambucus Canadensis.
Red Osier	Cornus stolonifera.
Round-leaved Dogwood	Cornus circinata.
Witch-Hazel	Hamamelis Virginica.
Ceanothus New Jersey Tea	Ceanothus Americanus.
American Holly	Ilix opaea.
Cockspur Thorn	Crataegus crusgalli.
Sassafras	Sassafras officinale.
Common Meadow Sweet	Spiraea salicifolia.
Mountain Maple	Acer spicatum.
Silky Cornel	Cornus sericea.
Purple-flowered Raspberry	Rubus oderatus.
Scarlet-fruited Thorn	Crataegus coccinea.
Leatherwood	Dirca palustris.
Red-berried Elder	Sambucus pubens.
Shadbush Juneberry	Amalanchier Canadensis.
Shepherdia	Shepherdia Canadensis.
Snowball Guilder Rose	Viburnum opulus.
Alternate-leaved Dogwood	Cornus alternifolia.
Snowberry	Symphoricarpus racemosus.

Native Creepers.

Virginia Creeper	Ampelopsis quinquefolia.
Bittersweet	Celastras scandens.
Honeysuckle	Lonicera ciliata.
Virgin's-Bower	Clematis Virginiana.
Native Grape	Vitis cordifolia.
Canadian Moonseed	Menispermum Canadensis.
Ground-nut Wild Bean	Apios tuberosa.
Smilax Cat-brier	Smilax rotundifolia.

Native Trees.

Pin Oak	Quercus palustris.
Swamp Hickory	Carya amara.
American Aspen	Populus tremuloides.
Hornbean Blue Beech	Carpinus Americana.
White Birch	Betula populifolia.
Swamp White Oak	Quercus bicolor.
Basswood	Tilia Americana.
Beech	Fagus ferruhinea.
White Elm	Ulmus Americana.
Sugar Maple	Acer saccharinum.
Red Oak	Quercus rubra.
Butternut	Juglans cinerea.
Mossy Cup White Oak	Quercus macrocarpa.
Black Ash	Fraxinus sambucifolia.
Buttonwood	Platanus occidentalis.
Silver Maple	Acer dasycarpum.
White Ash	Fraxinus Americana.
Red Maple	Acer rubrum.
White Oak	Quercus alba.
Black Walnut	Juglans nigra.

Slippery Elm	Ulmus fulva.
Tulip Tree	Liridendron tulipifera.
Chestnut	Castanea Americana.
Shell Bark Hickory	Carya alba.
Corky White Elm	Ulmus racemosa.
Balsam Poplar (Ba'm of Gilead)	Populus balsamifera.
Paper or Canoe Birch	Betula papyraceae.
Chestnut Oak	Quercus prinus.
Pignut Hickory	Carya porcina.
Mountain Maple	Acer spicatum.
White Pine	Pinus strobus.
White Spruce	Abies alba.
Balsam Fir	Abies balsamea.
Hemlock Spruce	Abies Canadensis.
Black Spruce	Abies nigra.
Red Pine	Pinus resinosa.
Larch or Tamarac	Larix Americana.

Ornamental Shrubs.—(Native and Imported.)

Spireae Waterii.
Hydrangea Paniculata.
Berberis Thunbergii, Barberry.
Cydonia Japonica, Japan Quince.
Spireae VanHoutteii, Bridal Wreath.
Retinospera Plumosa, Aurea pisifera Filifera.
Aralia Spinosa, Anglican tree.
Philadelphus Grandifolia, Aurea Lemonii, Mock Orange.
Spireae Prunifolia.
Wigelia, Candida nana rosea.
Viburnum, sterilis, Pileatum, Snowball.
Prunus Pissardii.
Barberry, Purple-leaved.
Dwarf Almond.
Rhus cotinus, Purple Fringe, Smoke Tree.
Thuja pyramidalis.
Thuja Siberica.
Thuja Virvarcana.
Cornus Mascula variegata, Spaethii, Aurea elegantissimi.
Ribes Sanguineum, Flowering Currant.
Syringa Persian, alba purpura, Common lilac.
Deutzia, Pride of Rochester.
Sambusus argenta, Silver-leaved Elder.
Crataegus Paul, Double Scarlet Thorn.
Suspensa Virdissima, Forsythia Golden Bell.
Prunus Tribola, Double Flowering Plum.
Spireae aurea, Golden spireae.
Spireae Thunbergii.

REPORTS OF REPRESENTATIVES TO FAIR BOARDS.

Eastern Fair, Ottawa: Mr. R. B. Whyte reported that the appointment of a representative was a mere matter of form in his district, as no opportunity was given to criticise.

Mr. T. H. Race, who represented the Association at the Western Fair, London, reported that that organization had now the best arranged horticultural exhibit in Ontario, and that they had succeeded in discarding everything from the prize list that was not worth being propagated.

Mr. Murray Pettit reported that they had succeeded in getting some changes in the prize list of the Toronto Fair, and had also obtained the appointment of some good judges.

The President said that the exhibition of a large number of varieties of fruit should be discouraged, and that prizes should be offered only for the more useful kinds. He had noted as many as forty varieties of apples on one of the lists.

It was moved by Mr. Race, seconded by Mr. Murray Pettit, That the Association expresses its regret at the absence of Mr. Thomas Beall, whose great services were well remembered, and would continue to be remembered by the Association, and that the Secretary forward to him a copy of this resolution. Carried.

Ordered that the revision of the Constitution of the Association and the re-arrangement of districts should be carried out by the Executive.

Moved by Mr. T. H. Race, seconded by Mr. Harold Jones, That the Horticulturist at the Ontario Agricultural College should hereafter be recognized as a member of the Board of Directors, as provided by the Agriculture and Arts Act, and that the Horticulturist at Ottawa be made an honorary member of the Board. Carried.

The Secretary presented a suggestion from the Minister of Agriculture, that the members of the Board should present a statement of their travelling expenses on the forms provided by the Department, as was required by the Provincial Auditor and in conformity with all other associations, instead of receiving their expenses in the form of a per diem allowance as hitherto. The Secretary was instructed to furnish blanks for such statements, and to carry out the Minister's wishes in the matter.

Mr. M. Pettit moved, seconded by Mr. G. C. Caston, That the Secretary be instructed to direct the Committee on Transportation to meet with the committees appointed by other associatins, the understanding being that each committee should appoint a delegate to wait upon the Government at Ottawa. Carried.

Moved by Mr. G. C. Caston, seconded by Mr. A. McNeill, that L. Woolverton be re-elected editor of the Horticulturist at the same salary as last year. Carried.

Mr. A. McNeill moved, seconded by Mr. R. B. Whyte, that the editor be requested to visit and write up for the Horticulturist the various Fruit Experiment Stations and other points of interest in Ontario, under instructions from the Executive. Carried.

The President announced the following committee on nominations: W. H. Bunting, G. C. Creelman (by the President); Harold Jones, T. H. Race, Murray Pettit (by the meeting).

REPORTS OF DIRECTORS.

The following reports of Directors were presented by agricultural Divisions:

Division No. 1.

The representation of this division being vacant, no report could be submitted.

Division No. 2—R. B. Whyte, Ottawa.

I am sorry that I cannot report any progress in the way of organizing branches of this Society in the district I represent. As I endeavored to show our Secretary when corresponding with him last spring about this matter, District No. 2 is essentially a non-fruit growing district, outside of the section covered by the Ottawa Horticultural Society, and that the few who did take an interest in the subject were so scattered over the district that, in my opinion, as well as that of all those I consulted on the subject, any attempt to organize such societies could only end in failure under present conditions.

I am sure that not one in fifty farmers in my district grow any fruit, and not one in five hundred grows as much as he could and should grow. This apathy is the result of several causes, one of the chief being the number that have been swindled by tree agents selling varieties unsuited to the climate, the failure of which prejudiced the purchaser against all fruit growing.

Another is the mistaken idea that there is a great deal of labor connected with fruit growing. Another, that it is very expensive to start a fruit garden. This mistake has been fostered by the exorbitant prices asked for stock by many tree agents.

The great success of those who have taken up fruit growing intelligently has demonstrated that, with all our limitation, we can grow fruit satisfactorily and profitably over a large part of the district. In the vicinity of Ottawa great strides have been made in the last few years. One firm of seedsmen tell me that the demand for strawberry boxes and fruit baskets has increased tenfold in the last five years. The day is not far distant when our market will be supplied by the local growers with all it requires in small fruits, summer and fall apples, and some varieties of plums. Our climatic conditions are such that we can never hope to grow profitably the domestic type of plums, or such apples as Spy, Baldwin, King, or Greening; but the success of the Dominion Experimental Farm and some private growers has shown us what can be done, and the question for this Association is how to convey that information to where it is wanted—how to show the average farmer that he may grow, at small cost, all the fruit that his family can and should use.

This missionary work is most important, and deserves the most earnest consideration of this Board. I would like to suggest that it can be undertaken with the least expense and greatest efficiency by utilizing existing agencies. A speaker thoroughly familiar with local conditions should be sent to every Farmers' Institute meeting in the district, and also to every agricultural show in the fall, if not to act as judge, at least to assist the local judges, and at an advertised hour to give an address on fruit culture in the horticultural hall or other suitable place, using the fruit exhibit as a text, drawing attention to the varieties best worth growing, and how to

get the best results from the fruit garden. I visited several shows last fall, and was surprised to see how many plates of fruit—some of them with prize tickets attached—were wrongly named.

If, in addition, an elementary bulletin on fruit growing was sent to every farmer in the district, giving simple instructions on how to plant and care for fruit trees and plants, the kinds most suitable to the locality, and what they should cost, I am sure gratifying results would be attained.

The good work engaged in by the Ottawa Horticultural Society for the last dozen years has been carried on with most satisfactory results during the past year. The membership never was so large, the monthly meetings so well attended, nor the interest shown by members so great as during the past season. Six exhibitions were held during the summer, and in almost every section of the prize list the competition was keen and the standard attained high. As in past years, the cordial co-operation of the horticulturist of the Central Experimental Farm added very much to the educational value of our exhibition. The great and continued success of the Society, where so many have failed, is most satisfactory testimony to the soundness of the principles on which it is founded and conducted.

Division No. 3.—Harold Jones, Maitland.

In January I attended the annual meeting of the Pomological and Fruit Growing Association of the Province of Quebec, as delegate from the Ontario Society, and conveyed greetings of good fellowship, joined in the discussions, and gave what help I could to the fruit growing industry in our sister Province.

In the latter part of the same month I attended two meetings of the Farmers' Institute in South Grenville, and spoke on fruit growing in its different branches.

In March I held five meetings in South Grenville, and organized as many local Fruit Growers' Association, obtaining a fair membership and working up quite a lot of enthusiasm and interest in the work.

During the summer I had numerous visitors to the Experimental Fruit Station, and was able to give demonstrations in pruning, grafting, budding, etc., also spraying demonstrations and instructions; in preparing the mixtures, and talks on insects, etc., all of which led to lively discussions, where questions were freely asked.

In September I acted as judge on fruit at two fall Fairs, and provided that the public be allowed admittance to the fruit building during the judging. A large number watched the work with keen interest, and when finished I encouraged the asking of questions and discussions on varieties which, I have been told since, led to much valuable information for those most anxious to learn.

Division No. 4.—W. H. Dempsey, Trenton.

I attended five metings in the early spring, and succeeded in forming local Associations at Trenton and Consecon. I also attended and judged at some of the fall Fairs, and answered questions. I also answered a good many letters during the season. I find that many are not willing to pay 75 cents additional for the "Horticulturist," when they get the Fruit Growers' Report as members of the Farmers' Institute. I encountered the same difficulty in getting members for the local Fruit Growers' Association.

Division No. 5.—H. J. Snelgrove, Cobourg.

As Director for Division No. 5, I have the honor to report that in conformity with the arrangements made by your Executive, a series of meetings were held last spring, for the purpose of organizing local Fruit Growers' Associations. We succeeded in forming branches at the following places, viz.: Northumberland Co.: Brighton, Colborne, Grafton, Camborne.

Durham Co.: Bowmanville, Orono, Newcastle, Welcome.

At the same time practical demonstrations were given in pruning and spraying, and useful discussions took place upon subjects pertaining to general orchard culture. In connection with this pioneer work, I take pleasure in bearing testimony to the excellent services rendered by President Caston, and Inspectors Lick, Carey, and Vroom, whose clear and convincing addresses were thoroughly appreciated by those who heard them in this great apple district.

With a view of ascertaining the present status of the local associations in my district, which are now affiliated with this parent body, I addressed last month the following questions to the Secretary of each association, viz.:

"Dear Sir,—As I am required to preface a report on horticultural matters in this district, for publication in the annual proceedings of the Ontario Fruit Growers' Association, with which your local society is affiliated, will you kindly send me brief replies to the following questions:

"1. What is the total membership of your Society?

"2. Can you suggest anything to increase interest in the work of your Society?

"3. Indicate to some extent the commercial conditions of the fruit industry in your locality."

To these interrogations I have received replies as follows:

Brighton: F. D. Sanford. (1) Membership, 35. (2) Meetings of instruction, to be addressed by not only the fruit growers sent out by the Department, but also by the fruit Inspectors. (3) Orchards are not realizing as well as was expected of them, on account of the unusually large quantity of apples shipped in the early part of the season, and also owing to the spotted and defective condition of the fruit generally in this locality. As a rule, the later varieties are not so badly affected with the spot, and are expected to bring better prices.

Colborne: G. M. Peebles. (1) We have 30 names on our membership roll, but we have not as yet received any literature, circulars or bulletins, from the head office. (2) I think that might do good. (3) Apples constitute one-half of the export products of this locality.

Grafton: Thos. Hoskin. (1) Seventeen members. (2) More meetings, with good practical speakers who are not afraid to take off their coats and demonstrate what they preach. (3) Commercial conditions are fair, prices being low. The crop was large. Some damage was done by hail, and a great deal by scab, which was so bad in some orchards that the growers could not sell their fruit to the shipper, and were obliged to send it to the canning factory and evaporators.

Camborne: R. Cullis. (1) About 17 gave in their names, but only five paid their fees. (2) How to increase public interest seems to be a hard question to answer, because everybody nearly is looking for someone else to do the work, while they will receive the benefit. We must continue to work and agitate. (3) The commercial conditions of the fruit industry in this section are fairly good.

Cobourg: Nearly 25,000 barrels of apples were stored here for shipment this season. As a rule, the grower received $1 per barrel for his apples on the trees. A few good orchards were sold en bloc. Although spraying was more generally resorted to last season than in any previous year, yet it was quite small in proportion to the total amount of orchard area. Result: those who sprayed effectively saved 90 per cent. of their fruit, while those who did not spray got from 60 to 75 per cent. The Baldwin was the only variety of apple comparatively free from scab.

Port Hope: A. W. Pringle. (1) Membership, 105. (2) The improvement of unsightly lots, street corners, and school grounds in our towns and villages. (3) Apple crop large; quality poor. Pears and cherries good. Plums fair. Prices poor.

Bowmanville: J. McLean. (1) Our membership is 37. (2) We have held only three meetings since we organized in May last. (3) I think commercial conditions have been pretty satisfactory, as apples sold mostly for $1 per barrel on the trees.

Orono: John Rickaby. (1) We have 13 members. (2) A meeting, with a couple of good speakers, as soon as the farmers' busy time is over, when the ground freezes up. (3) The 1902 crop of apples has been simply immense in this section. I cannot tell the time before when we saw such a crop. Over 75,000 barrels were put up in Clarke Township. There was a scarcity of barrels, and if the autumn had not remained open very late thousands of bushels would have been ruined. The price for winter fruit has been a dollar per barrel. We intend to have a meeting soon to stir up local interest.

Lindsay: F. J. Frampton. (1) Membership, 110. (2) Cannot answer. (3) Very little of the fruit grown in this locality is sent away. We have a good market in this town for all grown here.

I received no answers from Newcastle or Welcome, in Durham County, and, therefore, we are justified in concluding, I think, that the branches formed at those places must have died from an attack of cholera infantum, or else that the Secretaries appointed had dropped out of office.

The Horticultural Societies at Lindsay, Millbrook, Port Hope, and Cobourg, having a total membership of 350, are affiliated with this Association. It would be interesting to learn exactly why the other two horticultural societies in the district at Bowmanville and Peterboro', with a membership of 200, are not in affiliation with us. In my opinion, the Ontario Department of Agriculture ought to adopt regulations with the view of removing the nonconformity, inconsistency, and incongruity of the position occupied by those Horticultural Societies in the Province, which, although in receipt of the Legislative grant, have failed without any valid reason to combine and co-operate with this association in its great work of promoting in every way the most successful cultivation of fruit and flowers. I will venture to assert that any non-affiliated horticultural society will on close examination be found to be little better than a prize-package society, limited, into which each member puts $1, with the bargain-counter expectation that he will receive therefor $5 worth of plants, etc., not being so particular about quality as quantity. I certainly think that these so-called horticultural societies should be placed upon a higher plane of usefulness and public good.

I have met with some objections to the effect that the agenda of the Farmers' Institutes and the local Fruit Growers' Associations overlaps considerably; and we must admit that, as a rule, the intelligent farmers, who take an active interest in Institute work, are the same people to be found in attendance at the fruit growers' meetings. Many of them practice economy to such an extent that they object to paying a double membership fee. I

can assure you that this duplication of fees is a stumbling-block to many. How are we going to get around it ? is the question.

In reference to our official magazine, "The Canadian Horticulturist," some of the societies which I represent have requested me to ask the Board to reduce the subscription price of this magazine to 50 cents a year. I know you will agree with me when I say that "The Canadian Horticulturist" is most ably edited and conducted, both from a literary and practical standpoint ; and it is a very valuable and admirable adjunct to the work of this Association ; but everything betokens that we live in a great competitive age, and to keep up-to-date it is necessary ever to be on the alert and ready to adopt new ideas that are demanded by the spirit of the times. Now, when our horticultural societies are being offered such garden and orchard publications as I here lay before you, at clubbing rates of 15 cents and 25 cents a year, I respectfully submit it is only natural that they should object to paying 80 cents a year for our magazine.

A supposed invasion of the dreaded San Jose scale was reported to me from the Baltimore Hills. I immediately sent a specimen to Inspector Fisher, who had the pleasure of advising me that it was the Putman scale. I believe the district to be entirely exempt from the San Jose scourge.

To show the enormous value of the apple industry to the County of Northumberland—just one of the four counties comprising my district—I obtained from the Collector of Customs at Cobourg the total quantity and cash value of apples exported from Cobourg and its outposts : Brighton, Colborne, and Grafton, during the three last fiscal years. I find that during this triennial period 204,000 barrels of apples were shipped to Great Britain, Germany and the United States, representing a total monetary value of $616,130, or a yearly average of 70,000 barrels, at $238,710.

I also desire to point out that this county contains the largest and most complete packing and storage houses in the Province, affording room for 250,000 barrels at one time. This immense accommodation is taxed to the utmost, notwithstanding the erection of new depots each season.

I also find that, according to the figures furnished by the Bureau of Industries, Northumberland has 570,729 apple trees set out, and that the district as a whole can boast of having more than one-tenth of the 10,000,000 trees growing in the Province.

In conclusion, after serving this Association to the best of my humble ability during the year that is now closing, I realize more than I ever did the ineffable pleasure emanating from work which brings one in touch with Nature, who never did betray the heart that loved her, and would exclaim, with Whittier :

"Give fools their gold and knaves their power ;
Let fortune's bubbles rise and fall ;
Who sows a field or trains a flower,
Or plants a tree, is more than all.

For he who blesses most is blest ;
And God and man shall own his worth,
Who toils to leave as his bequest
An added beauty to the earth."

Division No. 6.—Elmer Lick, Oshawa.

Six meetings were held in my section, but no organization was effected. In some sections the farmers were more or less apathetic towards the orchard ; but this is not true of all, as some parts of the district I represent are pretty good apple sections. I also met the complaint among farmers that they could not afford to belong to too many associations. This was particularly the case in Wexford and Oshawa.

Division No. 7.—Murray Pettit, Winona.

The first work of importance done in our division was the calling of a meeting to discuss some better means of fighting the San Jose scale. As a result we formed a deputation to wait upon the Minister of Agriculture, and urged upon him the desirability of amending the Act so as to give municipalities permission to pass by-laws appointing inspectors, the municipality to pay half the cost and the Government half. This amendment was passed by the Legislature, and, in accordance therewith, we appointed fifteen inspectors, who went thoroughly through the locality locating the scale. In consequence, excellent work has been done in the direction of controlling the scale, and in some cases entirely exterminating it.

We held meetings in six places. Mr. McNeill assisted me, and we gave practical demonstrations in pruning and grafting in the orchard. In four places we had a good attendance, and much interest was shown. We also held a meeting at Fruitland, at which Prof. Hutt gave an address on pruning, grafting, etc., which was very successful.

Division No. 8—E. Morris, Fonthill, and W. H. Bunting, St. Catharines.

We have the honor to submit a brief report of the conditions, with reference to the fruit industry, that have characterized the season of 1902 in Agricultural Division No. 8 in this Province.

The year which has just closed has been, upon the whole, a favorable one for the fruit growers in this district. Notwithstanding that severe frosts in May seriously threatened, and in some localities destroyed a portion of the fruit buds, and the continued cool, wet weather prevailed during the entire summer, and that occasional hailstorms destroyed many crops in some localities, still in nearly all varieties of fruit a comparatively full crop was safely harvested and disposed of in the markets at fairly remunerative prices to the producer.

With the single exception of grapes and apples, all the other fruits were in large supply and of good quality. With regard to grapes, the May frosts seriously injured many of the buds, and fungous diseases still further reduced the final output; in consequence, the wholesale price of the marketable crop was considerably enhanced. Apples, while an unusually heavy crop, were so badly affected with the apple scab in many orchards as to render the fruit comparatively worthless. This condition of affairs was very much in evidence in orchards where spraying had been neglected. The value and importance of careful, thorough, and constant spraying has again been clearly proven during the past season.

While the year has been favorable for the development of fungous disease, it has not been so conducive to the increase and production of insect life. The various insects injurious to plants and fruits have not been so numerous as during some previous years, and, in consequence, reports of injury by insects have been less frequent.

Several orchard meetings in the afternoon, followed by evening sessions, were held during the month of May under the auspices of this Association. These meetings were fairly well attended, and much valuable information with regard to improved methods of orchard treatment was gained by those who were present.

There are several local organizations of fruit growers in this district, which are doing very good work, but we regret to say that these societies and associations do not seem to be as fully alive to their opportunities and possibilities as might be desirable. It is hoped, that in co-operation with the Provincial Association in the near future, these local societies may become more useful and aggressive in the great work of advancing the fruit industry of the Province.

WM. H. BUNTING.

I beg to report as follows the condition of the fruit industry for 1902 in Division No. 8, comprising the Counties of Lincoln, Welland and Monck.

I wish to call attention to the fact that the southern part of my district has been neglected. The Society never held a meeting south of St. Catharines, nor have any orchard meetings been held there. There is no section in Ontario where the people would more gladly receive the information afforded by these meetings, and I hope that the Society will favor the district with a few meetings during the coming season.

All yields of small fruits, with the exception of grapes and blackberries, have been the largest known for years, selling for good prices, and the demand equalling the supply. One grower in Pelham (Wm. Platts) making a net profit on strawberries of $3,000, probably the profits of other growers are equally as good, proportionately to the extent of their plantings and care given to the crop. The profits in the growing of raspberries would be much larger if growers would renew their plantings more frequently.

Grapes were much damaged by two hailstorms through portions of this division, but the increased price made up for shrinkage in quantity. European plums were a failure, owing to rot ; peaches a large crop, except in sections where the hailstorms destroyed about two-thirds of the fruit. Prices fair.

All varieties of pears were heavily laden with fruit of good quality. Apples, heavy crop, but badly affected with scab ; only about 50 per cent. were saleable. The following varieties were comparatively clean from scab and worms : Salome, Sutton Beauty, Stark, and York Imperial.

The farmers of Welland and Monck Counties do not give their orchards the care and attention necessary to produce good fruit, and have not had the benefit of orchard meetings. I hope, however, that during the next season the Society will arrange for such meetings, to be held in the neighborhood of the following towns : Ridgeway, Marshville, Niagara Falls South, and Fonthill.

E. Morris.

District No. 9.—J. S. Scarff, Woodstock.

In presenting my report I have much pleasure to state that the Woodstock Horticultural Society is steadily growing in public favor. We have a membership of 98, each of whom receive "The Canadian Horticulturist," with the plant distribution from the Fruit Growers' Association ; also distribution from the local Horticultural Society during the year to the extent of $60 worth of premiums.

The year 1902 has been somewhat unfavorable for horticulture in many respects, owing to late frosts in the spring, and the long-continued wet weather through July and August, which was very irregular and uncertain for floriculture. The Society holds open meetings monthly, when the public are invited to attend. Many papers on horticultural subjects have been read and discussed, with a great deal of interest and instructiveness. By co-operating with the School Board, have aided materially in the work of beautifying and improving the public school grounds in the way of flower beds, with bulbs, and later on with tropical plants and annuals ; also at the suggestion of the Horticultural Society planted a large number of shrubs and evergreens at the Central School grounds, which will in a short time add very much to the attractiveness of the grounds. In addition to the

above, the Society have distributed to the school children this year, to three pupils in each department of the Central and Ward Schools, a number of plants, such as asters, zinnias, phlox, petunias, and geraniums, which were distributed free to the scholars on condition that they should exhibit the flowers from them at the fall exhibition of the Society. In this way from eighty to one hundred pupils received plants and made exhibits.

The visit we had in March last from A. Gilchrist, Toronto Junction, and Mrs. Torrance, Chateauquay Basin, Quebec, was very instructive, and had a very beneficial effect on the school children, and was very much appreciated by the local Society.

In the County of Oxford the apple crop has been inferior this year, owing a great deal to the very wet weather and so little spraying done. The fruit was very scabby. The yield has been fully 70 per cent. greater than last year. In some parts the apple crop was very much injured by hail. As a matter of fact, the great trouble is a large proportion of the growers do not realize the importance of spraying.

Division No. 10.—W. W. Cox, Collingwood.

Georgian Bay Fruit Growers' Association.

On December 11, at the annual meeting in Collingwood, I had the honor to be elected Secretary. At this meeting discussion took place with regard to future work of Association in exporting, in shipping, and in selling; action with regard to unjust discrimination in transportation rates; the importance of agitation for reduction of rates, and action to prevent the successful cornering of apples.

With regard to co-operation, the ideas were embodied in a circular, of which five hundred were distributed in this section, and also printed by the "Sun," "Farming World," and "Farmer's Advocate." This helped to awaken the fruit growers to the importance of the subject, and incidentally gave the Georgian Bay District considerable free advertising:

DEAR SIR:—So far as I have been able to ascertain, it is the general wish that this Association do something with regard to the co-operative buying of packages and chemicals; with the object of placing orders in the slack season thereby obtaining a reduction in prices and also with regard to Paris green and bluestone, buying from a reliable firm upon a guaranteed analysis.

I would suggest that barrels be bought from the cooper who will give your local Association the best terms, that boxes be ordered from the factory by the General Secretary and billed to each local Secretary while chemicals may be bought in the same way from the wholesale houses, or each local Association may buy from their own local dealer as may be shown to be most advantageous.

In order that I may have a guide as to what the members wish, would you kindly fill out the enclosed blank and forward to me. The price mentioned means the highest price you are willing to pay. We would get the best terms possible in proportion to amount ordered.

We will be glad to have you make any suggestions which you consider would be for the general welfare of the Association. Let us have your ideas upon prospective work such as co-operative buying of supplies and also trees in quantity so that we may get both reduction in price but more especially to buy on a guaranteed bond that they will come true to name, transportation rates. care of orchards, packing, grading and selling of the fruit, the establishment of an information bureau, to give special attention to collecting data on the discrimination of railway companies and also to keep our members informed as to fruit prices and any other matters of interest to fruit growers.

Yours truly.

G. FRED MARSH, Sec'y.Treas.

P. S.—If you have not already paid your fee for this year you may enclose the 25c at the same time, which will entitle you to all the advantages of the society together with the report of the Fruit Growers Association, the Experimental Fruit Stations and all bulletins of interest to fruit growers issued by the Agricultural Department.

I agree to take the following stock to be delivered at the undermentioned place and at prices not to exceed those mentioned below.

.....Apple Barrels	at.....each	Delivered.....	.....1902.
.....Apple Boxes	at.....each	Delivered.....	.....1902.
.....Fruit Baskets	at.....each	Delivered.....	.....1902.
.....Pounds Paris Green	at.....per lb.	Delivered.....	.....1902.
.....Pounds Bluestone	at.....per lb.	Delivered.....	.....1902.

Signed.....

Place of Delivery.....

Suggestions—

A resolution calling for the appointment of a Railway Commission was passed, and sent by the Secretary to the Hon. the Minister of Railways, the members of Dominion Parliament from the section, and also to the clerks of each town and municipality in Georgian Bay District, asking that they co-operate by passing same.

The Minister of Railways and members sent very nice letters in return, while those interested in the municipalities paid no attention whatever to the resolution. This simply shows that Parliament will give us whatever we want just as soon as we show that we are in earnest, and will take united action, showing by our votes that we will support a man who will come out and work for our interests.

In March, owing to the kindness of Mr. Creelman, we were fortunate in securing the services of Mr. Hutt for a series of meetings at Meaford, Clarksburg, Stayner, Creemore, and Collingwood.

I had the pleasure of attending these meetings, and helping them along in a small way. They were certainly productive of much good, and many orchards were trimmed and grafted. Owing to this visit, thousands of dollars will, in a few years, be added to the value of fruit in the district.

A little later we had a flying visit at Thornbury from the chief of the fruit division at Ottawa, Mr McKinnon, who was so strongly impressed with the importance of the Georgian Bay District that he, in conjunction with Mr. Creelman, sent Messrs. McNeill and Carey for a series of meetings at Meaford, Clarksburg, Collingwood, Stayner, and Creemore, giving practical demonstrations in spraying, and giving better methods of packing and shipping. A pleasing feature of these meetings was Mr. McNeill's talks on Nature Study, to the school children.

In July, Mr. J. H. Sparling, Superintendent of Canadian Express Co., and their travelling agent, Mr. Allen, for this section, met our Association in Collingwood. Owing to the notice being very short, very few were able to attend. However, we had a good meeting, which was productive of about 20 per cent. decrease in rates to north, and also the improvement of shipping facilities at Thornbury, where a platform 25 feet long on a level, with the car on one side and the wagons on the other, was built, with a roadway across the track, where before it was necessary to take it by hand across in trucks.

Very little was done with regard to co-operation in buying of packages, though both coopers and basketmakers offered large reductions, and we hope to have a large order in time for next year.

Great interest has been manifested by the people in the Association, due largely to the advertising, a considerable amount of which was free, in the way of short editorials and locals, generously given by the local papers and agricultural journals, especially the "Farmer's Sun," Toronto. To all of these the Society is deeply indebted.

The membership is rapidly increasing, and now numbers somewhat over two hundred, though we have not been able to obtain full reports from local secretaries.

In closing, we must remember the generous gift of twenty dollars by the West Simcoe Farmers' Institute, which has relieved the Secretary's mind by turning an alarming deficit into a surplus.

We also urge the importance of the Fruit Growers' Association being placed upon the same standing as the Farmers' Institute, and being given an annual grant from the Department of Agriculture, as this is absolutely necessary if the Association is to continue to do good work.

Report of Creemore Branch.

The annual meeting of the Creemore Branch of the Georgian Bay Fruit Growers' Association was held at Leonard's Hall, Creemore, on November 30th, 1901. The Executive officers appointed were as follows: President, I. J. Honsberger, of Banda; Vice-President, W. T. Pattullo, of Creemore; Secretary-Treasurer, F. E. Webster, of Creemore.

At the annual meeting subjects that were up for discussion were: "Railway Rates." "Co-operation in the Sale of Fruit," "Orchard Management," and "Desirable Varieties of Fruit to Grow." Mr. I. J. Honsberger was delegated to attend the meeting of the Ontario Fruit Growers' Association, held at Cobourg.

On February 15th a meeting was held, where an extended report of the Fruit Growers' Convention at Cobourg was given by Mr. I. J. Honsberger, which was followed by an interesting discussion. Railway rates again came up for discussion, and it was resolved to petition our representative to support any measure in the House that would lead to the appointment of a railway commission.

Three orchard meetings were held. The first was held in Mr. W. T. Pattullo's orchard, near Creemore, on March 15th, 1902. A demonstration on orchard pruning was given by Mr. W. N. Hutt. The day was fine, and the attendance was over one hundred. This orchard meeting was intensely interesting to the farmers, and produced splendid results.

The second orchard meeting was held in Mr. W. T. Pattullo's orchard, on May 26th. Mr. Alex. McNeill was the principal speaker. He lectured on spraying to destroy the many fungous diseases and injurious insects. Owing to the farmers being very busy at home, the attendance was not over forty or fifty.

The third orchard meeting was held in the orchard of Mr. Robert McMann, of Mansfield, on May 27, 1902. The attendance was about one hundred. Great interest was taken in the practical lecture delivered by Mr. Alex. McNeill.

I might observe that the orchard meetings seemed to be of far more practical benefit than meetings held in halls. A tramp through the orchard looking for beneficial and injurious insects, and a talk on methods of destroying bad insects, a general discussion on each fruit tree as it is passed by, and the results of cultivation and fertilization of the different fruit trees, all these seem to make such lasting impression on the farmer that he carries the knowledge he gets home with him, and he does not forget it.

A meeting was held in the Matchett House, Creemore, early in September, for the consideration of "Co-operative Shipping of Apples" among the farmers. After much discussion it was decided to take no action this year.

The year closed with a membership of forty-nine.

All of which is respectfully submitted.

F. E. WEBSTER, Secretary.

The President: I will call upon Mr. Sherrington for a few remarks in this connection, as he has taken a great interest in organizing in Huron and Bruce.

Mr. A. E. Sherrington, Walkerton: The first work with which I was connected was the organization of a local Horticultural Society in Walkerton, where we formed a strong association, with eighty members. In accordance with a request received from the Secretary, I arranged a series of orchard meetings in the spring, covering the two counties. The points selected were

Port Elgin, Walkerton, Lucknow, Blyth, Clinton and Hensall. I was assisted at these meetings by our President, and we had fairly large attendances, especially at Walkerton, Port Elgin, and Blyth. At these points local Fruit Growers' Associations were organized. There was the greatest of interest taken in the work of pruning and grafting. I do not think there is any work the Association can take up that will be of greater benefit than this. Men from the lower part of the county have since said to me that they have done all their own grafting this year, and did not know how to do it before. They also report having shown many others how to do the work.

In May we held a series of meetings on Spraying, assisted by Mr. McNeill. I could not attend all these meetings myself. These meetings were well attended, and a great deal of interest was taken. I also called a meeting for Teeswater, and organized a local Association there.

With regard to our local Association at Walkerton, we have held a meeting every month except one, and that evening it was too wet for anyone to turn out. We discussed fruit culture in all its branches, and then took up the subject of co-operation. As a result, we bought all our spraying material on the co-operative plan, securing half a ton of copper sulphate and Paris green. In that way we got first-class material. We heard complaints of Paris green not being up to the standard in different parts of the Province, while ours was of the best quality. We also got it at greatly reduced rates.

Then we undertook to co-operate in the shipment of our apples. Each grower packed his own and put his name on the barrel. The results were satisfactory, and we intend to continue the co-operative work. We are now discussing a cold storage and storehouse for this town, which is to be located near the station, and will enable us to ship our peaches, etc., at any time we desire.

Mr. Creelman: Is this being undertaken by the local Fruit Growers' Association?

Mr. Sherrington: Yes.

Mr. Creelman: Do you think a twenty-five-cent membership fee too much for that?

Mr. Sherrington: I do not think it is enough.

Mr. Creelman: Does the Farmers' Institute interfere with the work?

Mr. Sherrington: No; nearly all our members are members of the Farmers' Institute. As a result of co-operation we got 50 cents on all our apples, while outsiders complained that they received only about 26 cents for No. 2's and 60 cents for No. 1's.

Q.: What caused the difference in price?

A.: It was the extra charges of the dealers. By co-operation we made $1.75 f.o.b. on our apples. I think we should get the local associations affiliated with the central Association, and that it would result in much good.

Division No. 11.—T. H. Race, Mitchell.

The principal work done in the interests of our Association in District No. 11 during the past year was through the regular and supplementary meetings of the Farmers' Institute; in the former Mr. Elmer Lick, and in the latter by Mr. W. N. Hutt. It would be a mistake to say that the work was either unimportant or indifferently done. It was very valuable work, and most excellently performed.

In the regular meetings Mr. Lick dealt with the picking, packing, and shipping of apples, and also with the Fruit Marks Act. His addresses were all so instructive and valuable that he got the closest attention from his hearers everywhere, and it is needless to say that he gave them a much

more intelligent idea of the nature and purposes of the Fruit Marks Act than they had previously entertained. The good results of his talks have been seen in the packing and shipping of apples this fall.

In the supplementary meetings, Mr. Hutt gave a very valuable address, accompanied with a practical demonstration on pruning. This object lesson, with Mr. Hutt's practical talks, provoked a lively interest wherever it was seen, and its tendency will be to promote a greater interest in caring for the orchard.

A greater interest has also been manifest in the local Horticultural Societies, in the planting and cultivation of shrubs, flowers and small fruits. In some cases this interest has reached the point of enthusiasm, notably in London, Stratford, and Mitchell, where strong and active societies have come into existence within the last three years. The good work thus far done, and the interest promoted, will amply justify the continued efforts of this Association in its aid and encouragement thereto.

Division No. 12.—Alex. McNeill, Walkerville.

I wish to endorse what has been said about orchard meetings. I believe that they are, perhaps, the most helpful form of work that this Association has undertaken.

We held five or six special meetings in our district, and, with one exception, had a fair attendance at all of them. Mr. Hilborn and myself attended, and gave practical demonstrations in pruning, grafting, care of trees, soil culture, etc. We also directed attention to insect pests and fungous diseases, and the remedies for them. We have three local Horticultural Societies in our district that are all doing good work. I do not think that we should cut off the ornamental part of their work, although we might sub-divide if necessary, and I would suggest adding forestry and vegetable growing.

The Fruit Division of the Department of Agriculture at Ottawa, which I represent, is a comparatively new departure. Its chief work hitherto has been in enforcing the Fruit Marks Act, but I do not think that it will be its ultimate work. I think there should be co-operation between the Fruit Division and the Fruit Growers' Associations, both local and Provincial. I hope steps will be taken to effect this. The scope of the work of this Department will depend on the people themselves, and upon what use they make of it. I have no confidence in any organization that is not founded on the will of the people, and I believe you can make this Department of great interest to our fruit growers.

District No. 13.—C. L. Stephens, Orillia.

I am asked to make a report on horticultural and fruit growing, covering the County of Simcoe, Muskoka, Parry Sound, and Algoma, and this without having been provided with "ways and means" which might enable me to do so. However, by correspondence I have been enabled to procure some information, which may be of interest to the meeting.

In the County of Simcoe there are 14 Agricultural, and 4 Horticultural Societies; in Muskoka 9, Parry Sound 12, and Algoma 12 Agricultural Societies. All of these Agricultural Societies, doubtless, at their exhibitions have classes for flowers, and most of them for fruits, and award prizes in these branches, thus, in a measure, doing work on the lines of this Association. So far as the societies at Coldwater, in Simcoe, and Bracebridge, in Muskoka, are concerned, I have a personal knowledge that they have very superior exhibits in these classes. The Barrie and Orillia Horticultural Societies

have for many years been engaged in these directions, and have been the means of largely promoting the growth of the different fruits in their localities. I am not familiar with what has been doing in Collingwood and Midland by the Horticultural Societies, but, doubtless, valuable work has been done. Fifteen years ago there were not apples enough grown about Orillia for local consumption, whilst this year, so far as I can learn, about four thousand barrels were shipped out, and the home demand well supplied. The total shipments from East Simcoe would probably reach over twenty thousand barrels. The most of these would be early apples, chiefly Duchess, for which a large and increasing market is found to the northward, nearly every station on the C. P. R. from North Bay to Winnipeg taking its quota. Wealthy, also, we can send to the north; but it is not so well liked as Duchess; for the latter apple there is a great future in this trade. Up to the present there is not a great supply of winter apples for shipment from Orillia; but the quantity is increasing yearly; this year I have heard of several farmers setting out 400 and 600 trees. Mr. J. P. Cockburn of Gravenhurst, Muskoka, grows a great many varieties of fall and early winter apples with much success, and is doing a great deal in testing the capacity of Muskoka to grow good apples. There are two experiment stations in this district, one under the charge of our esteemed president, Mr. G. C. Caston, in this county, and one on St. Joseph's Island, in Algoma, in charge of Mr. C. Young. I have never had the pleasure of visiting either of these stations, and have no personal knowledge of the work carried on by them. In this connection I would suggest that when the annual inspection of experimental stations is being made, it should be part of the duty of the local Director in each case to accompany the inspecting officer, and that his necessary expenses in doing so should be paid.

During the summer the Orillia Horticultural Society arranged a visit from Prof. Fletcher, and that gentleman gave a very instructive and interesting lecture on injurious insects.

Progress of Fruit Growing in Muskoka District.

After crossing the Severn River, the soil and climate changes materially. The soil and rock of this district is generally warm, by reason of the composition, the granite formation being a great absorbent of heat; so that during the growing season vegetation is rapid. Therefore, it is not well to encourage too rapid growth in trees, as they are sure to suffer in winter. However, the many troubles we have had in the past are now practically overcome. We have a better knowledge of the class of plants likely to succeed; in short, we must acclimatize and winter trees and stock, so as to bring it through the winter (sometimes 30 deg. below zero) with strong, healthy buds. Then we may expect a fair crop of a number of the standard sorts of apples. The following have been most successfully grown, the specimens generally being the best of their kinds:

Summer: Duchess, Yellow Transparent, Red Astrachan, St. Lawrence, and Trenton; for later crop, Wealthy, Sally Brown.

Fall: The Beautiful McIntosh, Longfield, and several very valuable seedlings (local).

Winter: Golden Russett, Pomme Grise, Labrador, Pewaukee, Scott's Winter, Nora, and Minto.

We have a number of most promising seedlings grown by observing people here, to wit, the Rev. W. Reeve, W. N. Moody, James Brydon, Wm. Jarvis, J. W. Slater, James Brown, and myself. Many of these seedlings should be propagated by some local nurseryman, to the benefit of the nur-

seryman and the lasting benefit of this district, and the cold north up to James' Bay. As it is, we have been practising and experimenting in our own quiet way till we have made a partial success of growing the most beautiful apples to be seen on the market anywhere—to wit, My Own Russett, which was so successful at the Pan-American. At our high school practical botany and forestry is made one of the features. We are thus whetting the powers of observation and fixing an intelligent foundation for future success in the rising generation of fruit growers at our practical lessons in pruning, grafting and budding. The girls join with as much enthusiasm as the boys, and make a great success of their work.

Last winter being a very mild one, the buds on the Domestica plums came through in fine form; in consequence, we had many fine lots of plums, the best of which were Lombard. Reine Claude gave some fine fruit; Moore's Arctic was overloaded; so also were Genii. The Yellow Egg and this class rotted very badly. A seedling Americana, very dwarf one, gave the best crop of fine plums, followed by Hawkeye, Wolff and Stoddart. The only advantage in these over our own Nigra is that they bloom later, and thus give us a double chance of missing the frost.

There are many of the Nigras well worthy of a place on our lists for the north, notably the Stormont, a fair size, yellowish red plum, with very little astringency, but plenty of stone—and some delicious pulp.

PUBLIC MEETING.

The proceedings at the public meeting (President Caston in the chair) began with an address from the Mayor of Walkerton, Mr. C. W. Cryderman, in which he extended to the Association the sincere welcome of the town. In the course of his remarks he said that he could point with pride to the fruit resources of the County of Bruce. The natives considered their county one of the bright spots of the Province. It was not one of the northern counties, as was too often supposed. They were in about the same latitude as Toronto, and could raise just as good peaches as were grown in the Niagara district. All the people needed was a little encouragement, and they would undertake to grow fruit for their own pleasure and profit, and in this connection he congratulated the Society on the work it was doing.

Judge Klein ably seconded the efforts of the Mayor to make the Association feel at home. He pointed with pride to the fact that for thirty years they had had a Horticultural Society in the town. It had now affiliated with the local Fruit Growers' Association, and for every dollar paid in for membership, they were receiving fourfold. The Fruit Growers' Association was not like the various commercial associations in its character—it had no trade secrets. He was very much impressed with this fact; all were willing to impart the knowledge they had acquired in the pursuit of their vocation, and thus advance the interests of fruit growing generally.

Mr. A. Shaw, K. C., said that, although he was a lawyer, he owned a farm and an orchard, and might be considered a sort of agricultural lawyer. Nature in all its aspects was particularly attractive to him, and there was nothing he took greater pleasure in than the growth of trees, shrubs, and flowers. Had it not been for the beauty of the forests of that county in the early days, he did not think he would ever have settled down there. He had been in every Province of the Dominion, and believed there were no trees anywhere that equalled those of Bruce and Huron, not because they were the largest, but because of their straight, clean, healthy growth.

Since the days of early settlement the farmers had been busy cutting down the forest, until, he was sorry to say, it had almost disappeared. For his own part, he had been busy planting trees for the last twenty years, and intended to continue the work. In referring to the fact that American visitors were present, he said he was not one of those who would forever be celebrating Lundy's Lane and Queenston Heights, thus keeping alive the quarrels of the past. It was much better to meet our American friends in conferences such as this, that had for their object the advancement of an industry important to the well being of so large a section of the community.

President Caston, in his reply, thanked the speakers for their cordial words of welcome. He agreed that the residents of Bruce had the soil and climate necessary to make the district a great fruit growing country. There was no part of Ontario capable of producing apples of higher quality. He hoped that those interested would take full advantage of the sessions held, which, he pointed out, were open to all comers. He then delivered his annual address as President.

PRESIDENT'S ADDRESS.

By G. C. Caston, Craighurst.

Another year has rolled around since our last annual meeting, and it becomes my duty to review the labors of the year, and to present some thoughts upon the topics that are likely to be of interest to us as an Association. But I would like to go a little farther back than the year that is just passed, and briefly to take a retrospective view of the work of our Association in the past, what it is doing at the present, and to offer a few suggestions as to the future.

On the 19th of January, 1859, in the Mechanics' Hall at Hamilton, our Association had its birth. The late Judge Campbell, of Niagara, was its first President. But of the first Board of Directors, only one now remains in the land of the living, and its was quite in accordance with the eternal fitness of things that the Association last year made him an Honorary Director for life. I refer to the veteran, Mr. A. M. Smith, of St. Catharines. Fruit growing for profit was little thought of or practised in those days, except in a small way in a few favored localities, and the little band of fruit growers, in laying the foundation of this Association, struggled against many difficulties and discouragements. But it may be said of them, that they builded greater than they knew. They held meetings at various places for discussions on fruit culture, and made exhibits of fruit, and although the attendance was small, and the membership in '68 only amounted to 30, yet a great deal of useful information was brought out, and the success in fruit culture in this Province which has followed may be said to be due to the efforts of those few men more than to any other agency.

In 1868, through the efforts of Mr. W. H. Mills, then President, and his co-laborers, the Society was incorporated under the Agriculture and Arts Act, and became entitled to a yearly grant of $350, which enabled the Society to enlarge the scope of their work. Meetings were held in various parts of the Province. Experimental work was begun in a small way by sending out to members every spring a premium in the shape of some new variety of fruit, flower or shrub, to be tested in the various sections of the Province. Then soon followed the publication of The Horticulturist, our monthly journal, which from small beginnings is to-day one of the best

of its kind. The editor is a horticulturist to the manor born, who has devoted his life to the study and practice of fruit culture, and he has the assistance of some of the most experienced men in the Association. Our membership has increased from the little devoted group of 30, in 1868, to 4,950 in 1902. In the Province of Ontario to-day there is nearly half a million acres in orchard and garden, over 11,000 acres in vineyard, over 7,000,000 apple trees, 15 years and over, with a total yield of 37,000,000 bushels, and over 4,000,000 trees under 15 years. Great improvements have been made also in the methods of handling fruits and in packages. In the early days berries were brought to market in pans and pails, jolted over the roads in heavy waggons, and reached the market in a condition ready for jam. Apples were carted to market in bags and old barrels. We now have attractive, clean, new baskets and packages for every kind of fruit, which are being constantly improved from year to year. But the work of the Association has not been confined to the development of fruit culture alone. Arboriculture, floriculture, and landscape gardening, those pursuits that beautify and adorn the home and its surroundings, have received a large share of attention, both at our meetings and through our journal. And who will say that the improvement noticed throughout the country in this line does not owe its inception and progress very largely to the work of our Association?

But while we have made great progress, it has not been all plain sailing. There has been many discouragements and hindrances to contend with. Fungous diseases, blight, mildew, black knot, and yellows have visited us. In some years unusual climatic conditions and a host of insect foes keep the fruit grower ever on the alert, in order to hold his own. But the methods disseminated by our Association for dealing successfully with these pests, and the assistance given by the Department of Agriculture, particularly in the case of the San Jose Scale, the most dangerous pest of all, must, I am sure, be a source of gratification to every one interested in the industry of fruit growing.

Our Association has also played a very prominent part in the proud achievements of our Province at the various international exhibitions. At the Centennial at Philadelphia, in '76, at the Intercolonial at London, at Chicago, at Paris, and at the Pan-American. The laurels won at these exhibitions by our fruit growers has done much to elevate our country in the estimation of the world, for our achievements in this line, while a matter of pride and gratification to ourselves, has been no less a matter of wonder to others. People naturally conclude that a country which can produce such a variety of fruits of the highest excellence, must be a good country, a fertile country, a country of sunshine and of favorable climatic conditions, and withal a pleasant land to live in.

Through the efforts of this Association much useful legislation has been initiated and placed upon the statutes of the Province, such as the Act for preventing the spread of black knot and yellows, the Act respecting the bandaging of trees for the destruction of the codling moth; and also the Fruit Marks Act, though a Dominion law, and having a wider scope, is the result of the continued and persistent efforts of this Society. We have been able to enlist the aid of the Department of Agriculture in giving object lessons in spraying fruit trees for the prevention of fungous diseases and insect pests, lessons which have been of incalculable benefit to the Province. Also in the transportation of our perishable fruits, through the valued assistance of the Dominion and Provincial Departments, we have made great progress, and from what has already been accomplished, in

the way of cold storage, ventilated compartments, etc., it is safe to say we are on the high road to success. In the matter of freight rates we have been able to secure some concessions in the way of classification and some slight reductions in rates. We have found the transportation companies and their rates a difficult problem to deal with, and we have to keep ever and always at them.

And just here I would like to draw the attention of the Association to the movement now on foot by the railway companies to ask Parliament to permit them to increase their rates. I may say, from correspondence I have had, that we will be asked to co-operate with other Associations in opposing this movement. We will be remiss in our duty if we fail to do it, and I hope this question will receive the serious attention and consideration by this meeting that its importance deserves.

The year now drawing to a close has been a fairly good one for fruit growers. Small fruits benefited by the abundance of moisture, and bore an abundant crop, and prices were pretty well maintained. Tree fruits were not uniform throughout the country. In some sections plums and cherries were abundant, and in others a failure. In the peach belt a good crop was harvested, and prices held good until near the close, when, owing to the lateness of the season, prices dropped considerably. In apples, which is our staple crop, there was also a curious lack of uniformity. Early apples were well up to or over the average, but winter apples were below the average in quantity, and were very much below in quality. Some orchards were bare, while others in the same section were fairly well loaded. A great deal of damage was done by the prevalence of scab and other fungous diseases. The frequent and heavy rains prevented effective spraying.

Yet those who were fortunate enough to have a good crop of apples of good quality have been able to realize good prices for their fruit. Owing to the scarcity of apples in Europe, all those arriving in sound condition realized good prices. It is seldom that fall apples and early winters realize as good prices as obtained this year.

And now a word about the work of the Association during the year. At the last annual meeting, as many of you are aware, Mr. Woolverton asked to be relieved from the duties of Secretary-Treasurer of the Association, in order that he might be able to devote more time and attention to the editing of our journal. This request was complied with, and we were fortunately able to secure the services of Mr. G. C. Creelman as Secretary-Treasurer of our Association, a man well known throughout the Province as Superintendent of Farmers' Institutes, and also for the zeal, energy, and executive ability he brings to bear upon this work.

A committee was appointed, composed of some of our best men, to act as a sort of Advisory Board, and as a result of this division of work our journal has been improved, until it is now one of the best of its kind published. The Association has been able to enlarge its scope, and develop a great deal of new work which cannot fail to be of great benefit to the fruit interests of the Province

It has been felt for some time that our Association should in some way seek to get in closer touch with the individual fruit growers of the Province; also that there was need for a great deal of educational work, and that no educational work was of such value as object lessons given in the orchard.

On the initiative of Mr. Creelman, the Executive secured a small grant for this purpose, and decided to undertake work along this line. During March and April 45 orchard meetings were held, where lessons were

given on pruning, grafting, budding, etc. In May, 18 meetings were held where demonstrations on the proper spraying of fruit trees were given. In July, 15 meetings were held, giving object lessons in thinning fruit, and general discussions on the care of orchards.

In the course of these meetings 27 Local Fruit Growers' Associations were formed, which we expect will become affiliated with our Association. Our membership has increased, and we justly pride ourselves on being the largest society of this kind on the continent, if not in the world. The work of the year will be fully brought out in the Secretary's Report; also the satisfactory statement that although a great amount of work has been done during the year, our finances are in good shape, with a balance of $241.56 on the right side of the ledger. I am sure all fruit growers will be gratified at the success of our Inspector, Mr. Fisher, in his persistent fight against that insiduous enemy, the San Jose Scale, and for the valuable assistance of the Department of Agriculture, which has enabled him to wage a vigorous war against the pest. And the success that has been attained goes to show that while we may not be able to entirely exterminate it, yet through the intelligent application of simple remedies, its ravages can be effectively checked, so that it will not be such an object of dread to fruit growers after all.

And now a few words as to the future. A vast amount of work yet remains for this Association to do. I had the pleasure of taking part in some of the orchard meetings, and I am strongly impressed with the need that exists for educational work in the best methods of orchard practice, more particularly in pruning and cultivation. It is surprising to see the sad havoc that has been wrought by itinerant pruners throughout the country. Had those people who have been injured in this way been members of our Association, or had access to our publications, this would not have occurred. One of the best articles I have seen on the pruning of fruit trees is that written by Mr. W. N. Hutt, of Southend, and published in Ontario Report of Farmers' Institutes for 1901. The article is well illustrated, and I would like to see it published in the form of a bulletin, and distributed among the members of Local Associations. The question of fertility should be strongly emphasized. Many of our orchards are suffering from want of proper food. We cannot produce good crops of fruit of high quality without a fertile soil, and I am satisfied that too little attention has been paid to this important subject by fruit growers. As I have already shown, this Association, from its very inception, has been doing educational work, and we have done a great deal. We have been very successful. We have made our Province famous as a fruit country, but we must not rest here. There is much yet to be done, and I trust the good work will be continued.

But there is also another phase of the business that demands our attention—the commercial. The questions of transportation and markets are important ones, and I trust that these vital matters will receive at your hands the careful consideration which their importance deserves.

I feel warranted in saying that there never was a brighter outlook for the fruit growers of Ontario than at present. A very gratifying feature is the ever-increasing consumption of fruit by our own people, thus furnishing a home market for a very large part of our products, particularly in view of the great influx of settlers to the vast prairies of the West, that part of our Dominion that is to provide homes for millions, and the vastness of which few of us seem to realize, but which will never be able, owing to climatic conditions, to successfully grow orchard fruits. It will be but a few years at the present rate of progress until that country will absorb all the surplus fruit our Province can produce.

Then we still have the British market, and we maintain our pre-eminence there. Some are doubtful as to the advisability of planting more orchards. I don't think there should be any doubt on the matter. For my own part, I intend to keep on planting; and I often think of the good advice given by an old Scotchman to his son:—"Aye, be plantin' a tree, Jock; it'll be growin' when ye'r sleepin'."

Since our last meeting one of our Directors, Mr. W. A. Whitney, of Iroquois, has been called away. He was a man respected and loved by all of us with whom he has been associated, and we sincerely mourn his loss. And we are reminded that there are many faces missing that formerly greeted us at our annual meetings. They are "crossing the river one by one," but they have not lived in vain, for in giving to others information gleaned from a ripe, practical experience, they have left behind them monuments more enduring than marble. And it may be said of them that "They rest from their labors, and their works do follow them."

You will notice by our programme that a new feature has been introduced, in the bringing together the experimenters from the Experimental Fruit Stations. Their reports will, no doubt, be both interesting and instructive. I trust we shall have a very successful meeting.

GREETINGS FROM THE WESTERN NEW YORK HORTICULTURAL SOCIETY.

Mr. John Hall, Secretary of the Western New York Horticultural Society, said that he wished to convey the fraternal greetings from the Society he represented to the members of the Ontario Fruit Growers' Association. His Association was the pioneer society of its kind in the United States. Among the names of those associated with its work are those of Downing, Barry, Vick, and J. J. Thomas. Speaking personally, Mr. Hall said that whenever he came to this side of the line and saw the flag, although he was a naturalized American citizen, that there was something in his breast that responded to its influence, and brought back thoughts of the Mother Country. Mr. Palmer had referred with regret to the fact that so much of the bone and sinew of this country went to help build up the United States. He was forced to conclude that the success of that country was due in a great measure to the stability of character of the people from England, Ireland, Scotland, and Canada who had settled there. There was one thing the horticulturists of his State were turning their attention to which he thought was worthy of imitation here, and that was the beautifying of school grounds. Mr. Hall concluded by extending to his Canadian friends a cordial invitation to attend the forthcoming convention of his Society.

ADDRESS.

By C. C. James, M.A., Deputy Minister of Agriculture.

There is something appropriate, it seems to me, in having the Ontario Fruit Growers' Convention in the Town of Walkerton. If my knowledge of your country is not astray, the settlement of this section of Bruce and the Ontario Fruit Growers' Association were begun about the same time. If anyone had said when settlers first came into this section to cut out homes for themselves in the woods—then so far remote from the front and the settled portion of the Province—that forty years hence a meeting of an asso-

ciation which extends over the entire Province would be gathered here to discuss questions of fruit growing, he would have been set down as a very unwise prophet indeed. However, it proves one thing that is very important to us, and it is that, as time goes on and our country becomes more and more settled, we find the fruit area being very much extended. Sections that a few years ago were considered ill adapted to the growing of fruits are now producing first-class fruits. The trouble always is to find out the varieties that are specially adapted to these sections. It may be, therefore, that we have in this Province considerable areas which are not spoken of now as being adapted to fruit growing, but which in ten or twenty years from now will be found to be very productive. Perhaps some of us will be here to see whether that prophecy or suggestion will hold good or not.

What is the object of an Association of this kind ? I do not know whether you are accustomed to have Association meetings in this place or not—whether persons concerned in other lines of work have at any time met here in convention or not. If they have, or if you have been elsewhere at conventions, you will find that in one or two particulars this Association in its meetings differs very materially from them. In the first place,the doors are open for everybody to come in and attend, and I trust that the people of Walkerton and vicinity will take full advantage of this and not allow this convention to come and go without attending as many of the sessions as possible. In the next place you will find that there are no restrictions or pass words to prevent anyone and every one from coming in and associating. What I want to convey is that this is an association for the general good ; it is for no persons in particular ; it is for everybody, although, perhaps, we might say that it is intended in particular for persons concerned in the growing of fruit. The aim and object of the Association may be summed up in the word "Education." We have a great many modes of education in this Province, but this is the one great line along which the fruit growers are to receive their education. We have a large number of other associations which are allied to this Association : We have an association for the development of our live stock industries, for the development of the bee-keeping industry, the poultry industry ; and so we might name ten or a dozen of these, all working along similar lines—that is, all more or less educative in their nature. It seems to me, therefore, that for a few moments this evening I might talk to you about the possibilities—what there is ahead—what is being gained by education.

What is the result of the educational work of this Association, and of other similar organizations that are being used in various ways to help on the one great common industry which embodies them all—our great agricultural industry ? A few days ago an announcement was made in the papers that we were to have shortly a new transcontinental railroad, and in display figures were set across these articles, " One hundred millions of dollars." We read these figures, and, possibly, some said : " It will be a magnificent thing for this country to have that amount of money spent in Canada in the next five years ; it will be enough to make the country rich." It is certainly a very large item, but if the prosperity of the country has to depend on this, it would be very little indeed. If you take the agriculture of the Province of Ontario from its extreme east to its extreme west and put it all together—farms, buildings, live stock, and implements—to make up what we call our agriculture, it would amount not to one hundred millions, but to a little over ten times that sum. So that when we hold up this large amount which is to be spent on a railway and think of it as something of very great importance, let us not forget that we are engaged in an industry that has invested in it an amount not less than a thousand millions, or a billion of dollars.

Now, education in connection with an industry that has an investment of this enormous amount must be of importance. In this business we have in Ontario about 175,000 shareholders. These produce annually from two hundred to two hundred and fifty millions of dollars' worth of produce. Here, then, we have an industry beside which all the other industries of the country sink into insignificance. Is it not, therefore, important that associations for the improvement of our fruit and live stock, for the education of our farmers along these lines—is it not of importance that such associations should receive as much encouragement as possible, and be allowed to do as much good as possible ?

Let me put it in another light : We have in the Province nine million acres of land under crop. I am not going to speak solely about fruit growing to-night, because I think that in this section of the Province you are interested in all the aspects of agriculture, and possibly at this convention you will have a surfeit of talk on the subject of fruit growing. We have, as I said, nine million acres of land producing field crops. You know very well what we grow upon those fields. Would it be possible by improved methods—that is, by an improved educational system—to add a dollar a year to every one of those acres ? If so, you will see that our Provincial income would be increased by nine millions of dollars. If we could add only one cent per bushel to the value of the grain that is produced, we should add annually a million and a half to the receipts of this Province. Sometimes people may say that it does not make very much difference whether you get that extra cent for your grain or not ; or whether you have to pay that extra cent for transportation ; or whether your crop is just a little bit less or not. Perhaps to each individual it may mean only a few dollars, but when you take it in the aggregate and make this improvement all over the Province, whether in the production of the crop or in the amount received per bushel, you will see that you can count it not by hundreds of thousands, but by millions of dollars. Here is something that will appeal to us as fruit growers : If we could take the apple trees of this Province and improve the product of each one by only fifteen cents (and you will notice that in all these calculations I am keeping them at a minimum), we should be adding a million dollars' worth of fruit to our Province. One dollar on the milk produced by every milch cow would add a million dollars to our revenue, and only a quarter of a cent per pound on every cheese would add three hundred thousand dollars. Suppose we could improve our fields so that each one would produce a little more ; suppose we could improve the product of our animals, and so, working from the bottom up, we could add a very little indeed to the average production of this Province, you see we should improve our annual income by ten, fifteen or twenty millions of dollars. How is this to be done ? It is summed up in Education—educating our farmers, dairymen, fruit growers, grain growers, live stock breeders—in educating them and helping them to improve their products ; and in this work this Association is playing a very important part indeed.

The possibilities of this Dominion were hinted at by the previous speaker in connection with British Columbia. I do not suppose that we have yet begun to realize even a fractional part of the enormous possibilities of that Province. Then we turn to the great Northwest and then to Manitoba, and last, but not least, to our own Province. I said that forty or fifty years ago where we are now standing was considered the remote backwoods, and not many people were dreaming that there would be a very prosperous agricultural community—a community interested especially in the subject of fruit growing—established here. Thinking of what has happened right here within that time, what is likely to happen in that still more extensive backwoods

country of our farther north ? We have beyond the main line of the C.P.R. one solid block of fifteen million acres of magnificent clay land. It is unoccupied, and to a large extent unexplored. It has an area larger than the whole present occupied portion of Ontario. We must not think that this will not be occupied. There is good reason for thinking that forty or fifty years from now there will be thickly settled districts in that section, just as we have here in Bruce, Simcoe, and Huron. This means that there is going to be an enormous production in the country to the north of us ; and the Northwest is also filling up at a rapid rate. In those countries we shall have a population to be numbered by the million, and this will have a very important bearing on the fruit industry of this part of the Province of Ontario, for the reason that whatever may be the possibilities of these countries so far as the growing of live stock and wheat is concerned, we have very serious doubts about their ever being reckoned fruit producing countries ; they will be great fruit consuming countries. The thousands pouring into these northern countries mean so many more consumers of our fruit, and it may be that the shipping of fruit to the Old Country will sink into insignificance in comparison with the market likely to be developed in that section.

I want to refer to one or two items to show how by education two or three of these industries have grown very rapidly indeed. Take our live stock industry. The bacon and ham industry in Ontario has grown from nine million dollars' worth in 1892 to sixteen million dollars' worth the year before last. It has steadily grown by leaps and bounds. There is a production which I suppose has been unequalled by any of our manufacturing industries. It has not come by hap-hazard. It has been carefully nurtured and worked out along educational lines. If there is one industry in the Province that has been based upon rational education, it is the pork and bacon industry. The farmers have received education along all lines. Wherever an opportunity has presented itself, men well qualified have gone out and taught the farmers, and the result has been the gradual and sure building up of this industry. Consequently, our exports have grown at a very rapid rate. In 1896 we exported forty-seven million pounds ; in 1897, sixty million ; seventy-seven million pounds the next year, one hundred and twelve the next, and then it jumped to one hundred and thirty-two million pounds. The result has been that large amounts of money have been brought into the country, and the country has been greatly benefited. Those sections that have given particular attention to this branch, and have been receiving this education, have been profiting by it exceedingly, so that whenever you go into a section where pork is being extensively grown you will find prosperity existing in that section.

We might refer to the good effects of educational campaign along other lines, but I want more particularly to refer to this Association. This Association has undertaken in the past, and is going to continue in the future, what may be called educational campaigns in connection with the fruit growing industry. I have no figures to prove what the extent of our fruit growing industry is, but it will amount to a very large sum indeed. Through this Association a campaign has been inaugurated, and is being spread over the Province, instructing farmers and fruit growers as to the best kinds of fruit to produce, the best methods of producing fruit, and of sending that fruit to market. I think you will admit that if this Association through any of its channels can do anything to encourage and improve the production of fruit, then the small amount of money spent in connection with it will certainly be very wisely spent indeed. Agricultural questions—and fruit growing, of course, is only one part of the agricultural question—are questions of

very wide import: they concern everybody—people in the towns as well as in the country, so that when an agricultural meeting is called in your midst, I trust that the people of Walkerton will be found taking as much interest in it as the people from the surrounding country. We may put down three very important results as the outcome of improved agricultural methods—results of the campaign carried on in the right direction. In the first place, there is a more equitable distribution of wealth. Supposing an individual by his efforts is able to amass a hundred thousand dollars ; that wealth is centered largely in himself. Now you will see what I want to bring out in contrast. The development of great industries in towns and cities has a tendency to centralize wealth in the hands of a few individuals. But agriculture is distributive ; it takes a large number of persons to enjoy that wealth. Certainly the rewards of agriculture are not likely to be as great as in the case of our manufactures, but a prosperous agriculture means a more equitable distribution of wealth throughout the community. It is much more important to have a hundred men well-to-do than it is to have one man extra well-to-do. Then the next point is that more men are likely to be attached permanently to their homes and to their country. The prosperous farmer is tied down to his land. The man in the towns and cities who becomes wealthy is in nine cases out of ten likely to move. He will perhaps go to some centre where he has an opportunity of spending his money more rapidly ; but the more prosperous you make an agricultural community, the more permanently you tie that community down to the soil. It is not from the country that revolutions proceed ; it is not from the country that great social troubles emanate. Given a country with a hardy, prosperous, contented rural community, and you are not likely to have much trouble proceeding from that source. The more prosperous you make the agricultural community surrounding the towns, the more prosperous must that town become. A man in a town may amass a large fortune, and it may have very little effect upon the surrounding community ; he may build a fine house and add a few laborers and servants to his domain, but the great community outside is not improved very much. But the money you send back through the dairy industry and the fruit industry to the five hundred homes surrounding the town—does it stay there ? It begins at once to flow back into the town. It seems to me that again and again our towns have been very short-sighted. I have known places where the surrounding country has been entirely neglected, and the people in the town have given no thought to the prosperity of the people in the vicinity. Perhaps they have passed a large bonus to build up an industry that has afterwards moved away. To a large extent that prosperity is evanescent. If the same money had been used in developing the prosperity of the farming community around the town, there would have been built up something that would not move away, something that could not have been kept to itself ; and you will always find that a prosperous agricultural community necessarily means a well-to-do town in its centre. I would like to say to you living in the town of Walkerton that you have as much interest in the prosperity of the country around you as have those who live there. It is important to you whether the farmers shall be prosperous—whether the fruit growers here are well-to-do or not ; it is important to you how the dairy industry is going on ; and when our towns take a rational interest in the rural communities around them, we shall set up an educational influence that will affect the whole community, and then both town and country will progress in unison.

ADDRESS.

By Dr. James Mills, President Ontario Agricultural College, Guelph.

I am here to-night not because I have anything special to say to you as a Fruit Growers' Association, or even to the people of the Town of Walkerton, but because I wish to keep in touch with the fruit growers. I wish to become better acquainted with them, and to know what they require of us at Guelph. The only way we can do this is to attend their meetings, listen to their discussions and criticisms, and hear what they have to say. I bring greetings from the Agricultural College to this Association, and to the people of the town of Walkerton. I never had the pleasure of visiting this locality before. Hence, I am glad to have an opportunity of meeting such a large representation of the people of this town, especially the young men and young women, who are the hope of the country. We are all struggling in this country after we reach fifteen or sixteen to make a living as best we can. We have certain natural resources of soil, timber, and minerals, and certain conditions as to climate. Most of us think we have a very good climate. We have also a given amount of capital, which we are anxious to increase. We use these natural resources and capital to produce wealth, and the great instrument in the production of wealth through the agency of resources and capital, is labor. We cannot improve much on our natural resources, and we cannot very quickly increase our capital; it is to some extent a fixed quantity. The only thing we can really improve is the labor,—the industrial qualities of our people—our men and women and our boys and girls as they grow up—with a view to make them more successful workers.

The problem of production in this country, and in every other, is really the problem of how to improve the industrial qualities of its people. I like a meeting of this character, because it is a contribution to what I call practical education—education that tends to make us more successful workers, more effective producers; that will tend to make us wealthier, and enable us to secure a larger share of the necessaries, comforts, and luxuries of life in exchange for our labor. I have been surprised at the record our people have made in the matter of fruit growing. You have been engaged in several large international exhibitions. One, as you remember, was held at Chicago, and we certainly had little expectation that our Ontario, much as we prize it, would stand abreast of California, Michigan, New York, and other great States in the matter of fruit; but we happen to know that Ontario took a larger number of marks for fruit than any State in the great American Union. I do not think that this was due to any superiority in natural resources. Of course, it is admitted that the further north you can successfully raise anything, the better will be its quality. Our fruit is of excellent quality, and that no doubt added a good deal to the number of marks gained at Chicago. But, after all, I do not think our resources are in any way superior to those of New York, Michigan, Ohio, and other fine States in the northern and western part of the Republic. Why is it that we stood first at Chicago and second at the Pan-American? I think it is due to the high standard of industrial qualities to which our people have attained. They have a large foreign population across the line, which has hardly been assimilated yet, while we have in this Province a combination of English, Irish, and Scotch, and a little German, which has produced a very high type of workers among us; and when it comes to an international competition, our men tell every time. The one that counts is the men. If you can raise a higher type of men, you will make a higher

record every time. I am glad to see meetings of this kind, that contribute towards practical education—towards the raising of the people to a higher level as workers ; and our education is beginning to point in that direction, even in the public and high schools. They were hard to move, but they have come to it at last, and all are aiming to give our education more of a practical bearing, so as to make our people better producers, that they may get a larger share of the necessaries, comforts, and luxuries of life for their labor. I think the result will be that we shall get as much of general education as we have had, and at the same time more of the practical.

This Province has already spent a considerable sum in the development of the fruit industry, and a great deal of valuable work has been done. A good deal has been done by this Association—by such meetings as this, by the press reports thereof, by the publication and distribution of your annual report, by the publication of the "Horticulturist," and by holding meetings here and there at various centres to discuss questions pertaining to fruit growing and floriculture. I am inclined to think, however, that they have not yet done so much as they ought in the matter of vegetable gardening. I have not yet heard anything worth listening to on that line. I think it is important that our people should be taught to raise the best quality and the largest quantity of vegetables in the gardens of the country ; and, in my judgment, it would be well if this Association would give the matter a little more attention.

I think that even better work is going to be done under the plan of holding orchard demonstrations in the spring in spraying and pruning and how to care for orchards generally. I would say, go ahead on this line, as I think there is a wide field for very valuable work in this direction.

I am a member of a Board, a very modest Board, that has not said much about what it is doing. I mean the Board which controls the Fruit Experiment Stations of Ontario. We have in this Province what many people regard as the simplest, cheapest, and most effective plan for fruit experimentation that has been devised by this or any other country. We have a Board of five men. The President of the O.A.C. is Chairman, with no pay for his services; the Horticulturist of the O.A.C. is a member of the Board, with a reasonable allowance for visiting stations and reporting on them; and the Fruit Growers' Association contributes three of its most progressive, wide-awake members, whose remuneration consists of their travelling expenses and a per diem allowance for the time spent. What do we do ? We test varieties of fruit, to see what kinds are of value to the people, and to determine which are best adapted to the different localities and different soils. How do we do this? By buying land and supporting experiment stations, and erecting buildings and equipment would have been one way ; but that would have cost a great deal of money. Instead of that, someone wisely suggested another line of action, and said to the Board, "Select in different parts of the Province some well-established fruit growers, who have good orchards already bearing —one in the southwest, with peaches as a specialty, one in the Grimsby region for grapes, one in the Burlington district for small fruits, one somewhere else for apples, and so on through all sections of the Province." We, therefore selected men who already had orchards, and were known to be good workers. We said to them : "We want you to report at once on the trees you now have in your orchards, and take such varieties as we send you and report on them ; and we will give you a small sum per year for your labor." You will see that in this way we got reports on all varieties of fruit that were already growing in different parts of the Province without waiting to

grow trees. We had not to buy the land, and spend money in buildings and large salaries; we utilized what we had, and got valuable results from the beginning.

The second part of our work is to prepare a list of all the fruits grown in the Province, giving a photograph, with a concise, accurate, and thoroughly reliable description of each—such a description as will serve growers and others in coming to a conclusion as to the value and suitability of fruits for different localities. We are using our Secretary to prepare a description of all the fruits grown in the Province. Instalments of that report are being published from year to year. The whole expense for service and all the rest of it has never exceeded $2,600 per year, and we are doing as much work in the way of testing varieties as though we had spent a large sum for land, buildings, and equipment, and were paying $5,000 a year for management.

But there is still a great deal to do in this Province for the advancement of the fruit industry. I want to ask you two or three questions: What about the neglected orchards of this Province—orchards run to grass and weeds? I have travelled through some of the best fruit sections within the last two months, and I confess I have been ashamed for my Province to see orchards running to grass and weeds up to my waist. I have seen this in one of the most public places of this Province—along the Niagara River—to the utter disgrace of the Province; orchards with dead trees standing in them; trees with dead limbs on them—an eyesore; orchards with piles of brush lying among the trees for months or years—I suppose to manure the soil—(laughter)—to the disgrace of the owner and the men of the neighborhood in which he lives. I wish this Association would send a committee through the Province or do something else to reach the men of whom I speak, and make them tidy up their orchards for the credit of the Province, if not for their own benefit. I think the women should deal with their husbands and their boys, and give them no rest until they put their orchards into good shape. If I had an orchard such as I speak of, I would work night and day till the dead trees and dead limbs were removed. There is a good deal yet to be done through the direct agency of the Association, or of the Farmers' Institute, or in some other way to reaching men who are neglecting their orchards all over the Province.

This season has convinced me that the fruit growers are not spraying so much as they ought. A great deal of the fruit this year is badly spotted. It is not all spotted by any means. I could point to some orchards that had just as much rain as all the rest to wash off the spraying mixture, but the trees were sprayed in such a way that the apples were clean and nice. Four-fifths of the snow apples are unfit to put on the table, just because the trees were not sprayed properly. Four out of five men who spray do not half do it. You need to spray from all sides, so as to reach the utmost tip of the farthest limb, or you will not kill the insects or the fungi that you ought to reach. There is a great future for this industry if you will go to work. Take your coats off and cut out the brush. Some people are always asking us how to kill one kind of weed or another, and how to kill this insect and the other. There is just one way to get rid of them—take off your coat and go to work; that is it. You say, "Labor is scarce." Yes, it is, and most of it is not worth much when you get it; but that will not let you out at all, because you have as good a chance for labor as many of your neighbors who have nice orchards. Many men, young and old, spend as much time kicking their heels together in hotels and blacksmith shops as would remedy these things.

I have just read the report of a delegation of fruit men sent out by the Fruit Association of the city of Liverpool. They say that the best fruit belt on the continent of America is on the north side of Lake Erie and Lake Ontario, and not only on the continent of America, but in the world, taking the quality and variety of fruit it produces into consideration.

The President: We are trying to remedy this sort of thing. We have been an educative institution from the time of our inception in 1859, and I think we are making progress. I venture to say that the Province could not have made the showing it did at the great Fairs had it not been for the Fruit Growers' Association.

ADDRESS.

By R. M. Palmer, Freight Rate Commissioner for British Columbia.

I have looked forward for some years to attending a meeting of this Association in order to get some pointers that would be of use in British Columbia. We have a good many settlers from Ontario in that Province, and since the inception of Institute work there we have drawn upon the talent of Ontario for our speakers. Commercial fruit growing in British Columbia is not developed along the line you have been following here, but is patterned more upon the system carried on in California, Oregon, and Washington. I must confess that in commercial fruit growing the Californian leads the world. If I might give this Association a hint, it would be that in developing the commercial interests of fruit growing in Ontario it would be worth while to pay more attention to the methods that have been successful in California and other Pacific Coast States.

But I must confess to having also an ulterior motive in coming here. For many years we in British Columbia have heard that the young bone and sinew of Ontario and other parts of Eastern Canada finds its way to the United States and to Manitoba and the Northwest Territories. Not only do you lose a great many people to the United States, but also those people who have gone to Manitoba and have prospered there, when they want a change of climate, invariably turn their attention to the other extreme and want to go to California. We in British Columbia have a climate that is in many respects better than that of California, and we want more of the bone and sinew to which I have referred in order to develop our Province; if you must lose these young men, we want our proportion of them in British Columbia.

British Columbia has been likened to a sea of mountains; but between these mountains we have valleys—broad stretches of fertile land, some of which are being made use of as pasture land. But the time is coming when these lands will be irrigated on a large scale, and then they will be valuable for fruit growing purposes. We shall then have a large development of the fruit growing industry.

Now, I do not wish to make any inviduous comparisons, but merely to give the facts. I am surprised to learn of the low prices you are receiving this year for your fruit. There must be some reason for this. I hear, for instance, that transportation rates are high, and that commission charges are high, but it is borne in upon my mind that if you really want to realize the profits that rightly belong to you, there is a good deal of work to be done among your people themselves. For the last two years I have been identified with the question of freight on farm products in our Province. We found

that the railway people had their views on the subject, and that the fruit growers and farmers had theirs, and each one blamed the other. After going very carefully into the matter we succeeded in getting from the C. P. R. concessions in rates and in the handling of our products that were of great value indeed. At the same time I am bound to confess that the greatest fault has lain with our own people. When you come to consider this question closely, I think every reasonable man will admit that the interests of a railway corporation and those of the community it serves are very closely bound up together. Where you have a prosperous community, you must have a prosperous transportation company serving that community; so that the two interests are identical. This is the basis on which I would suggest you go to work in this Province. I think that one of the reasons that prices are low in Ontario is that there is something wrong with your system of selling, and that either the fruit is not of so good a quality as it should be, or else it is not properly packed. We have had the same difficulty to contend with in our coast district. On the other hand, in the Okanagan district, where our true commercial orchards are, we do not experience that difficulty, because careful attention has been given to packing and grading, and the methods employed in California have been lived up to. We find that buyers are most anxious to get fruit in that district. At the present time arrangements are being made with buyers as far east as Winnipeg for the whole of the product of that district. In our coast sections we have not yet such a desirable state of affairs. We have greater difficulties of surroundings there, and therefore I can sympathize with you in the troubles you encounter here.

There is a very prevalent impression that, while we can grow large fruit in British Columbia, the quality is not good. This is not the case, however, and I believe the idea has got abroad through the fault of our own people, who, in their efforts to advertise British Columbia, have sent out only the very largest specimens. I do not need to tell you, as practical fruit growers, that with overgrown specimens you invariably have size at the expense of quality. I should also explain that our climate varies very much, being much more humid along the valley of the Fraser, and on the coast generally, than it is in the Okanagan and the valleys of the interior. The quality of the fruit varies correspondingly. Now I wish to say that the fruit I have with me from British Columbia is not only good to look at, but is good to eat, too.

In the early history of fruit growing in our Province almost any kind of package was used for sending fruit to market, and with disastrous results. I remember inspecting a lot of fruit three or four years ago where such was the case. One package, for example, had been repaired with part of a coal oil case, and the lettering on it said that it was "warranted not to explode." But things move pretty fast in the West, and such packing is now altogether a thing of the past. We have gradually got the business into such shape that now all through the country the packages are uniform. We also had trouble in the grading of our fruit. I am sorry to see that you are having the same trouble here. We have to some extent overcome this difficulty. It has got to be that certain brands of fruit upon our markets are a sufficient guarantee of excellence, and there is no necessity to open the package. I am quite sure this will be the case here when the growers adopt this system of packing. We use nothing but the box for packing, and find it has many advantages. Besides, it is handier for the housewife, who is able to use a box of apples before the fruit begins to spoil. Nothing increases consumption so much as to place only choice fruit

upon the market. If you want to encourage the consumption of fruit not only in our own district, but in the outside districts, send nothing to market but the very best of its kind. Make some other use of everything that is not up to standard—evaporate it or turn it into cider or vinegar, or feed it to the hogs, but do not put it on the market.

My main object in coming here is to give information, and also to gain settlers for British Columbia, and it would therefore be unfair for me to take up much of your time this evening.

INSECTS INJURIOUS TO FRUIT.

By Dr. James Fletcher, Central Experimental Farm, Ottawa.

The subject of the control of insect pests in garden and orchard is an exceedingly simple one to those who have studied it. Almost every fruit grower to-day knows that it is necessary to treat his trees and plants for the destruction of insect and fungous pests, and that there are remedies which may be sprayed on the trees, and that these remedies have a sort of mystical effect on their crops; but the general conception of spraying is the turning on of some liquid with a fire hose. Spraying, as a rule, is not well understood by the people of Canada, to whom it is of the greatest concern. Its correct definition would be an operation by which some liquid is placed upon the plant in a spray, or in a vapor, which settles upon the plant, all the little molecules of the liquid being separated from each other. If the spraying is done properly, the nozzle is moved from that part of the plant treated as soon as it is covered. It may be done too densely to be thorough, in which case you merely wash off what you have put on. A great deal of the spraying is not done well through lack of observation and care in choosing the implements with which it is to be performed. The nozzle is of more importance than the pump.

The object of spraying is to prevent loss to the crop. There is no advantage in pruning, planting and cultivating well if the fruit grower does not also know how to protect his crop. Yet the futile question is always being asked, "Does spraying pay?" Does anything pay? Where it has been done with care there is no doubt about it. Then people frequently raise objections like this: I sprayed my trees; yet I have the codling moth. What did you spray with? Bordeaux mixture. Nothing to do with codling moth; but if you use Paris green and Bordeaux mixture you should expect results. Bordeaux mixture is a fungicide; Paris green is an insecticide, that is to say, it is an arsenical poison to destroy insects that eat our fruit. Fortunately for our fruit growers, we can combine these two operations.

I firmly believe that one of the best things for the fruit interests of Canada was the introduction of the San Jose Scale, as it is bound to emphasize the necessity for thorough work in studying and treating insect pests generally. There is better work going on here in regard to that insect than at any other point in the world. The Ontario Department of Agriculture, through its inspector, has achieved better results in this connection than the scientific entomologists and horticulturists of the United States. To-day we are in a position to say that we have a remedy that the orchardist can apply, and can, if he will, protect his trees from this pest.

There are about one hundred injurious insects that annually affect our crops in Canada, and a remedy has been found for 98 per cent. of them. But you cannot do the work without knowing how, and to know how

you must study the habits of the insects. I am thankful I have lived to see the day when some knowledge of natural things is a part of the proper equipment of every boy and girl.

It is also most important that you should have the best materials and the best implements if you want your success to be the best success. The difference between good and bad and the best and the worst, is often merely a matter of a few cents. Never buy a thing merely because it is cheap, as the cheapest often turns out to be by far the dearest. This statement applies with special force to the purchase of seed. Between the best clover seed, for example, and that which is exceedingly bad, the difference in price is but a few cents per pound. Eight cents will pay for poor seed, and twelve cents will pay for good seed. This is a narrow margin, but by planting the poor seed you may bring into your place weeds that may cause damage to the extent of hundreds of dollars.

I find that the oyster-shell bark louse has become very prevalent in our orchards, and is now one of the most injurious insects that we have to fight. The first step taken is not to kill the insect, but to invigorate the tree on which it is found. This is done by proper cultivation and fertilizing. You may then turn to the insect and give it the treatment recommended for it. It is not necessary for me to go into the details of the treatment of this and other pests. A postcard sent either to the Ontario or the Dominion Department of Agriculture will at any time result in having sent to your address bulletins that contain full and accurate information upon these points.

APPLE GROWING IN WESTERN NEW YORK.

By Prof. John Craig, Cornell University, Ithaca, N.Y.

This lecture was intended to emphasize the importance of cover crops and spraying, and was illustrated with lantern slides. One of the views showed the effect of fall rains on orchards that had been kept in cultivation all season and left bare in the fall. The land in this case, having considerable fall to it, was seamed in every direction, and the best of the surface soil washed out. Other views showed in contrast the surface of the orchard well protected with cover crops of clover, buckwheat, vetch, or rape, sown in the middle of July. Not only was the soil prevented from washing by this means, but the roots of the trees were protected against winter frosts, by the subsequent rotting of the growth, a large addition was made to the humus of the soil.

Other illustrations showed how the roots of clover penetrated deep into the soil, and the effect this penetration must have in bringing up nutriment from below, and in breaking up the subsoil.

In speaking of clover crops, Mr. Craig placed the hairy vetch first. Vetch planted early in June caused an addition by the 1st November of 256.1 pounds of nitrogen to every acre on which it was planted. Cow peas gave 52.6 pounds. If you value nitrogen in the form of a commercial fertilizer at 15 cents per pound, it is quite evident that you get your fertilizing material at a very low price when you sow vetch to plow under.

The illustrations dealing with spraying were particularly effective, and showed the great improvements made by the orchardists of New York State in this particular. In some cases gasoline engines were used for operating the pumps. The gasoline engine, said Prof. Craig, when perfected, will prove the ideal system, as it is easily started and readily managed.

Orchardists in New York give their trees lots of room, and make money by doing so. One apple grower in that State had an orchard of Baldwins in which the trees were planted 40 x 40 feet apart. When full grown they were thinned to 60 feet. On this orchard 48,000 gallons of Bordeaux mixture were used, and the crop was sold for $15,000. Out of 10,000 barrels gathered, not over 100 barrels were culls.

SPECIAL METHODS OF CULTIVATION FOR SPECIAL CONDITIONS.

By W. T. Macoun, Horticulturist, Central Experimental Farm, Ottawa.

It is not very many years ago since most Ontario fruit growers were farmers as well. Gradually, however, it was found that on account of injurious insects and fungous diseases, in order to make a success of both farming and fruit growing, it was necessary to either let the orchards look pretty much after themselves and take what was found in them in the autumn, or to pay less attention to the farm and more to the orchard. The result has been that the older farmers have, I believe, been neglecting their old orchards as a rule, and not planting any more trees ; while a large number of the younger men who believed that a good living could be made out of fruit growing alone, have left general farming and are devoting their whole attention to fruit growing. As soon as fruit growing became a special industry it received more attention, and men have devoted their lives to the solution of problems relating to the soil, moisture, plant growth, and kindred subjects, and as a result various systems of orcharding and small fruit culture were tried, and those recommended which were thought to be the best. Up to the present, however, I think that the advice given to fruit growers has been, as a rule, too general, and that in the future more attention should be given to the special conditions which prevail in different districts. In an article in the November number of the "Canadian Horitculturist," called "Contrasts in Methods of Apple Culture," I gave my views on this subject of special culture of apples for special conditions, and should like to repeat them here.

During the early part of September the writer had the opportunity of visiting the Hamilton and Grimsby districts, and of inspecting some of the large apple orchards there, and almost immediately afterwards of travelling more than 350 miles east to Montreal and vicinity, and examining large orchards there also. The contrast in methods was very marked, yet as good fruit was seen at one place as at the other. In the West, clean culture, heavy pruning, and thorough spraying resulted in good fruit. In the East, there was good fruit where the orchard was in sod, the trees lightly pruned, but thoroughly sprayed. Spraying with Bordeaux mixture is necessary everywhere, but methods of pruning and soil culture must be governed by climate. In the West the soil is cultivated principally to conserve moisture. In the East, especially in the Ottawa Valley, this is not usually necessary, as there is sufficient moisture to ensure a thrifty growth and well-developed fruit. In the West, severe pruning invigorates the tree, the result being larger fruit. In the East, there is danger of sun scald from severe pruning, though light pruning is necessary.

In Eastern Ontario and the Province of Quebec protection for the roots in winter is, in the writer's opinion, necessary, and as a rule more important than conservation of moisture. A young, bearing orchard may be ruined by winter-killing if the roots are not protected by grass, sod, or some clover crop. There is no better system of cultivation known for Western Ontario than

clean culture in spring and early summer, followed by a cover crop for winter protection, and for adding humus to the soil. It is doubtful, however, if this system should be recommended without restrictions for all sections. The writer believes that after the young trees are established good results will be obtained, where the trees do not suffer from drouth and where the soil is good, by keeping the orchard in grass or clover all the year round, and mulching the ground with the grass or clover, which should be cut several times during the season. The soil may be top-dressed with manure of other fertilizers as often as is found necessary to maintain its fertility. There is much more likely to be immature wood where the clean culture and cover crop system is adopted than where the trees are in sod, and well ripened wood is very essential in Eastern Ontario and the Province of Quebec.

In the American agricultural and horticultural periodicals there has been much discussion for a year or more over the splendid results obtained by Mr. Grant Hitchings, Onondaga, N.Y., in growing his apple trees in sod and mulching with the cut grass. The fine results obtained by this gentleman has fully justified the discussion on his methods, but it is unfortunate that more prominence has not been given to the special conditions of soil moisture which are said to exist at his place, making apparently an unfair comparison with the general conditions in that part of New York State, which, I believe, are such as require clean culture, to conserve moisture. Mr. Hitchings' results, however, prove that where there is abundant moisture, as in many parts of Eastern Ontario and Quebec, his method may be adopted with good success. At the Central Experimental Farm it has been found that growing clover in the orchards and mulching with it has resulted in a thrifty growth and better fruit, and the writer has seen many orchards in sod producing fine fruit. Every orchardist must, however, study his own conditions, especially those of moisture and soil.

Another fruit which requires special culture for special conditions is the grape. An entirely different system of cultivation is required in Eastern Ontario from that in West and Southwestern Ontario. In the West no protection for the vines is necessary. In the East, unless the vines are laid down and covered with soil, no crop need be expected. On account of this necessary protection, a different system of pruning has to be adopted in order that the vines may be laid down and covered with the least expense. It has been found that the most satisfactory method is a modification of what is known as the High Renewal. In the system we have adopted the vines have two arms which are trained in opposite directions. These arms spring from a stub near the ground, and not more than 18 inches from it. The arms are removed, and new ones left as soon as enough buds are killed or die to leave them unprofitable. If the buds all live, the arms are renewed before they get stiff, as when they are pliant they are much more readily covered. A description of this system may be found in the report of the Central Experimental Farm for 1901. As many as 115 varieties of grapes have ripened at Ottawa in one season, but not this year.

Strawberries can be grown as successfully at Ottawa as in any place in Canada, though the successful wintering of them is uncertain unless protection is given. All that is necessary, however, is a light covering of straw, which prevents much of the alternating thawing and freezing of the soil in winter and early spring, and retards the growth of the plants in spring, so that the blossoms are more likely to escape spring frosts.

Abundant evidence was afforded last spring of the value of this special method for the special conditions we have in the East. The growers in the vicinity of Ottawa who did not cover last winter had very little fruit owing to May frosts, which destroyed the pistils of the flowers. Others uncovered early and suffered as badly. At the Farm we did not uncover, as usual, un-

til there was danger of the plants heating. As a result, only a few of the earliest blooming varieties were injured. There is a great temptation to uncover early, and even not to cover at all, as the fruit ripens earlier, but as the best prices are obtained for our mid-season and late berries this is not necessary. These are some examples of what is meant by special culture for special conditions.

The question, however, to be solved is : Where or under what conditions is one system good and another bad ? The fruit grower may and can get useful information from the Experimental Farms at Guelph and Ottawa, and from the Fruit Experiment Stations, but although the work done at these places is well done and in the right direction, every individual must solve these questions for himself, and he who studies his special conditions well and understands them best and puts into practice the knowledge which he thus gains will, all other things being equal, make the most successful man. As an example of the results of following special methods of culture for special conditions, let me give you an account of a close-planted orchard of Wealthy apple trees at the Central Experimental Farm :

A Close-planted Wealthy Apple Orchard.

In the spring of 1896 there were in the Farm nursery 144 five-year-old Wealthy apple trees which had been used in an experiment. As there was a piece of land available that spring, they were planted out 10 by 10 feet apart, the object being to carry on further experiments with them. Eight of these trees have died, but most of the rest are making thrifty growth, though some of the trees are affected with canker and sunscald. The soil has been kept thoroughly cultivated during the growing season every year since. During the past four years this little orchard has given very good returns, considering the size of the trees, and it promises to be still more profitable. It is doubtful if the trees will need much thinning, as a few of them die every year, letting the light and air into the rest. The soil is a cold, light, sandy loam, and from 1896 up to the autumn of 1901 the only fertilizers applied were 284 pounds of superphosphate, 54 pounds of muriate of potash, and 132 pounds of sulphate of ammonia, the estimated value of which was $6.64.

In the following tables will be found the receipts and expenses for the past four years :

			Per acre.
1899..	Picked 189 gallons ; sold at 10c. gal.	$ 18 90	$ 59 15
1900..	" 455 " " 10c. gal.	45 50	142 39
1901..	" 156 " " 15c. gal.	23 40	73 23
1902..	" 982 " " at $25\frac{24}{37}$c. (Glasgow)	85 41	356 83
	530 " second grade sold at Ottawa at $6\frac{15}{105}$c.	32 55	
1899..	Windfalls, 66 gallons ; sold at 5c. gal.	3 30	10 33
1900..	" 143 " " 5c. gal.	7 15	22 38
1901..	" 224 " " 5c. gal.	11 20	35 05
1902..	" 932½ " " $8\frac{200}{378}$c. gal.	79 60	240 79
		$307 01	$940 15

EXPENSES.

1899-1901.. Estimated expenses per acre for three years, including rent of land, fertilizers, cultivating, spraying, and marketing	$148 80
1902.. 45 tons per acre barnyard manure 50 cents per ton	22 50
Rent of land per acre	3 00
Cultivating and spraying per acre	14 43
Baskets and boxes	120 12
Picking, packing and marketing	145 77
Total expenses	$454 62

Total receipts per acre for four years	$940 15
Total expenses per acre for four years	454 62
Net receipts	$485 53
Average profits per acre per year	$121 38

There were 512 1-2 gallons of small apples which were not sold, of which 119 gallons were among the picked fruit and 393 1-2 gallons among the windfalls.

The reason that there is such a large proportion of windfalls is that the Wealthy apple drops badly, and this was especially the case this year. The windfalls, however, which were sold brought a better price than the second-grade picked apples, and as good prices as picked fruit from other Wealthy trees. There is a great advantage in having a good local market, as the windfalls can be disposed of before they decay. The expenses are all estimated on a very liberal basis. The greatest yield of picked fruit from one tree in 1902 was 16 1-2 gallons, and the greatest yield of windfalls and picked fruit was 34 gallons from the same tree.

It has not been possible to obtain the exact cost of this orchard prior to 1899, but, including rent of land, cost of trees, planting and cultivating, the expenses per acre would be about $150.

When such good returns can be had in a short time from Wealthy apple trees planted 10 feet apart, it is worthy of consideration. Is it not possible that it would be a good practice to have blocks of such early bearing trees of different ages and keep rooting out the older ones when they begin to fail ? The development of this little orchard of Wealthy apple trees will be watched with much interest.

THE STUDY OF THE DEVELOPMENT AND GROWTH OF FRUITING BRANCHES OF OUR COMMON FRUITS.

By Prof. H. L. Hutt, Agricultural College, Guelph.

The speaker produced an apple, and said: This may be termed the finished product towards which the orchardist is aiming. It will be interesting to trace the development of this fruit, starting with the growing of the seed, through the various stages of growth, until the finished product is obtained. If we were to plant one of the seeds of this apple in the ground, under the influence of the sunshine and the moisture of the soil, it would germinate and send a root down into the ground and a stem into the air. The stem would develop leaves in a short time, and we then have all the parts that a tree requires for growth—the root, the stem, and the leaves. The first year the tree will not grow more than eight or ten inches. The following year it will grow from two to three feet high. If we want that tree to produce exactly the same kind of apple as the one from which we took the seed, the nurseryman has to take it in hand, and he secures a bud or graft from the parent tree and inserts it into the seedling.

The young tree grows in two ways—in height and diameter. It will be interesting to note a little more carefully how growth takes place. How does a tree increase in diameter ? To begin with, we have in the ground a root system, from the large main roots to the rootlets and root hairs. These extend as far below as the branches extend above ground. These roots take in the moisture from the soil, containing plant food in solution. This food passes up the roots and through the sap-wood or outer wood of the trunk and branches until it reaches the leaves. The leaves are contrived for spreading out the sap over a wide area, where it is exposed to the action of sunlight. In the leaves a number of changes take place in the sap. Much of the moisture is given off through the leaf pores, and much of the sugar in the sap is converted into starchy matter, and thus becomes ready to enter into the growth

of the tree. After the sap has been thus changed in the leaf, it passes down again through the twigs and branches and trunk until it reaches the roots. In its downward course it passes just underneath the young bark, forming what is known as the cambium layer. This cambium layer, by hardening or drying, forms a new layer of wood on the inside and a new layer of bark on the outside. So that over the whole tree we have a new layer added each year. It is thus that the rings or circles are formed that you see in the cross-section of a branch or trunk of a tree, and by counting them you may find out the age of the branch or tree. That is how the tree increases in thickness. Now for the growth in height. The same flow of sap which goes into the leaves increases the growth at the extremities of the branches, but none of the parts below the top bud increase in length at all. We sometimes hear the question asked, Does a tree trunk (that is, the part below the branches) lengthen ? If the growth takes place at the extremities only, how can the trunk lengthen ? But in the forest we see trees that have trunks forty or fifty feet high. How do they get to be that height if the trunks do not stretch out ? The explanation is that the lower branches have fallen away, and the new growth each year in the diameter of the tree has gradually buried the stubs and knots till they are completely out of sight, and nothing but a smooth surface is presented. But when the lumberman takes the tree and saws it through the centre, you find the knots showing where the branhces have been.

Then, too, people cannot understand why the growth takes place from the downward flow of the sap rather than from the upward flow. How, they ask, does it come about that the bottom of the tree is the larger. We must look on a tree or branch as a stream, where the branches are the tributaries. The more branches, the more material is being sent down to aid in the growth below, so that the part below is necessarily thicker than the part above.

There are two ways we can learn the age of a tree or branch. If we start at the end of the branch and count backwards, we shall see that at the base of every year's growth there is a ring in the bark. If we count these we get the age of that branch. We can also determine the age, as I have said, by cutting the branch in two and counting the number of rings shown in the cross section.

When the tree comes into bearing, it is intersting to study its buds. Before that time all the buds are leaf buds, and every perfect leaf bud is capable of producing a branch. That is one of the most important things to remember. They do not all do so ; but the terminal bud does, and in that way the growth of the branch is extended. Those most likely to produce branches are the ones near the top. Near the base of the year's growth you will find a lot of inactive buds that have been covered more or less by the flow of cambium. Although every bud does not naturally produce a branch, every one can be made to do so by cutting off all the branch above it, and thus giving it a prominent position. It then becomes a terminal bud.

As the trees come into bearing the fruit buds appear. Fruit buds are specialized buds developed primarily from leaf buds. It is one of the strange facts that a leaf bud may produce a branch, or may remain dormant and produce nothing, or it may develop into a fruit bud and produce fruit. This transformation is one of those mysterious changes that goes on so smoothly and imperceptibly that we cannot see it ; we see only the result of it. If we study the question closely we may discern some of the conditions that bring about this transformation. The tree has got to reach a certain stage of maturity before this transformation can take place. A tree of poor soil will

often come into bearing earlier than one on rich soil. If a tree is checked in its growth, it tends to bring about an earlier transformation of the leaf bud into the fruit bud. For example, the Bartlett pear, grown as a standard tree, will be five or six years coming into bearing, but by grafting it on the quince and thus dwarfing it, it will come into bearing in half that time.

How are we to distinguish the leaf bud from the fruit bud ? This may be done by observing the different characteristics. In the cherry, for example, the leaf buds are all sharp pointed, while the fruit bud is much rounder and plumper. The fruit buds, also, begin to swell much earlier in the season, and start into growth more rapidly.

Fruit buds vary also in the way they produce blossom ; some are simple and others are compound buds. The peach or apricot produces just a single flower, but in the cherry, plum, apple, and pear, each bud produces several blossoms—the plum two or three, the cherry three or four, and the apple and pear six or eight.

As the young tree comes into bearing, it develops peculiar branches, or forms of branches, on which the fruit is borne. In the case of the apple and pear, while the tree is young, the fruit is usually produced at the ends of the more vigorous shoots, or at the ends of the branches ; but as the tree matures you will find that other forms of fruit branches are developed. The more important fruit branches on the apple and pear tree are usually known as the fruit spurs. These are short, stunted branches.

Take a branch, starting at the bottom, see if you cannot read its history. All the way back you will find scars showing where it has blossomed or has produced fruit. In the apple and pear the fruit is borne at the extremity of the spur, and growth at the extremity is checked in consequence. The next year a bud just below the extremity produces a short shoot, so that you will find the growth of the fruit spur going zig-zag. In the plum and cherry we have a different kind of fruit spur. Here the blossoms are in a cluster at the end of the spur, and just in the centre of the cluster we will find a leaf bud, which is to extend the growth of the branch ; so that instead of the branch zig-zagging, it grows straight ahead, and you get a straighter spur.

In the peach we have a still different growth. Here there is no fruit spur, strictly speaking. We sometimes find the fruit produced at the end of a little shoot, but it is not a spur. The fruiting wood of the peach is the wood of last season's growth. It is important for the fruit grower to know where to look for the fruit bud in the peach, so that in pruning he may not cut away too much of the bearing part of the branch.

In the grape the fruit is produced on the same season's growth, and the first three joints of that wood will produce the bunches of fruit. Some fruit growers think that if only those three joints produce fruit, there is no use in the rest of the wood beyond that. They forget that the vine is sending sap away to the end of the cane, and that every leaf beyond the grapes is sending back its supply of material to the grapes, so that the more wood you have beyond the bunches the better the growth of the fruit. In pruning the grape we should leave thirty or forty buds of this year's growth from which shoots may be sent out the following spring. If this is done large grapes will be produced. The raspberry is somewhat similar, the fruit being produced from the wood of this season's growth.

In the quince the fruit is produced at the extremities of shoots of the same season's growth. In the currant and gooseberry we have little fruit spurs, something like in the plum, and the fruit is produced from wood of the second and third year's growth.

This is an important subject for the fruit grower. If they would take a branch of their tree and read what nature has written, they would have a much more intelligent idea of how fruit is produced. I have heard fruit growers say : "I have given my trees a heavy pruning this year, and we are going to have a good crop." They forget that the fruit is not produced in one season ; it is not what we do this year that gives us the crop of next year—it is the accumulation of the work of years. It is necessary by proper management to get a good growth of fruit spurs from year to year.

FUNGOUS DISEASES AND INSECT PESTS OF 1902.

By Professor Wm. Lochhead, Ontario Agricultural College, Guelph.

Chief among the apple diseases of the present season has been the Scab. I think that the fruit growers are coming to understand this disease, and to treat it properly. It should be borne in mind, however, that the scab has not only summer spores, which are spread by the wind, but winter spores, that winter over in the dead fruit and leaves, and that, in the following spring, come out and reinfest the young leaves. Cleanliness is, therefore, of the greatest importance at this stage ; it is just as important as spraying is at the first of the season. In the treatment of Scab, I would advise you to spray thoroughly, and early in the season, just when the buds begin to swell. Early treatment is an important factor in the control of this fungous disease—as early as you can get on the ground. In the case of Curl Leaf of peach you should begin spraying one or two weeks before the flower buds open.

Bordeaux mixture and Paris green or arsenic is the most reliable mixture for spraying. The reason why I recommend the use of a poison along with the Bordeaux mixture, which is a fungicide, is to catch the Bud-Worms and the Case-Bearers, which are becoming very numerous, and which are probably doing more injury in many respects than the Codling Moth. They begin work early ; they have great appetites, and they eat the young buds, which are ruined before you are aware of it. The proper time to treat them is when the buds are beginning to unfold. For Codling Moth you should spray immediately after the blossoms have fallen. You should spray again two or three times during the season, both for Scab and Codling Moth.

Another pest to which I desire to call attention is the Woolly Aphis. Alarming reports regarding this insect are coming from many parts of the Province. Woolly Aphids are sucking insects, and the stem forms can be treated readily with kerosene emulsion; but there is another form, which resides on the roots of the tree. It is safe to say that where you see a Woolly Aphis on the limbs there are also some on the roots, and it is the root form that does the chief injury—the formation of gall-like enlargements. In treating them, watch carefully the stock as it comes from the nursery. One of our prominent fruit growers has found by experience that it has paid him over and over to dip the roots of his trees in tobacco liquor before planting them to kill aphis eggs and larvae which winter there. Fumigation will not kill the eggs. Another method of treating the roots is to mulch the soil around the trees with tobacco, so that the rains will carry down the solution among the roots. This may not be feasible in large orchards, but it is feasible where you have a few trees. It is a cheap application, but if the trees are small and you find the aphis on the roots, it is ten times cheaper in the end to uproot the trees altogether, as they will never thrive properly.

Another insect made its appearance lately. In some apples which I received a few days ago from Stayner I found a number of holes. In one apple I counted eleven, some of them half an inch deep. In each of these holes a green grub was found. It works very late in the season, and I do not know the name of it, *and can find no reference to it in literature. It is a saw-fly. It is doing a good deal of damage, and it will be our duty, both at the Experimental Farm at Ottawa and at the College, to study it, and devise some method of treating it.

Next, in regard to the plum: The great disease of the plum is Brown Rot, and it is a difficult one to treat; in fact, I consider it one of the most difficult of orchard diseases to treat successfully. It requires early treatment; nothing but that will do; if you put off too late you will not succeed; and the treatment must be continuous. I think if these conditions are fulfilled, the rot may be controlled. You should use Bordeaux mixture and Paris green, and commence as soon as you can get on the ground. The "mummies" should never be allowed to remain on the tree, because they contain the winter spores, which will spread in the spring just as soon as the temperature is suitable.

Q.: Would winter spraying be effectual?

A.: I would not advise it, because the spores are not ripe till early in the spring, when spraying will destroy the winter form.

Q.: Will the spores spread from the mummies on the ground?

A.: Yes, to be sure—by the wind. My advice would be to gather all the mummy plums in the early winter. I have sometimes seen half the plums allowed to remain on the tree all winter. In such cases, I do not wonder that the spores spread. They will spread not only to your own trees, but to your neighbors'. Such a practice is a menace to the whole country.

Another disease that should be noticed is the Peach Leaf Curl. This may be controlled. I have reported on this in the Canadian Horticulturist. In spraying for Peach Curl, Bordeaux mixture, full strength, may be used when the tree is dormant. After growing begins, it is safer to use it only half strength. As I have already stated, begin spraying two or three weeks before the buds open.

VARIETIES: QUALITY VS. QUANTITY.

By Prof. John Craig, Cornell University, Ithaca, N. Y.

This is a plea for a fuller recognition of the axiomatic principle that it is better to study varieties before the trees are planted, than to accept the dictum of the agent or nurseryman, or follow the custom of the locality, and regret it in after years. A man should first settle with himself the type of fruit he desires to grow. Does he pride himself on the excellence of his product, or is he willing to secure an average price only? Does he wish to create a market of his own, or will he dump his product on the markets of the world? Would he grow for quality or quantity? Are his tastes of the Early Joe and Gravenstein order, or is his palate satisfied with Ben Davis and Gano? Which will give him most pleasure? The next consideration is what can he grow in most perfect condition. As time goes on the finer adaptation of varieties to peculiar sites and soils are becoming more apparent, yet far too little attention has thus far been accorded this feature of fruit growing. Is it not time that our principle orcharding regions were surveyed, so that the character of the soil, the site, aspect, the

* Since this meeting I have found the name—"Taxonus Nigrisoma." (See Coll. Rep. 1902.

varieties, together with a statement of successes and failures, might be recorded, from which to draw deductions for the benefit of future planters. Here is work for the Fruit Experiment Stations. Local experience should be accepted for what it is worth. One must be able to distinguish between real experience and local bias. Some one says this is not a serious matter; if they do not prove to be the right kind, you can easily work them over. (Lockport man.) So you can, but you have lost four or five years by your indifference. Such negligence may spoil a man's chance for profits during his lifetime.

Factors Which Influence the Cultivation of Orchard Fruits.

1. Vigor and productiveness of the variety.
2. Character of tree in nursery.
3. Texture which enables the fruit to be handled and transported with ease.
4. Longevity or natural life of the apple.
5. Appearance, including size and form.
6. Quality, as measured by texture, flavor, and aroma.

The man who would cater to the world's markets—the larger mart—will consider the factors of productiveness and appearance of greater importance than those of quality and texture. On the other hand, should not he who would build up a high class trade, take into account the factors of beauty and flavor?

What kinds of markets are there? At a glance, it is seen that these are of two kinds: (a) the general, (b) the special. In the general, or world's market, quality does not rule. Appearance and stability are the standards by which the commercial value of varieties are judged. Uniformity of product is, in a measure, a guaranty of satisfaction. This market is world-wide, and prices are governed by the law of supply and demand. On the other hand, the special, or restricted, market is the one whose quality is rated at its true value; and where prices are guaged by the desire and financial ability of the purchaser and the marketing astuteness of the seller. The special market will always be a limited one, because a peculiar ability is required to meet its demands, and because the purchaser must belong to the class which can afford to indulge in luxuries. It is to be remembered that this market is capable of being cultivated. The producer may, therefore, enlarge the market by convincing the buyer of the superiority of his wares. (Oswego strawberry grower.) (Niagara grapes.)

What is the Present Trend in Orcharding? Unquestionably, it is overwhelmingly in favor of the low grade, general purpose apple. Superlative productiveness and vigor are usually coupled with mediocrity in quality of fruit. In peaches, the vigorous, handsome Elberta, of medium or poor quality, is being planted by the hundreds of thousands in peach regions. In pears, Kieffer, that lusty representative of a union between Oriental and European races, easily outdistances all competitors in the planting competition. They will handle, they will ship, they will keep. These are the recommendations. So it is with apples. No variety is being planted so extensively as Ben Davis. Not only is this true of the Mississippi Valley States, the natural home of ubiquitous Ben Davis, but it is characteristic of orcharding from Maine and Nova Scotia to Michigan and Mexico. What is to be the effect upon the market of this immense production of low grade fruit? Can we doubt that a just discrimination, based on intrinsic qualities, will not gradually assert itself? Are there not indications at the present day that Ben Davis is finding its level in those markets where a knowledge of its character has been acquired. Writing under date of October 20th, P M. Kiely, of St. Louis, Mo., says:

"We sold Saturday, for instance, the day that showed the largest receipts and lowest prices of the season, a lot of Huntsman's Favorite apples, from J. L. Graff, of Murphysboro, Ill., at $3.50 per barrel. At the same time, really choice Ben Davis was offered at the levee at $1.50. We sold on the same day Grimes' Golden at $2.50 to $2.75, Rome Beauty at $2.00 to $2.50; Willow Twig, $2.25 to $2.50; Jonathan, $2.50 to $2.75; Northern Spy, Missouri Pippin, Gano and similar varieties, $2.00." This is the heart of the Ben Davis country.

Another dealer of Kansas City predicts that long after Mr. Kiely, with himself, has made their entry into the apple orchards of the other world, we will look down upon our brother merchants left behind, and will see them handling apples just the same, and three-fourths of them will be Ben Davis. We will look upon the orchardists setting out new orchards, and three-fourths of them will be Ben Davis! Judge Wellhouse, the apple king of Kansas, however, acknowledges the truth of Mr. Kiely's statement, but says the low prices were a result of peculiar conditions, and that Ben Davis and Gano are still the most profitable varieties. Secretary L. A. Goodman, of the Missouri Horticultural Society, reaches the core of the matter, to my mind, when he says that the Ben Davis of the Ozarks is not the Ben Davis of the north and east. Ben Davis is a variety that requires sun and heat to mellow, produce flavor and add juice. In the average of seasons I do not believe that this can be done in the best apple growing sections of Ontario. I do not believe that we should try to grow the apple that cannot be grown to the same degree of perfection as elsewhere when we can grow something else better. It is true that Ben Davis of large size and handsome appearance can be and is produced in Ontario; nevertheless, the proof of this pudding is distinctly in the eating. Compare this Ontario specimen with a well grown Ozark representative, and it is not difficult to realize that the Ontario individual is outclassed. But how can you turn the tables with crisp Spy, juicy King, and aromatic McIntosh! It is a matter of environment, and why not recognize it. Compare the flavor of a Concord grape, handsome, large, as it is possible to grow it in favorable seasons at Ottawa, with that found under the limestone escarpment of Southern Ontario or on the gravelly reaches of southwestern Lake Erie. Both look equally tempting, but oh, the difference in quality! Concord is a favorite table grape of mine when I can get it from the place of my own selection. The question, therefore, hinges largely on the factor of adaptation. Let us find the place where each variety reaches its highest state of perfection, and then cultivate our natural advantages. It is much better to do this than to try and adapt or acclimate a foreigner of uncertain qualities and attainments. This brings me back to one of the first principles enumerated, viz.: that as time goes on, quality, as influenced by local environments, will receive an increasing meed of consideration at the hands of purchasers and consumers.

Varieties to Plant: My recommendations would be of little value to you, because each one is more or less influenced by a personal bias. By all means in growing fruit grow your favorites, because I think a man might as well grow something he likes as well as something he does not like. These likes are very strong at times. I knew a man once who had such an antipathy for soft maples that he said he could not sleep if one grew near his bed. Looking at the fruit of the apple from the standpoint of quality and general external appearance, it is possible to throw them by a natural method of classification into more or less coherent and consistent groups. This is the field of systematic pomology. For instance:

1. Ben Davis group might contain Gano, Black, Ben Davis, and Beach.

2. The Fameuse Group would contain McIntosh, Shiawassie, Princess Louise, Scarlet Pippin, etc.
3. Blenheim Group: Hubbardston, Ribston and Sutton.
4. Newton Group: Green and Peck's Pleasant, and perhaps Greening.
5. Spy Group: Ontario, Wagener.
6. Winesap Group: Stayman, Paragon, Arkansas.
7. Rome Beauty Group: Salome.
8. Alexander Group: a number of Russians and Wolf River.
9. Russet Group: Roxbury, Golden, Pomme Grise, etc.

Each of these groups of apples has certain more or less well marked characteristics which separate it from the others. These characters are intimately associated with definite climatic conditions. A knowledge, therefore, of these group characters, coupled with a knowledge of the place where the members of the group reach their highest degree of perfection, may be used to guide the intending planter. For instance, members of the Fameuse group are natives of the western portion of the St. Lawrence region in Quebec and Ontario. They reach the acme of their excellence on the islands of Lake Champlain and along the St. Lawrence. The relatively cool summer of this region brings out the handsome color, gives sprightliness to the flavor, and prolongs the keeping quality. In Southern Ontario and Western New York, Fameuse and McIntosh are rated as fall apples; neither are they as highly colored nor as crisp in texture.

Again, let us consider the Blenheim group, which we may say includes Ribston and Hubbardston. Ribston is native of the cool, equable climate of England. It is not strange, therefore, to find it a favored variety in Nova Scotia, while it hardly has a place in the commercial lists of Ontario. As we pass from the coast to the interior, the climatic conditions become less favorable for the development of its peculiar qualities; so it is also with Blenheim, and to a less extent with Hubbardston, possibly because the last named is a native of Massachusetts.

Returning again to apple products of our own country, we may cite the Ben Davis group, including Gano and Black Ben Davis. These are products of the middle west. To strengthen my contention, that locality has much to do with quality, I have but to draw attention to Downing's estimate of Ben Davis, based on specimens grown in the southwest. "Good, to very good!" he says, and he was usually conservative. I am safe in saying that it would be difficult to find confirmation of that opinion by a committee of Ontario experts passing judgment on Ontario grown Ben Davis at this meeting. (Mo. B. D. at Ames.)

A few years ago the Russian apple occupied a prominent place in the pomological stage. Great things were expected. The vast north was to be shorn of its ill repute as an inhospitable home for the apple. The fever has passed; a few varieties have been added to our list of early summer and fall varieties, and none to our list of reliable winter sorts. The impress of environment was upon these apples. They came from a region having a short, hot growing season, and when they had received their accustomed amount of heat in the new country, they ripened, whether the fruit grower desired it or not. Much good will come from this importation eventually, but in the mixed offspring is our hope, and not in the pure blood foreigner. Have I made my point clear? Local adaptations in the production of fruit of the highest excellence is worthy of our most thoughtful study. These problems are being studied by your Provincial experiment stations with a thoroughness which, so far as my knowledge goes, has no parallel in the fruit growing world of North America. It has been a pleasure to me to see their in-

fluence for the good of horticulture grow and develop; it is a source of the keenest personal gratification to look over the reports of this Association of nearly a decade ago, and find that I was permitted to lend a helping hand in the organization of these now powerful factors in the educational work of the Association.

CONTROLLING SOIL MOISTURE IN THE ORCHARD.

By Prof. J. B. Reynolds, Ontario Agricultural College, Guelph.

In dealing with this subject, I shall present it under a number of heads, which you may enlarge from your own experience.

First, Preparation of the Land : Before planting the orchard it is necessary to prepare the land properly, and as you are all planting or replanting from time to time, I think that a few remarks under this head will be opportune. You must get the land into proper shape, and if possible, permanent shape, before the trees are planted. With this in view, the first step necessary is drainage. If the land is already naturally underdrained, then artificial underdraining is unnecessary, but it must be seen to, that there is good drainage—natural or artificial. The second point in the preparation of the land is deep cultivation. If the land is stirred and loosened up before the trees are planted, the roots are encouraged to go deep, rather than run along just below the surface, and they will feed from safer regions of the soil. This loosening of the subsoil is specially necessary where you have a heavy soil.

After the trees are planted, there are various methods of treating the land. One method is to put the orchard down to permanent sod. The advantage of that is very obvious—it is, perhaps, the easiest method of disposing of orchard land. I do not think that sodding an orchard is to be universally condemned; it depends upon the locality. There are, I am satisfied, some localities even in Ontario, where sod, so far as soil moisture is concerned, is good rather than otherwise. We must not forget that we have a wide difference even in Ontario as regards rainfall. The average rainfall at Toronto is about 31 inches ; at Guelph it is 28 inches ; at Port Arthur it is 24 inches. East of Toronto, at Montreal, it is 38 inches. So that as we go westward from the eastern part of Ontario till we reach the extreme west, the rainfall diminishes. It does not always follow the westward movement, however, but, as you would naturally expect, the rainfall around the shores of the Great Lakes is higher than in the interior. This probably accounts for the fact that in those sections—lake and river shores—we have a climate more suitable for the production of fruit. I am told that east of Toronto the sodding of orchards is not generally unfavorable to the yield of fruit. I believe that west of Toronto, taking Toronto as an arbitrary point of division, sodding of the orchard is rather objectionable from the point of view of moisture. Of course, grass in the orchard has the same effect as a number of pumps in the land, pumping the water out of it, and it is a question whether or not we can afford that withdrawing of the moisture from the land. I believe I am right that in this part of the country—in the interior of western Ontario—apples do not keep so well late in the winter as apples grown east of Toronto, in the neighborhood of Brighton and Belleville. The reason is, we allow the moisture in the soil in the western part—where moisture is less plentiful—to diminish so much that the apples ripen earlier in the season, and, therefore, what is a late fall or

winter apple in the east, is a much earlier apple with us in the west. We can prevent that early ripening by keeping the moisture in the soil longer; and therefore sodding of the orchard cannot be approved in parts of the country where moisture is scarce.

Of cropping we may say much the same thing. The orchard may be profitably cropped, first, if the soil is rich enough to stand it, in which case it may be a good thing; and secondly, if moisture is plentiful enough; so that cropping also is largely a question of the local climate. It appears to me that, subject to the exceptions mentioned, the safest plan is not to sod an orchard nor to crop it, in the ordinary sense, but to use a cover crop. Let me mention briefly the advantages of a cover crop. By "cover crop" we mean a crop sown late in the summer, or early in the fall, allowed to remain as a cover or protection to the land during the winter, and plowed down the following spring. First, especially if it is a crop that winters over, it enables you to plow down and cultivate in the spring a little earlier, because the living crop dries the land out. After the early plowing, there remains bare cultivation for the summer, which enables you to conserve the moisture at that part of the year when it is most needed. We must be guided entirely by the conditions of the season as to how soon to plant the cover crop in the fall. If the season is moist, and likely to continue so, the cover crop may be sown much earlier, because under such conditions we can sooner afford the loss of moisture from the soil. In California, where they have to irrigate, and where they grow sugar beets, when they want to ripen the beets in the late fall they irrigate the land—wash it all over—and that dries out the soil and ripens the crop. That looks like a paradox, but it is the practice followed in that country. The reason for the success of the practice is that the irrigation water does not penetrate more than a few inches into the soil, but it destroys the surface mulch, starts the capilliary movement of the ground water upwards, and thus encourages evaporation, so that the land is dried indirectly by this irrigation. So if we want to dry out the land and ripen our crop of apples and also the new wood, we may do it by stopping cultivation and still further by planting a cover crop. Further, the cover crop affords opportunity to cultivate, thus keeping the land of a proper texture. We do not yet, with all our knowledge of the soil, sufficiently appreciate the necessity of good texture in the soil—of having it in the right physical condition. That texture cannot be got without proper cultivation.

With regard to spring and summer cultivation, that must be done according to the kind of soil we are cultivating. The heavy clay soil must be loosened up as much and as often as possible. On the other hand, the sandy subsoil may require to be compacted, in order to prevent loss of soil water by percolation. Therefore, I should say, for heavy clay soils occasional deep cultivation, with shallow cultivation in summer, for sandy soils, continuous shallow cultivation. That is as near as one can get to a general rule.

Q.: How about injury to the roots in deep cultivation ?

A.: If the land has been properly handled before the trees are planted, the roots will be well out of the road of even the deepest cultivation. Even then, root pruning, if not excessive, is not objectionable, but rather an advantage than otherwise.

Mr. W. T. Macoun, Central Experimental Farm : I should like to caution the Institute speakers about recommending certain systems of culture, and of conducting fruit plantations without studying well the conditions of climate, soil, etc. Our climate in the east is very different from yours. For instance, with regard to the clean cultivation of orchards to which Prof. Reynolds referred, if the Institute speakers were to come east and recommend clean culti-

vation, without impressing on the people that they must have a good cover for their orchards in the autumn, there might come a severe winter, and the chances are the orchards would be cleaned out from root killing. It is somewhat difficult sometimes to get a good cover crop, and I believe it is wiser in the east to recommend sod culture, because as a rule the general fruit grower cannot keep in mind all the principles that must be observed, and would be very likely to cultivate and not use cover crops. In fourteen years' experience at the Experimental Farm we have never suffered from drouth, and I, therefore, conclude it would be wiser to recommend sod with top dressing of the sod rather than clean cultivation and cover crops.

REPORT OF COMMITTEE ON SAN JOSE SCALE.

By George E. Fisher, Provincial Scale Inspector.

In speaking to an audience at Walkerton, where the San Jose scale is not known to exist, I think it may be well to refer briefly to its life history and general behavior on the trees, and to some of the other scales. There are about eight or ten different scales that have become sufficiently plentiful to be injurious to our fruit trees. They are divided into two classes, the armoured and the unarmoured. These are again sub-divided into those that reproduce by eggs, and those that bring forth living young.

The Oyster-shell Bark Louse, the Scurfy Bark Louse, and the New York Plum Scale reproduce by eggs, and are single-brooded. Then we have the Putnam, the Ostreaeformis or Curtis Scale, the Cherry or Forbes Scale, and the White Rose Scale. These are multi-brooded, and also reproduced by eggs.

The San Jose Scale, however, is distinct from either class. It lays no eggs at any time of year, but gives birth to living young, and for this reason is more susceptible to treatment than the egg-laying scales, it being difficult to destroy the vitality of eggs. The color of the larva is a bright lemon yellow, which makes it easily discernible to the naked eye. They are sometimes so plentiful that badly infested trees have a yellowish appearance. When the young larva has found a suitable place to settle, it inserts its threadlike beak through the bark into the juicy tissues beneath. In the course of their growth, the males moult twice and mature in 24 days, after which they have a second period of liberty ; after they fix, the females never move again, moult three times, and mature in 30 days. At about 35 days they are giving birth to young, and continue to do so for a period of six or seven weeks. You see, therefore, that the young of the first brood will be giving birth to young themselves before their mother has completed her brood. This accounts for the Scale being present at all times of the year in all conditions of development, except, of course, in the winter, when there are no larvae running.

There is one point in regard to the appearance of the San Jose Scale that I should like to bring particularly to your attention in order that you may be better able to recognize it. When the larvae fix, they throw out a waxy secretion from the pores of their bodies, which forms a covering or scale. The first condition of this cover scale is white, then greyish, shading off gradually into black by the time the insect has reached the half grown stage. On the top of the cover-scale there is formed a deeply corrugated ring, having a distinct nipple in the centre. You will find this ring in connection with other scales, but it is not nearly so deeply cut. The San Jose Scale also has the quality of distributing itself over the tree. Wide distribution and a very distinct nipple and ring are characteristics which clearly indicate the species.

With regard to the spread of the scale in Ontario, I think the conditions of the country are very similar to what they were a year ago. I have not heard of the existence of the scale at any new points. Yet, in sections where it has become established, the destruction has been very great indeed, greater than was anticipated by most people, because it was supposed that the cold season would interfere with its increase and distribution ; but it does not seem to have had much effect. The winter was mild, and the scale came through with little loss. Only the weak scales are killed by the winter ; that is, the little ones that are not sufficiently advanced, and the females that are developing young.

The feeling of indifference that seemed to have hold of the people at the beginning of the inspection has almost entirely gone. There is no such thing as ridicule any more, and most of those who are interested in orchards are disposed to take up the fight. I have considerable correspondence with those who are anxious to know exactly what should be done, which is a very encouraging feature. As soon as it became known that it was not practicable to exterminate the scale by the destruction of infested trees, we set about finding remedies. Whale oil soap was used. Crude petroleum, diluted and undiluted, with and without soap. Applied with a combination emulsion pump, and in the form of a prepared emulsion applied with an ordinary pump. Lime and sulphur, with and without salt, in proportions varying from one-half pound of lime and one-quarter pound of sulphur to two pounds of lime and two-thirds of a pound of sulphur to the gallon of wash. Fumigation with hydrocyanic acid gas and several other remedies during winter. For summer treatments we used crude petroleum emulsion and kerosene emulsion. Whale oil soap is a good remedy, but expensive. It is a rather mild remedy, and not likely to do any harm to the tree if applied during the last two weeks in April, but if used in the winter before the frosts are over, it will destroy the blossom buds.

Crude petroleum is much more fatal to the scale than soap, and may be used to good advantage on trees that will resist it. If used undiluted, it should be applied with a fine nozzle having an opening not larger than 1-30th to 1-40th of an inch in diameter. The effect of soap is to lessen the severity of oil treatment. We also experimented with an emulsion of crude petroleum and soap, and found that it makes a splendid remedy. The formula for winter use is 1 gallon crude petroleum, 2 1-2 pounds whale oil soap, and water enough to make 5 gallons. This gives one-half pound of soap to the gallon, and 20 per cent. of oil, or 1 in 5, and 1 in 10 is strong enough for foliage. It is much more trying to the foliage than kerosene emulsion. I think the danger from the use of crude petroleum is too great to recommend its use on peach trees.

Two years ago we began to make experiments with lime, sulphur, and salt. This remedy is very popular in California, but was condemned in the east on account of the heavier rainfall. We used it with and without salt, and secured the best results where no salt was used. This mixture has given very satisfactory results, and has the advantage of being cheaper than any other remedy. I think I may say of it that it is cheaper, safer, more effective, and with the application of steam in its preparation is more easily prepared than any other remedy. The formula found most useful is one pound of lime and one-half pound of sulphur to the gallon of wash. I must, however, point out that its efficiency depends on its being sufficiently cooked. The difficulty lies in dissolving the sulphur. This may be done by boiling in a kettle, which is too slow for a large orchard. The method of cooking that has been adopted lately is to utilize steam from ordinary threshing engines, which serves

the purpose admirably. There are two lines of inch pipe which convey steam and cold water to each of a row of barrels, where they are controlled by stop-cocks. The barrels are filled one-quarter full with cold water and the steam turned on, say, four barrels at first. With eighty pounds of steam pressure these will be boiling in five minutes. The steam is then turned on four more barrels and off the first four, into which the lime and sulphur are introduced as rapidly as is possible without causing them to boil over. When the lime is all in and slaked, steam is again turned on, and a small stream of cold water sufficient to fill the barrels in the course of two hours' cooking. In this way the mixture can be applied faster than it is likely to be used. The mixture must not be allowed to become cold before being applied to the trees, as the materials in it apparently crystallize and cannot be redissolved. One great advantage of this mixture is that the lime leaves the trees white after they have been treated, and it is very easy to observe whether any part of the tree has been missed, and if so to go over these spots again.

With regard to summer treatment, I may say we had difficulty in finding a remedy that would destroy the scale without injuring the foliage. We tried a great variety of treatments, and found that kerosene emulsion fills the bill well, and that the cheaper grade of Canada kerosene is better than the more expensive grade. The formula we recommend is one part of kerosene in six parts of emulsion for apple, pear and plum, and one in seven for peach, emulsified with whale oil soap in the proportion of half a pound to each gallon of kerosene. The proper preparation of the emulsion is very important. We found the best way to get a good emulsion is to dissolve the soap in half as much water as oil used, and bring them to a boil. Throw the boiling soap and water into a barrel over the oil, and churn violently for five minutes, then slowly, while the quantity is being increased with cold water. Soft water is best for emulsions.

The weather should be dry and clear when this emulsion is used. It should be weather that will evaporate the oil quickly. We have had decidedly the best results when the weather was hot and dry ; the dryer and hotter the better. We have also had very good results, when the weather was favorable, with one part of crude petroleum in ten parts of emulsion ; crude petroleum, however, is more liable to injure the foliage than kerosene.

Fumigation with hydrocyanic acid gas is looked upon by most people as being too complicated a method to be practicable. If I had an infested orchard of small trees that was sufficiently isolated to be relieved from the danger of reinfestation from outside, I should consider fumigation a most excellent process for getting rid of the scale. It is so important to destroy the last one that remains to reinfest the tree. Fumigation, if properly done, will, in my judgment, reach that last scale. We fumigated some trees last winter when the temperature was away below zero, when it is supposed the scale is in a dormant condition, and there is no breathing, but I have concluded there is no time when they do not breathe more or less, and, therefore, are in some degree susceptible to the gas. We used cyanide in the proportion of 20, 30, 40 and 50 hundredths of a gramme to the cubic foot enclosed, giving an exposure of three-quarters of an hour. When spring opened we found no live scale on any of these trees except those treated with 25-100's the proportion generally used for fumigating nursery stock, which is entirely effective at the season of the year when this work is done. In July we treated some stock trees in the day time without injuring the foliage, using one-seventh of a gramme of cyanide, and giving twenty minutes exposure, with apparently perfect results in killing the scale. All this would seem to indicate that

the scale is more susceptible to gas treatment when it is active than when dormant, and the more active it is the more susceptible. We think this is true with any treatment.

In regard to nursery fumigation, I have reason to believe that if it is carefully attended to it is effective, and, further, that it is carefully attended to at all important points, as it is under the supervision of a man appointed by the Department to look after it.

Q.: Can you tell us at what degree of frost the scale is destroyed ?

A.: In my judgment it will live wherever fruit trees will live. It winters successfully in St. Paul, Minn., where they have it forty below zero.

Q.: Will lime and sulphur clean up a tree as well as whale oil soap ?

A.: Yes ; very much better, and kill the scale better.

Q.: What about its effect on Curl Leaf?

A.: It is one of the special treatments for Curl Leaf in California. It is also an acknowledged remedy for mildew.

Q.: Did you ever try tobacco water ? In the Leamington district this wash is considered one of the best preventives of insect attacks. Tobacco grows in our section, and we get the stems for nothing. They are steeped in hot water for an hour, and then diluted in the proportion of one pound of stems to the gallon of water. The mixture will not hurt melon vines, but it kills the lice. The stems could probably be delivered at outside points for $10 per ton.

A.: I have only used tobacco in destroying the aphis.

Q.: Have you had any experience with lime and sulphur in the combined form ready to be dissolved in hot water ?

A.: No. The material requires boiling for two hours, and to be used before its cools ; otherwse it crystallizes, and cannot be restored to its original condition by hot water.

Mr. Macoun : Have you tried lime alone again ?

A.: No.

Mr. Macoun : I thought that two years ago you made some experiments with lime. We found lime a perfect remedy for the oyster-shell bark louse. I think that good fresh lime applied hot would be worth trying.

Mr. Fisher : I think that perhaps the investigations into the results of the work done at that time were not sufficient. On examination we found the female scale still alive, and concluded that the remedy was a failure. But a little later on, when the breeding season commenced, we found that while the trees that had not been treated were swarming with larvae, no larvae could be found on the treated trees. The mothers were there in a fat and healthy condition, but under the microscope they showed not a single larvae and contained no young. Now we know that in the over-winter brood there are three or four times as many males as females. We know further that later in the season the female has in herself the power of reproduction, but at the beginning of the season the fact that there are so many more males than females would seem to indicate the necessity for a very perfect fertilization of the females early in the season. It was evident in the case in point that the males had been destroyed by the treatment, while the females had escaped. The reason for this is that the females are protected beneath the incrustation of several generations.

W. H. Bunting, St. Catharines : Mr. Fisher has gone into the details of his work in the last few years, and I think that as fruit growers the thanks of every member of this Association is certainly due to the Department of Agriculture for the earnest effort they have made to assist us in this difficulty. We have now reached a stage in the work that has passed that of experi-

ment, and the Inspector has succeeded in demonstrating to a very great extent the efficacy of the lime and sulphur treatment. All these other treatments and remedies are beneficial, and we have advocates of them all in the different districts. One objection to whale oil soap is its expense. So long as the Department could come to the assistance of the grower and pay part of the cost, it was not felt to be such a burden, but now that we are thrown upon our own resources it is a different matter. In crude oil there is danger, as Mr. Fisher has stated, to certain classes of trees. When we come to lime and sulphur, we find that it is a safe and cheap treatment, and one that indicates from the white appearance of the trees whether the work has been performed thoroughly or not. I think this is a very important point, because unless the scale is covered with the preparation used, destruction will not result.

What are we going to do about this matter? We have the scale with us in some sections, and whether it is on our trees or not we are all interested. Unless determined efforts are made to combat it, sooner or later the pest will have obtained a foothold in all our orchards, and they will be of much lessened market value in consequence. We have had great help from the Department, but I do not know to what extent it will be continued; and it seems to me that we should now unite and co-operate to provide the material and get it on the trees in the most effective manner possible. The idea of co-operation is the one thing I wish to bring out. We all have an interest in the matter, and must be up and doing if we are to control this scale.

Mr. Creelman: The scale question is one of the most difficult the Department has ever had to contend with. Mr. Fisher has labored hard in its extermination, and yet we have it. We want to bring all the facts from this and other countries to bear and endeavor to help Mr. Fisher and the Department. I see it is stated in British Columbia that lime and sulphur can be obtained in the combined form. You will realize what an immense amount of work would be involved in boiling the mixture in a kettle for two hours. Mr. Fisher has solved this to some extent by employing the steam from a threshing engine for this purpose. I should like to ask Mr. Palmer the experience of British Columbia with the remedy in its combined form.

Mr. R. M. Palmer, Freight Rate Commissioner for British Columbia: My experience leads me to believe that the conditions have to be carefully studied in each district before you are safe in arriving at conclusions. After examining the conditions in California and Oregon and the methods adopted there, we were satisfied to adopt them in British Columbia. I am glad to tell you that although we have very little trouble with the scale there, we have found that the use of this wash has been followed by the very best results in our orchards. When they first began to use the remedy in Oregon, they found the same difficulty in dissolving the sulphur, but finally hit upon a combination in a solid form. We imported a quantity of this mixture, and it was found entirely satisfactory. We afterwards induced one of our manufacturers to prepare the material, and this was done under the superintendence of the Board of Horticulture, so that we were assured that it was properly made. I do not know to what extent it could be adopted here, as the conditions may be different.

The greatest danger with the San Jose Scale or any other insect pest is from the man who has only a few trees. He takes the greatest amount of looking after. The large grower, on the other hand, will usually avail himself of every means to rid his orchard of these pests. We have found the best results to follow the use of freshly made mixture, so that although you can make a solid form, it should not be kept too long before it is applied.

Q.: Do you apply hot ?

A.: Yes ; in making the solution from the solid form, hot water is used ; usually boiling water. I notice that you omit the salt from your mixture. As we understand it, the use of salt is to cause the mixture to adhere to the trees. I do not think it has any other value.

Mr. Fisher : What is the object in that ? I understand that in Southern California they have discarded the use of salt.

Q.: Do they use copper sulphate in their wash in Oregon ?

Mr. Palmer : They have another formula which contains it. This has given better results in some districts. We find that lime, sulphur, and salt is of decided value against fungous diseases where we have no scale at all.

Mr. Fisher : Do you understand the method of preparing the lime and sulphur in solid form ?

Mr. Palmer : To a certain extent. The principle of it is this : The mixture is made in a steam jacketed vat, such as you find in soap works, and the water is evaporated from it.

Q.: Have you the San Jose Scale in British Columbia, and have you the Codling Moth ? If so, to what extent ?

Mr. Palmer : We had some cases of scale, but not during the last three years ; in every case the infested area has been destroyed. In regard to the Codling Moth, we have endeavored to prevent its introduction by a system of inspection.

REPORT OF COMMITTEE ON NEW FRUITS.

By Professor H. L. Hutt, Horticulturist, Agricultural College, Guelph.

For the benefit of those present who may not be familiar with the work of the New Fruits' Committee, I may say that this is one of the standing committees of this Association. The members of the Committee are : Mr. L. Woolverton, Editor of the "Canadian Horticulturist," and Secretary of the Board of Control of the Ontario Fruit Experiment Stations ; Mr. W. T. Macoun, Horticulturist at the Experimental Farm, Ottawa ; and your humble servant, the Horticulturist at the Ontario Agricultural College, Guelph.

The duty of this Committee is to receive samples, take note of, and report upon all of the promising seedlings or new varieties of fruits which are from time to time making their appearance in various parts of the country.

Our duty is not to report on the merits or demerits of those new varieties which have already received the distinction of a name and a place in the nurseryman's catalogue ; to test and report upon them is the work of the Fruit Experiment Stations ; but it is, as we understand it, to introduce to the public those new varieties which have not yet had such distinction, and to recommend for further trial such as are likely to be worthy of propagation.

At the last meeting of the Board of Control of the Ontario Fruit Experiment Stations, it was decided that all such new varieties as are recommended by this Committee as worthy of trial, should be obtained for testing at one or more of the Fruit Experiment Stations. This, we think, is desirable for two reasons : First, because it will guard against the loss of any new variety ; and, second, it will afford a thorough test for each kind before it can be offered to the public, and thus guard against worthless varieties being distributed which never should have been propagated.

In this connection, as in the past, we intend to be very careful about recommending for further propagation any new variety unless it has some

quality or qualities likely to make it more valuable than the many named varieties now under cultivation. What we need now in most classes of fruits is, not more varieties, but fewer varieties and better quality.

At the request of some of the members of our Association, we made an attempt a couple of years ago to get some information regarding new varieties which originated in the United States, but all our inquiries met with little or no reply. Since then we have been considering the question, and we have decided that for several reasons it will be just as well for us to confine our attention to the seedlings of our own country. In the first place, we are more likely to find among these something of value for our own country ; for, as a rule, varieties are of most value near where they originate. And in the next place, we may rest assured that if our American cousins do find something of value, we will not be long in hearing about it. The first thing for us to do in such a case would be to give it a fair trial at one or more of our Experiment Stations.

The following are the most important seedlings which have been brought to our notice during the past season :

Seedling Apples.

There is already such an extensive list of varieties of apples under cultivation, and the season is so well covered by good varieties from early to late, that it would be a mistake to recommend for propagation any new variety unless it possesses some good quality in a marked degree over those varieties now under cultivation.

Samples of twenty-four seedling apples were received by our Committee, only half of which are mentioned below, and only one of these is deemed worthy of further test.

No. 1. From James Blair, Aberfoyle, Ont.:

A medium-sized green apple, with a red cheek ; something like a Rhode Island Greening. The tree is said to be very productive, and the fruit keeps as long as the Greening.

A good apple, but in no way superior to Greening.

No. 2. From T. G. Allanby, Galt, Ont.:

A modern-sized, handsome fall apple, a little like Maiden's Blush, but having a much deeper cavity and basin. The quality is fair, but not enough better than Maiden's Blush to make it worthy of propagation.

No. 3. From Geo. P. McNish. Lyn, Ont.:

A large, white fall apple, having a crisp, white, juicy flesh and pleasant sub-acid flavor. Would make a nice dessert apple for home use, but would be too tender in the skin to be of any value commercially.

No. 4. From Peter Dunbar, Guelph, Ont.:

A medium-sized, yellow summer apple ; but not so good as Primate or Yellow Transparent.

No. 5. From C. A. Cass, L'Orignal, Ont.:

A large, handsome red apple, of good quality ; in season about September. The tree is said to be "a wonderful bearer," and is loaded nearly every year. Mr. Macoun thinks this might prove an acquisition, coming in between Duchess and Wealthy.

No. 6. From J. P. Cockburn, Gravenhurst, Ont.:

In all respects so much like Duchess that it would be useless to give it any other name.

No. 7. From Thos. Beall, Lindsay, Ont.:

A large, roundish, conical apple, somewhat angular. Stem short and stout, in a deep cavity ; calyx open in a deep basin. Color yellow, washed with

orange and purplish red, mostly on sunny side. Flesh yellow, tender, juicy. Flavor rich, pleasant, sub-acid ; quality very good. Season, September and October. Tree said to have been bearing five or six years.

Mr. Macoun says : This apple is quite promising, and well worthy of being given a thorough test.

No. 8. From C. L. Stephens, Orillia, Ont.:

A medium-sized apple of yellowish green color, well splashed and washed with deep red. Evidently a seedling of Fameuse, as it resembles that variety in several particulars ; but it is in no respect superior to it.

No. 9. From Mr. Marr, Simcoe, Ont.:

A large, coarse, greenish-yellow apple, with bronze cheek, in season about October. Too coarse for dessert, and not long enough keeper to be of value.

No. 10. From J. R. Ballantyne, Ottawa, Ont.:

A very large, red fall apple, but not sufficiently promising to make it worthy of propagation.

No. 11. From F. Birch, Wode House, Ont.:

A seedling from the Fameuse, pale green in color, with a bronzy or dull red cheek ; flesh, like its parent, white, and of good quality, but not worth propagating when compared with Fameuse or McIntosh.

No. 12. From T. W. Gibbs, Bracebridge, Ont.:

A medium-sized, pale green apple, splashed and streaked with purplish red ; of fair quality, and something of a Fameuse flavor. In season about September, but not sufficiently valuable to take the place of Duchess or Fameuse.

Seedling Pear.

The number of varieties of pears in cultivation in this country is not so great, but there is room for a few more good varieties, particularly those which have greater hardiness, and also those having fruit of greater keeping quality.

In our report last year, we mentioned a promising seedling pear raised by Mr. E. C. Beman, Newcastle, Ont. This is a large, handsome pear, somewhat resembling Sheldon ; but I hesitated about recommending it last year because the texture and quality were hardly what I thought they should be in a variety, if it was to be added to the list now in cultivation. As Mr. Woolverton and Mr. Macoun both spoke well of the quality of the specimens they sampled, I concluded I might have tested those sent me a little too early, so I asked Mr. Beman to send me another lot this year. This he did on the 23rd of November, just one month later than last year. In the letter accompanying them he says : "I have kept them as long as I thought advisable. They are now in about right condition for eating. I think probably you did not let them get soft enough last year. They will get very soft, without rotting at the core, which is one good quality they possess." After trying these again this year, I can say that when they are kept long enough the texture becomes as melting or buttery as could be desired ; but as regards the quality, I think Mr. Beman in his letter last year has very fairly said all that could be said in their favor : "The quality is not so good as I would like, but it is much better than that of many varieties considered first-class for market." I think the variety is well worthy of further trial, and would recommend it to be thoroughly tested at one or more of the Fruit Experiment Stations.

Seedling Plums.

No seedling plums were sent to the committee this year, but mention should be made of the native plum seedlings which are grown by H. C. Carstesen, Billing's Bridge, Ont. (near Ottawa). Mr. Carstesen does not grow seedlings for experimental purposes, but for profit. Practically every tree in his little orchard of between 300 and 400 trees is a different seedling. His most promising varieties are those which ripen early in August before any of the named American varieties. Some of these are of very good quality, and he gets high prices for the fruit, as there is little competition in plums at that time.

A large number of seedling American, European, and Japanese plum trees are now growing at the Central Experimental Farm. Already some very promising American seedlings have been originated, two of which were named last year. The following are two which are thought worthy of being named:

No. 1. Consul—a seedling from Wolfe.

Roundish; large ; cavity narrow, medium depth ; suture a distinct line ; apex round ; deep red ; dots moderately numerous, yellow, distinct ; bloom light ; skin moderately thick, tough ; flesh deep yellow, juicy ; stone medium size, oval, flattened, almost free ; quality good.

Will probably prove a useful late plum. Ripened September 24th in 1901, and October 14th in 1902.

No. 2. Sunrise—a seedling of De Soto :

Oval ; large ; cavity narrow, shallow, abrupt ; suture a distinct line, not depressed ; apex rounded ; yellow, more or less covered with bright red ; dots few, yellow, distinct ; bloom moderate ; skin thick, moderately tough ; flesh deep yellow, juicy ; stone large, flat, oval, practically free ; flavor sweet ; quality good ; season———— ; promising.

Seedling Peaches.

The peach, one of our choicest Canadian fruits, is extensively grown in the southern sections of the Province, particularly in the Niagara and Essex peninsulas. In the inland and northern sections it is grown only to a limited extent, and that only in sheltered situations. One of the most desired qualities, then, in new varieties of peaches is greater hardiness; and I believe we will yet obtain varieties hardy enough to enable it to be grown much more widely than at present.

If we are to have such varieties, I believe also they will be found among seedlings grown in northern and inland sections. At Guelph, we are so far inland, and our climate is so severe that the idea of buying and planting peach trees there is seldom thought of, yet in and about Guelph there was grown this year, on seedling trees, probably over a hundred bushels of excellent peaches.

Through the kindness of the editors of the Guelph Daily Mercury, who took the matter in hand and stirred up quite a boom in peaches, we were enabled to procure samples of fruit from 30 different seedling peach trees fruiting in Guelph this year.

In this connection it may be well to mention just one other feature, which must not be lost sight of in looking for new varieties, and that is that peaches may be had in season for at least three months of the year.

At our Fruit Experiment Station at Leamington we have under test about 150 varieties, and from among these it is possible to select a dozen varieties that will give peaches in season from July to November. The best vari-

eties, as a rule, come in about midseason. All of the very early varieties are white-fleshed cling-stones, of somewhat inferior quality, while the fruit in greatest demand in the market and for canning are yellow-fleshed free-stones of high quality. If, then, besides getting varieties of greater hardiness, we also get varieties of better quality, we will be supplying a requirement of growers even in the most favored peach sections.

Amongst the Guelph seedlings there were no early ones, all of the fruit being received between the middle of September and the middle of October. Of the thirty varieties examined, at last one-third of them would rank as first-class peaches, and had it not been that in many cases the trees were allowed to overload, probably one-half of them might have been so graded. We have not time to speak of all, but would mention a few of those which were most promising :

No. 1. From Walter Grierson, Galt street :

A large, handsome, yellow-fleshed freestone ; ripe September 25th.

No. 2. From Wilber Snyder, Glasgow street :

A good-sized, yellow, showy peach, with bright red cheek ; freestone ; ripe September 20th ; tree six years old from seed, and bore about a bushel this year.

No. 3. From Wm. Cowan, Paisley Block :

A large, showy, yellow peach of the Crawford type ; freestone, of good quality ; ripe September 20th.

No. 4. From the late Dr. Cowan, Trafalgar Square :

A large, oval, red-cheeked, yellow-fleshed peach ; freestone ; of good quality ; ripe September 25th. Tree only 4 years old ; in exposed position, and bore 40 fine peaches this year. Name suggested, " Polar Beauty."

No. 5. From Samuel Brown, Devonshire street :

A good-sized, handsome yellow peach; a freestone of fine quality, and with very small pit. Ripe September 25th. Tree eight years old, and bore a bushel and a half of fruit this year.

No. 6. From Edwin Sanderson, George street :

A large, showy, yellow peach; a freestone of good quality. Ripe September 25th. Tree five years old, and bore a basket of fine fruit this year.

No. 7. From Miss A. Smith, Norwich street :

A very large, handsome, yellow peach, with red cheek ; a freestone of excellent quality. Ripe September 25th. This was one of the finest of the lot. From a young tree fruiting this year for the first time, which bore twenty peaches.

No. 8. From Mrs. Bower, Derry street :

A large, showy yellow peach, from a six-year-old tree, which bore nearly a bushel of fruit. Ripe about October 5th.

No. 9. From John Bowman, Wood street :

A very large, handsome, yellow-fleshed peach ; freestone, of excellent quality. Ripe October 1st. From a tree eight years old, which bore only about one dozen peaches.

From the most promising of the above list we have procured quite a number of pits, which have been planted at the College, where we intend to grow the seedlings in a less sheltered situation than most of them are grown in the city, in the hope of fixing, if possible, their hardiness, without losing any of their other good qualities.

This plan of raising seedlings from the finest specimens of northern grown fruits is well worthy of a trial by those outside of the peach sections, who would like to grow this luscious fruit for themselves.

The pits should be planted in the fall, while they are fresh, and the trees should be given plenty of room for development, and not be over-protected. If any protection is given, it should be from the warm sun in the late winter and early spring, which often causes the too early swelling of the buds.

Seedling Gooseberries.

Mr. C. L. Stephens, of Orillia, has given a good deal of attention to the improvement of the gooseberry, and has been raising quite a number of seedlings. Two years ago, we reported upon several of these, and this year Mr. Stephens has sent us a half dozen more, which are well worthy of further trial.

No. 1—Is a large red, oval berry, much like Industry, and said by Mr. Stephens to be one of his best.

No. 2—A large pale-green, oval berry, said to be a strong grower and very prolific.

No. 3—Called "Imperial Seedling," is a large green, oval berry, of thin skin and good quality.

No. 4—Called "Foundling," a medium-sized, bright red berry, somewhat spiny, and said to be the best of its size.

No. 5—A large yellow, oval berry, thick skinned, and said to be very productive.

Currant Seedlings.

A large number of seedling black currants have been originated by Dr. Saunders at Ottawa, quite a number of which have been named and described in the annual reports of the Central Experimental Farm. Another one has been named this year, which perhaps is the best of all. It has been called "Topsy."

Topsy: Fruit large, black, very glossy; sweet, fine flavor; quality, very good; productive; ripens evenly, and clings exceptionally well to the bush, which makes it exceptionally valuable.

Hybrid Crab Apples.

A number of Dr. Saunders' cross-bred and hybrid apples fruited this year. The following five varieties, which compare favorably with those named previously, were named this year:

Prince—Pyrus bucatta (female).....X Tetopsky (male)
Manitou—Pyrus bucatta (female).....X McMahon White (male)
Tony—Pyrus bucatta (female).....X McMahon White (male)
Alberta—Pyrus bucatta (female).....X Haas (male)
Elsa—Pyrus bucatta (female).....X Yellow Transparent (male)

Some of these may prove useful in Northern Ontario or the Northwest.

H. L. Hutt,
W. T. Macoun,
L. Woolverton.
Committee.

Prof. W. T. Macoun: The fact that we received so many seedling varieties for examination shows the appreciation of the people of Ontario in the work of the Committee. We have only recommended one variety of apples

for name. We do not believe in recommending anything that we do not consider better of its kind than any of the commercial varieties already on the market. But we must remember that we have many districts in Ontario to take into consideration, and varieties that might not seem to be of much value in one section might be of great value in others. For instance, in Eastern and Northern Ontario we are looking for a winter apple, and a winter apple which you might not think much of might be considered of great value in those sections. The plan I work on, therefore, in passing judgment on the seedlings submitted is to make a list of those I consider most suitable for various parts of the country. In my district, for example, I take for a standard those varieties that are already recognized as the leading varieties, and if the specimens submitted do not come up to these, they are not recommended.

In connection with this question of new varieties, it is interesting to note that our present standard fruits are the result of selection from unlimited numbers of seedlings produced during a long period in the United States. To show how many varieties are required to provide something of merit, I may say that 3,000 Russian seedling apples, which had been grown in latitude 60, have been tested at the Ottawa Experimental Farm, but failed to get anything that would be of value to Northern Ontario. The reason for this is that Russian apples are grown in a short season, and they necessarily mature quickly. The consequence is, that when they are grown in our comparatively long season, they become summer apples. What we want is an apple that takes a long season to mature, and we shall have to look, I think, to the southwestern States for some of our best winter apples. Such apples, requiring a long period for maturing, would, when grown in our comparatively short season, become a winter apple.

We are trying to do some work at Ottawa in originating new kinds of apples. We grow a large number of seedlings from standard varieties, and hope before long to be able to put before the Society some winter apples that will be better for some districts than those you have at the present time.

I think that in future in recommending new varieties we shall have to consider their power in resisting insects and disease. I was glad to hear from Mr. Palmer that in British Columbia they are giving this matter serious consideration. If in this way we could reduce the necessity for spraying, it would be a great thing.

Mr. F. Metcalf, Blyth: I think if it were better known where seedlings could be sent to be tested, it would facilitate the work.

The President: Prof. Hutt and Prof. Macoun are always glad to receive and test them, either at Guelph or Ottawa.

Mr. Woolverton: In behalf of the Experiment Stations, let me say that we are always anxious to get trees and fruits that are really worthy of being tested. Our plan is to try to secure plants of the varieties recommended by this committee, and to test them at the various stations, so as to decide definitely as to their merits.

Mr. Joseph Tweddle, Fruitland: With reference to the pest-resistant varieties, I think we should be careful before we discard our old and well established varieties. We have been looking in that direction, and the result is the Ben Davis. When looking for strong varieties, there is a danger of going down hill in point of quality. Instead of looking for disease-resisting varieties, we should take greater care of the more tender varieties of good quality that we now have.

REPORT OF THE COMMITTEE ON THE CODLING MOTH.

Your Committee have to report the following: We are pleased to state that on account of the low temperatures of the past season, comparatively little damage has been sustained by the work of this much-dreaded pest. We know of no municipality, other than the Township of Saltfleet, where any attempt has been made to control it by the adoption and enforcement of the Insects' Act and its provisions therefor; and in this township we have to report only a very lax enforcement by our municipal board. This we regret, and have only to account for it from two causes: First, the heavy expense re the thorough inspection for San Jose Scale, costing the municipality over $700.00, and secondly, the almost total extinction of the codling moth by weather conditions of this season, and the very light crop of the previous year. The bandages were removed and examined early in July in many orchards, and so few larva found that to many growers it seemed unnecessary to continue the work. However, later in the season the larva appeared in variable proportions, but on the whole only a small proportion of the crop was affected, but where the bandages were well and thoroughly attended to, almost perfect immunity from damage resulted. And notwithstanding the lax enforcement by our council in Saltfleet township, your committee believe, and would respectfully submit, that a general adoption and enforcement of the Act for its suppression is advisable and necessary.

Patent tree protectors are in use to a small extent, but as none of your Committee have used them, and as reports concerning them are to come from the Experimental Stations, we respectfully submit the above.

Signed in behalf of the Committee.

JOSEPH TWEDDLE,
Chairman.

Mr. Tweddle: We arranged that later in the season the Committee should examine some of the tree-protectors provided for under the Act, but the weather turned cold, and the examination could not be made.

Q.: What has been your experience in spraying to control the codling moth?

A.: I believe it does something towards killing them. For the last two years we have sprayed late in July or early in August, using white arsenic instead of Paris green. We have used the mixture as strong as half a pound of arsenic to fifty gallons of water. This is much stronger than the prescribed mixture, but I found by experiment that the foliage would stand it. This has been of considerable benefit in ridding our orchards of the moth, and I am hopeful that we shall yet be able to find some powerful insecticide which will keep it under control.

REPORT OF COMMITTEE ON TRANSPORTATION.

By H. W. Dawson, Toronto.

The term transportation is usually accepted to mean the moving of commodities from one point to another. I look upon it has having a wider meaning and scope where fruit is considered. The business of transportation begins with the picking of the fruit. It is at this point that as much intelligence and common sense is required as at any other stage. After picking, comes packing and the package. These subjects will be taken up later, but

both are necessary to proper transportation. Due care must be taken in the packing whether in basket, box or barrel, and also in conveying the fruit to the railway station or boat landing.

The next stage is when the fruit is delivered to the carrying company, and it is right here that there is room for grave complaint, both as to the manner in which it is handled and as to the time taken in loading and unloading. So long as we put up with it the companies will make no improvement. It is right here that the producer and shipper should join hands, and insist on getting better service from the transportation companies. I have seen cars of fruit that should have been in the market early in the morning, side-tracked for all through freight to pass. The probabilities are that it would not reach the market until the day's sales were over. You know what effect that would have on its quality, and consequently on the price that would be obtained for it, because most of the fruit is conveyed in cars not specially built for the purpose, and when the weather is warm, such delay results in great loss to the grower and to the shipper.

The next phase of the subject is the cost of transportation. There is room for grave complaint there also. Fruit is no longer a luxury, and should be placed on a level with other food commodities. But fruit is discriminated against in the matter of rates, while they do not give you any better service, and in some cases not as good. A year ago at this convention I presented some facts, showing that much higher rates are charged on apples than are charged on flour. I have been trying ever since to find out the reason for this, but have not succeeded. The railways say that fruit requires more care in handling, but it frequently receives less care. Neither can it be placed in a special class by itself as a luxury. The day for that has passed, and it has now become an article of diet.

But high as the rates are, I see that there is now some talk of the railways increasing them. If this increase is made, it will no doubt apply to fruit as well as to other classes of freight. For my own part I do not see any reason for this increase, as the railways are already paying dividends on watered stock.

Another grievance we have in connection with transportation companies is that our business does not receive the careful attention it should receive. The railways seem to care nothing about the local trade, and it is impossible to keep track of fruit cars. If I have a car of berries coming, say, from California, I can tell at any hour exactly where that car is, and know to an hour when it will arrive. If, on the other hand, I have a car coming from Grimsby, I cannot tell whether it will come to-day, to-morrow, or the day after.

How are we to improve our condition ? I would suggest that a suitable resolution be passed by this Association, and that copies be sent to the express and carrying companies, and to the Chairman of the Association that has the classification of railroad rates. A copy should also be forwarded to the Chairman of the Railway Committee in the House of Commons. But more than this should be done. A resolution should be adopted calling for the appointment of a Railway Commission to enquire into all these grievances, and, further, the Commission should have power to give publicity to its findings. The Interstate Commission was given this power in the United States, and the mere publication in official form of the cause of grievances has been found an effective means of securing their remedying in that country.

Mr. W. H. Bunting : I heartily agree with the suggestion that such a resolution should be passed, and especially that the proposed commission

be authorized to give publicity to the grounds for complaint. There can be no doubt that some of the complaints we hear from time to time are well taken ; others, perhaps, are not. By bringing them before a body of men able to judge and sift out the real grievances from the unreal, it seems to me that great good would be done. I beg, therefore, to move the following resolution :

"That this Association believes freight rates will not be placed upon an equitable basis until a Railway Commission is appointed, the duty of which shall be to go from point to point, hear complaints in regard to grievances which exist, and publish quarterly or semi-annual reports, setting forth the facts brought out ; and that delegates be appointed from this Association, in co-operation with the delegates from the Farmers' Association and delegates from other organizations, to wait upon the Government before the forthcoming session of Parliament and urge the appointment of a Railway Commission."

Mr. L. Woolverton : I am very glad to second the resolution. Another grievance I could mention is the charging of different rates on different fruits. This summer in shipping cars of apples to Montreal I found that if I included a few pears, I had the rate on the whole car load greatly raised. This is very unfair indeed.

Q. : Even in the same kind of packages ?

Mr. Woolverton : Yes, in the same packages. I believe it is claimed that because pears will yield more money they will stand more freight, but there is very little difference between the markt price of pears and apples now.

Mr. Fraser, Leamington : I sent a car of melons to Toronto last fall during the time of the fair. The railway companies claimed that sufficient freight had not been paid, removed the car from the point of delivery, and delivery did not take place until the Fair was over.

Mr. Jas. Muir, Port Elgin : It is too often the case that cars cannot be procured within a reasonable time. There have been times when I have had a load of fruit to ship, and have made application to the railway daily for ten days for a car to convey it to market, but they have paid no attention whatever to my application.

Mr. Johnston, Leamington : This question is a very important one to us in South Essex. It is often a doubtful question with us whether we shall receive a cheque in return for a fruit shipment or a bill for further freight charges.

Mr. F. Metcalf, Blyth : Packages of fruit are very often robbed in transit. But we cannot afford to hold our fruit while the matter is being investigated, which is often a difficult matter to accomplish, so we bear the loss.

Mr. Wm. Fisher : I think the conditions of carriage is often a more important matter than the rates charged. The neglect in this respect is often almost criminal. In August a steamship company, through its representative, issued a circular saying that splendid opportunity would be afforded for shipping tender fruits on one of their vessels. I sent a carload of tender fruit by that ship. At the end of the voyage the thermographic chart showed that the temperature of the chamber had ranged from 68 degrees to 30 degrees, and it was quite evident that the fruit had been both choked and frozen.

Mr. A. McNeill : I am thoroughly in earnest upon this question, as it is the one subject before all others that is at the basis of our fruit industry. Whatever can be done should be done immediately. I should like to add one or two facts to those already stated. We need not take time in discussing railroad rates ; we know that we are in this matter discriminated against as Canadians in favor of Americans, and we are discriminated against as

fruit growers as well. Other interests in this country secure better rates than we do on our products. Then there is the question of accommodation. This I consider is quite as important, and should come within the scope of inquiry of the Commission that has been suggested. At Hensall, some four weeks ago, I saw three or four cars of apples standing outside the station exposed to the full force of an afternoon's rain. The loss on that one shipment, as a result of this exposure, would be sufficient to provide a shed at that station which for half a century would have provided storage room. The same thing occurred at station after station. There has been enough lost on apples alone in this one season to have met the cost of providing shed room for fruit and everything else. Then there is the matter of the supervision of refrigerator cars. There is no supervision over them. No one knows whether they are iced or not. Then, as Mr. Dawson has said, on the other side of the line you can tell just where a car is from day to day, and you can see that the refrigerator service is kept up all along the line. Here, after a car has been despatched, neither the railway company nor anyone else can tell where it is. Do not address a written communication to Ottawa, but send a man of weight and influence from this Association. Never mind the expense ; you will never spend money half as well.

Mr. D. D. Wilson, Seaforth : I should like to emphasize what has been said by Mr. McNeill. I believe that the method proposed will have some effect in dealing with this most important subject. We must insist on having a Commission appointed for the purpose of setting these matters right that have been wrong for so many years. I think a committee should be appointed to put the matter in shape to lay before the Government. A written communication will have no effect. That committee should not only collect facts in reference to this matter, but should associate them with every other organization that is intersted in transportation. The conditions were never more favorable than they are now for securing what we want. One of the great railway companies is about to come before Parliament and ask for a charter to build a transcontinental road. They will ask for certain privileges, and the Government will be in a position to say to them that unless you comply with the demands of the people we cannot grant you those privileges.

The President : We have with us the Secretary of the Farmers' Association. That Association has been organized for the purpose of uniting all agricultural interests, and I understand it has already taken some steps in reference to the matter we are not considering.

Mr. W. L. Smith, Secretary Farmers' Association : It is intended to follow that action with the sending of a deputation to Ottawa to ask for the appointment of a Railway Commission. Other bodies representing organized agriculture will be asked to appoint delegates for the purpose of making a joint representation in the matter. There is reason to believe that the Dairymen's Associations and the Dominion Cattle Dealers' Association will take part in the effort to be made, and I have no doubt that Mr. Creelman will secure the co-operation of the Farmers' Institutes. The support of the City Councils should also be solicited. If a joint deputation of the nature suggested is sent to Ottawa, I feel assured that a Railway Commission will be appointed, and that more equitable rates will be secured. Then, if the fruit men increase the value of the output of their orchards, as Mr. James suggests, by fifteen cents per tree, all this increase and more will not be absorbed by the carrying companies.

The resolution was then put to the meeting and adopted unanimously.

Wm. Rickard, M.P.P.: You should appoint a good strong committee, because it is very important work that they have to do ; it is all-important. We produce the best of fruit, and lose it, or the profits from it, entirely on account of the methods of transportation and the high freight charges.

It was moved by Mr. McNeill, seconded by Mr. Fraser : That Messrs. Caston, Bunting, Wilson, and Dawson be appointed a committee to co-operate with the committees appointed by other Associations to urge upon the Government at Ottawa the necessity for appointing a Railway Commission. Carried.

THE GRADING AND PACKING OF APPLES.

By Alex. McNeill, Acting Chief, Fruit Division, Ottawa.

In the grading of apples we are taking six things into consideration : the form, the size, the color, freedom from blemish, the flavor, and keeping qualities. Some of these elements are more important than others. Freedom from blemish is, perhaps, the most important ; size and color are of very great importance in some cases and not so much in others. The matter of form, while it is important, is of somewhat less importance. A perfect apple should be free from scab, worm holes, or bruised or broken skin. For commercial purposes flavor is indicated by the name of the variety. Under the present Fruit Marks Act we are required to put the name of the variety and the grade of the fruit on the package. By placing the name on the package, we grade the contents to a large extent as to flavor and keeping quality. For instance, when we see "Red Astrachan," we know that we have an apple of fair keeping qualities. When we see "Ben Davis," we know that we have first-rate keeping qualities. So that keeping qualities and flavor are indicated by the name of the variety.

This leaves us four points to consider—size, color, form, and freedom from blemish. You cannot form a grade upon any of these taken separately. We cannot grade from color alone, although it is an important point. For a commercial system of grading, therefore, we endeavor to unite these four qualities as nearly as we may in order to form a grade, and apples that are not deficient in these respects—are free from blemish, or fairly good color, and are not too small for the variety are classified as No. 1. Anything can, under the law as it now stands, be classed as No. 2. Is that system of grading too difficult for the average grower ? I think not.

The question has arisen as to whether a grade for No. 2 apples is desirable. We know that, commercially, apples grade as No. 2 that are slightly smaller in size, etc. There is a somewhat wide demand for a definition of a No. 2 apple. I do not know of any definition that is not free from objection. Possibly the Association can be of assistance in this matter.

When we use the term "free from blemish," we mean blemish that would cause appreciable waste. A slight dent is a blemish, but I do not think that any inspector would consider that it would disqualify a first-class apple, so long as it is not a breaking of the skin and will not affect the keeping qualities. Anything that causes appreciable waste is a real blemish, and must be considered in grading. As a means of preventing bruising, I would suggest clipping the stems, so that these may not turn over and press on the sides of the apple.

For the last six or eight years there has been considerable discussion in regard to packages. With regard to apples, the time has not yet arrived when

we can do away with the old-time barrel. For many years to come it will continue to be the package in which the bulk of our apples will be shipped. Nevertheless, I do not think the barrel trade will increase as rapidly as the box trade. That form of package is becoming more popular in the Old Country. It has several advantages ; apples will keep longer in a box than they will in a barrel, especially in warm weather. Then the box shows off fine grades to better advantage, and the larger specimens carry more safely and pack more economically. The box is also a convenient form of package for taking into the home of the purchaser.

In putting up barrel fruit, the Fruit Marks Act must be strictly observed. It provides that the package of whatever kind must be packed so that the surface layer fairly represents the fruit all the way through. Even this year we have had a few examples of the old-time practice of facing the package with the best specimens, and using the inferior fruit as a filler. But I am pleased to be able to make this declaration, that this year, after inspecting 10,000 barrels of fruit, we found a very small portion that were not packed in accordance with the provisions of the Act. I went specially to Montreal on one occasion for the purpose of seeing how the Act was being observed. While there I saw 30 carloads examined, and out of the contents of all those cars not more, I think, than two samples called for positive action by the inspectors. I do not think there is any harm in telling the truth once in a while even in a matter of this kind. What has been the result of this? It is that our Canadian apple trade in England has been placed upon a better basis than ever before. We have received a number of letters from dealers on the other side stating that for the first time in the history of the trade they could depend upon the quality of the fruit being the same all the way through from start to finish. We get these reports continually at the Department, not only from England and Scotland, but from Ireland and Germany as well. I thought it would take two or three years to wipe out the disgrace of the old method of packing ; and it is a big thing to be able to report as having been accomplished in one year. As to results in the future, I will predict that this grading of our apples will result in sales being made in this country for the British market on the grade mark alone. One dealer said to me personally that next year he would be willing to buy all the No. 1 apples packed in Ontario. He has seen that 98 out of the 100 barrels of apples that have been placed on the market this season as No. 1 have turned out true to grade, and he is now willing to purchase on the strength of the grading without seeing the apples. If this is continued for another year, fruit dealers will have no hesitation in writing over here and saying, "I will take all your No. 1 apples at a fixed price." Such a system, if it became general, would mean that instead of taking all the risks of consigning to a market thousands of miles away, you will be able to sell your apples right in the orchard.

In packing, pay special attention to the racking of the barrel ; this should be thorough. If there is anything lacking in the present methods of packing it is in proper racking of the barrel. By this I mean the gentle shaking of the barrel as it is being filled. The inspectors at Montreal report that more apples are spoiled through over pressing than under pressing. There is a tendency of late years to over press apples. This requires nice discrimination and proper supervision. Open a barrel occasionally after it has been packed just to observe the condition in this respect. I think every dealer should test the work of his help by opening a certain number of barrels in every shipment.

I believe the time is coming when fancy apples will be packed altogether in boxes, and the poorer grades in barrels. To put the box trade on a satisfactory basis, we should have a standard size, and I think it would be well for the Association to discuss this question. An assortment of sizes coming from one country is confusing to the buyer. If our boxes were uniform in size, we should make an impression on the market much quicker. Last season 250,000 boxes were received in Great Britain, and 200,000 of these came from the United States, and were of the Californian size. Why should we not adopt that size ?

As to material, the Canadian box has unyielding sides, ends and lids. Their box is made of tough, thin wood, the springiness of which enables the Californians to pack their boxes tight. They claim that their packages never get slack.

Q.: What quantity does the Canadian box hold ?

A.: Between 45 and 50 pounds.

The President : I have been using a fifty-pound box. They call it a bushel box.

George E. Fisher, Freeman : A marked improvement in packing has no doubt resulted from this Act, but it has resulted principally from section 7, which requires the fruit on the face of the package to fairly represent the contents, and from sub-section "a" of section 4, which provides for the packer's name appearing on the package. This is not too much to expect from a farmer, who can readily understand the difference between honest and fraudulent packing, and this feature of the Act should be upheld.

When we come to the amendment of last session, which requires compulsory grading, I wish to be understood as giving that my unqualified condemnation, and to go on record to that effect.

Sub-section c of section 4 provides for arbitrary grading, and to my mind is an unwarranted interference with the fruit industry and with the rights of citizens. Parties packing fruit are by that section required to grade to a specified standard, and to take the responsibility of branding their packages to these grades, which no other class is compelled to do. There is a responsibility put upon the poor farmer that no Government would think of putting on any other class, and which no other class of the community would tolerate. Fruit differs so in different sections, and people's ideas differ as to what should constitute the several grades, that one man's No. 2 will be better than another man's No. 1. Uniformity cannot be got in this way. Inspectors themselves cannot do it. It cannot be done by any class of men ; it is an impossibility. Yet under section 8 of this Act a farmer is fined if he does not judge and brand his own fruit and his judgment does not coincide with that of the Inspector. Why should the fruit grower and farmer be saddled with a responsibility which is not only unprecedented but impossible to perform ? It seriously hampers trade by terrorizing the farmer, who rather than take the risk of marking his packages and incurring the odium of being fined, disposes of his fruit at a low price or leaves it to rot in the orchard. The fruit growers of the country are thousands of dollars worse off this year because of this clause.

A Member : No ; no.

Mr. Fisher : They are, undoubtedly. Lots of my apples went to the evaporator because I was afraid to take the responsibility of grading them.

Mr. McNeill : That's where they should have gone.

Mr. Fisher : We have about us on all sides evidences of the injustice the Act is working, and also letters from the British markets explaining that the marks have no meaning there, and that fruit is sold strictly on its

merits. Being the marks of the owner, who is an interested party, these marks would not be considered in any court, and would consequently have no commercial value in case of a dispute between the seller and the buyer. There should be no compulsory grade marks. The responsibility for grades should not rest upon the farmers, but upon the inspectors, who should be available to do inspection work and issue certificates when required, as in other lines of business. It should be entirely optional with a shipper whether he has his fruit graded to standard or not, and if it be so graded, it should be merely to serve his own purposes; there should be no compulsory marking of the grade. Millions of bushels of grain change hands without inspection; and when it is inspected the owner is not required to indicate the quality, but the inspector makes his examination and gives his certificate. There should be clearly expressed definitions of the three grades of apples and pears for the use of inspectors only. Section 14 provides for summary conviction and imprisonment, and places the case under the criminal code. It demands a deposit of costs in case of an appeal, and denies the right of trial by jury in a criminal case. Who ever heard of a criminal being denied the right of trial by his peers or of being required to put up costs? In my judgment the clause should be repealed.

Elmer Lick, Oshawa: I do not believe that parties who can trust their own judgment as to what constitutes a No. 1 apple have any complaint to make against the Act. If a farmer knows what a No. 1 apple is, he will put himself in the position of an inspector and will not go far wrong. Mr. Fisher appears to be a little afraid to trust the judgment of those packing the apples. Very large shipments have been made from the Brighton district, and there has been no difficulty there. They realized that this year a large proportion of the fruit was second quality, and marked it accordingly. The question is, Shall we have marks that mean anything in the British market? They have not meant anything in the past; they do mean something to-day. The greater portion of the apples shipped in former years bore the mark "X X X." Where the apples really were No. 1, the shipper's own name was added; where they were not, the X X X was still put on, but an employee's name was added instead of the exporter's. These fraudulent No. 1 apples come into competition with the genuine No. 1 fruit of the honest shipper. This year No. 1 apples have been No. 1, and as a result the fruit brought from 50 to 75 cents per barrel more in the British market. Even if it does work a little hardship, is it not better that we should put up with it than go back to the old system? If you have inferior apples, had you not better mark them accordingly and wait till you get No. 1's?

Mr. McNeill: Or work till you get No. 1's?

Mr. Lick: That is it.

A. H. Pettit: I wish to say that I have been an advocate of the Inspection Act from the beginning. To-day I feel that there is a great deal of complaint throughout the country in regard to it. If there is a body of men who feel that the Act is oppressive, I feel that they should be given an opportunity to express their views. A committee should be appointed to consider any amendments that may be deemed necessary. Many orchards in our part of the country this season have scarcely contained a barrel of fruit that could properly be marked No. 1. If fruit growers consider the Act too stringent, let them express themselves as to the way in which it should be amended.

F. G. H. Pattison, Grimsby: The Act has caused considerable injustice as between growers and dealers. The growers contracted early in the season at a certain price for No. 1's and a certain price for No. 2's. The growers'

understanding in making the sale was that No. 1 meant the same as in former years ; the dealer understood it to mean No. 1 as defined by the Act. As a result the grower was compelled to accept No. 2 prices for what he considered to be No. 1 fruit. The buyer might also reject fruit altogether, while the apples lay under the trees after picking and were still at the grower's risk, if there happened to be a fall in prices, on the ground that they were not No. 1.

Robert Thompson, St. Catharines : I think it is possible in a case of that kind that the fruit might, owing to the development of a fungous condition, become worse in the meantime. As a grower, I should have no hesitation in making the buyer take as No. 1 all the fruit that would come under that class that he had contracted for. I believe the Act is all right ; but we should have the privilege of calling in the inspector to grade our fruit before selling, so that we could sell on the grade.

A. E. Sherrington : There is no doubt that the law caused serious loss this season throughout this section, because farmers were afraid to pack for fear they should make a mistake in the grading and be fined for it. I think apples should be inspected at the point of shipment, and marked by the inspector before they are shipped. Under present conditions, if the buyer complained of the quality of the fruit on arrival, and refused to pay the price agreed upon, we have no redress. If the apples were inspected and marked by the inspector before shipment, payment could be enforced.

A. W. Peart : I think it would be of interest to know at whose instigation the amendment quoted by Mr. Fisher was incorporated in the Act. I think that the Act as it stood in 1901 was perfectly satisfactory, and in the interest of honest packing. No other industry is required by law to place arbitrary marks on its products to indicate the grade. Why are fruit growers discriminated against ?

Wm. Rickard, M.P.P.: We all know that Canadian apples were given a bad name in the British market for the reason that, under an assumed name, shippers sent over inferior fruit marked as first grade. Some legislation was, therefore, necessary not only in the interest of the shipper, but in the interest of a far more numerous class, the grower of apples. Notwithstanding what has been said here this afternoon, I fail to discover what real objection there is to the Act. I think the grade mark counts for something in the English market. I claimed at the time the Act was passed that it would do away with nine-tenths of the evils complained of. It has been a very hard matter in the East this season to put up No. 1 apples at all. The only thing to be done was to mark them No. 2, which they were. I shipped 500 barrels to Glasgow, all marked No. 2.

The President : I was one of the committee that framed the original Act. We found it an extremely difficult matter to deal with ; but we have the testimony of the Inspector that it is working to the good of the trade, and I do not think we should be in too great haste to amend it without giving it a fair test.

A Member : I do not think that many object to the original Act ; it is to the marking of the grade that objection is made.

On the motion of Mr. A. H. Pettit, seconded by Mr. Woolverton, the President was authorized to appoint a committee to present to the meeting any amendments they wished to suggest.

The President thereupon named the following : A. H. Pettit, L. Woolverton, A. McNeill, Geo. E. Fisher, Wm. Rickard, and H. W. Dawson.

After discussing the matter for some time, the committee failed to bring in any report.

MARKETS AND MARKETING.

By D. J. McKinnon, Grimsby.

I entirely approve of the suggestion that has been made this afternoon that we should have legislation to define the size of the apple box. It is necessary that we should sell a great deal of our fruit by correspondence and by telegram, and in order to do that to advantage we should have something definite to offer for sale, something of recognized size and quality all over the country ; something that cannot be a subject of dispute between buyer and seller. We should also have a standard for grading, so that the buyer may know what to expect. There are requisites to successful marketing. When I speak of marketing, I do not refer to marketing the crop in the orchard ; nor do I mean merely picking the fruit and shipping it to a commission merchant to dispose of. For the man who takes no care in the culture of his fruit, and who gives no attention to grading and packing, I would recommend that way of marketing. Get your fruit together ; bundle it somehow into barrels, boxes or baskets, it makes little difference which, and send it to the nearest commission house. My remarks will apply to those who wish to know how to make the most out of their fruit. For such I lay down two requisites : First, that they have something definite to offer as to size, and, second, as to quality.

It is quite easy for the individual grower to make a grade for himself. It is easy for him to say that the ordinary peach basket holds three layers of fruit, and that they run about so many to the basket ; that the small basket holds two layers, and averages so many. That is generally satisfactory to the buyer. The quality is more difficult to define, however ; but he may say that the fruit is free from spots, rot, or gum. Define your fruit as nearly as possible, and you will, generally speaking, get a higher price for it than if it is not defined.

There are various ways of marketing besides those I have mentioned. A very good plan for those living near a city is to dispose of the fruit on the market to the individual buyers, or to carry it around and sell it to private customers. The next plan is to sell to a jobber in your neighborhood. My experience in selling to jobbers is that in nine cases out of ten I realize more than if I put the fruit on the commission market. Besides getting a better price you also have the satisfaction of helping your neighbors in a business way.

Another system of marketing for large growers is to get retail customers all over the country—retail grocers and others. This is more profitable, if the business is conducted right, than selling to jobbers in the neighborhood. It, however, necessitates taking a great deal of trouble, and it is not worth worth while unless you go into it in a large scale. It will not pay in a small way, and will pay very few growers unless they buy fruit from neighboring fruit growers to fill up.

With regard to the commission market, I may be prejudiced, but with me it has always been an unsatisfactory method ; although once in a while I get a fair price. In the first place you have to pay double freight—freight, say, to Toronto, and then on to its destination. In addition to this there is the commission of 10 per cent. This system is unsatisfactory in another respect : Last summer I found a little store keeper at an outside point selling fruit at a very much lower price than I could afford to accept on board cars at Grimsby. I asked him how he could do this, and he replied that he had an arrangement with a commission man under which he was

to charge a certain price for the fruit if he could get it, but if he could not get that price, he was to sell it for whatever it would realize, take a fair profit for his trouble, and send the balance to the commission man from whom he had received the fruit. I heard two retailers in one town make a similar statement, and they were buying from two different commission merchants. That is a serious state of affairs. It means that in some cases we pay a commission to the dealer to whom we consign in the first place, and then he pays a second commission to the retailer. The sooner the system is changed, and the commission men become jobbers and buy fruit from the producer at a fixed price, the sooner will the business be on a satisfactory basis.

I have a suggestion to make, not my own, but something that is being spoken of by fruit growers all over the country. It is that we should organize ourselves into Associations and build cold storage warehouses and packing houses, and secure first-class men to superintend them. First-class packers should be employed to take the fruit as it is brought in and give it its correct grading. The superintendent would give a receipt for the fruit according to its grade, and then sell the product of the whole Association to the best advantage, each grower receiving a fair return according to the quality and quantity of his product. This is the plan that is being pursued in California in regard to oranges and other fruit. It may be more difficult, however, to carry it out in this country with more perishable fruits.

As to the foreign market, I agree with the theory that the box is the right package for that market. I agree that the fruit should be of standard quality; but I would go further, and declare that no apples except those of No. 1 quality should be exported in boxes. That may be considered arbitrary. One grower will say, Why should I not ship third quality apples in boxes if I want to? Simply because the greatest good to the greatest number must rule. For that reason you must not be allowed to spoil the market for your neighbor's No. 1 fruit. I am led to believe that such a plan, if adopted, would be very profitable indeed for us.

Mr. A. W. Peart, Burlington: In reference to co-operative associations, I may say that there is already one in operation in the Burlington district which is giving excellent satisfaction to all those connected with it. In regard to the important question of markets and marketing, no matter how skilful we may be in fruit culture, unless we handle our fruit in a business way we cannot expect to get satisfactory results. In a general way we may divide the market into two classes, the home market and the foreign market. It would seem that the foreign market is capable of extension. One of our members recently shipped fruit in cold storage to Cape Town, and the result will, no doubt, depend on the efficiency of the cold storage service on board ship. My experience in the export business has been large, and my experience with the British market is that no matter how great a crop of apples we may have, if we send No. 1 apples there we can always get a No. 1 price. But during a year like this, when so many apples are going forward, it does not pay to send No. 2's, and for these we should endeavor to find a market at home. I believe it is best to send only choice apples in boxes; but I would not use boxes for the home market. There is always a good market for pears in Great Britain if we could only be assured of efficient cold storage; but at the present time we have no assurance that they will land in good condition.

I made an experimental shipment of tomatoes to the Old Country, thinking there might be a market for them there. I sent the variety known as "Honor Bright." It is a late, medium-sized, smooth, firm variety. I clipped the tomatoes with the scissors, leaving half an inch of stem, wrap-

ped them in tissue paper, and placed excelsior between the layers. Three years ago a similar shipment landed in good condition, and brought 6s. a box. Last year nothing was realized, as they landed in bad condition. This I rather expected, as there was a slight frost previous to picking. This year the shipment arrived in good shape, and sold at 4s. If we could average 5s a box there would be good money in it. I also tried shipping some Rogers grapes to Great Britain, but without success. I found they arrived in a shelled condition. I do not know whether it would be of any advantage to dip the end of the stems in wax to prevent evaporation. I have also shipped plums, but obtained no better prices than we receive here.

Wm. Rickard, M. P. P.: With regard to the boxing of apples, I think that a committee should be appointed to interview the Government on this matter, with a view to providing a uniform box, and also that none but No. 1 apples should be shipped to the Old Country in boxes.

M. Pettit: I think the suggestion is a good one. If nothing but No. 1 apples are shipped in boxes, it will tend wonderfully to increase this trade.

The President: Do you propose to bar anybody from shipping No. 2's in boxes.

Mr. Rickard: Yes; the box should be kept exclusively for first-class apples.

A. McNeill: The Chief of the Fruit Department, who is investigating the markets in England at the present time, wrote a letter stating that one of the serious dangers threatening the box trade was the inferior fruit that was being shipped in boxes.

The President: I do not think we should be debarred from shipping our smaller apples in boxes.

Mr. Rickard: The smaller apples should go into barrels. That is where the huckster in the Old Country wants them.

A. H. Pettit: Our great Northwest market will exceed the British market in a few years, and whatever we do, it should cover our own country, as well as the export trade.

R. M. Palmer, British Columbia: You must remember that you are asking legislation for the whole Dominion, and not merely for Ontario. In behalf of the British Columbia fruit growers, I may say that we wish to have a standard box just as much as you do, but we do not want to be limited to putting our No. 1 apples in those boxes.

A Member: We require boxes for shipping other fruits besides apples. I think that the committee should also consider this.

A. H. Pettit: We are using a case that goes a little more than three to the barrel. The British market prefers the 40-pound package to the 50. As regards the lightness of the package, the California boxes are made of a tougher, stronger, and springy material, which we cannot obtain. Our boxes must have substance in order to have the necessary strength. They are already costing us too much money. The ends are dovetailed, which I think too delicate. In the near future all our No. 1 stuff will have to go forward in boxes.

Mr. Sherrington: I think it would be well for the Association to adopt a uniform size of box.

Mr. Rickard: The question of securing the right kind of barrel is also a very important one. I have seen barrels this year that I would not have if they were given me—the barrel made of light stuff, with the light hoop and a big bilge. You may rack such a barrel as much as you like, and it will never carry tight. I want a firm package with a good stave and a good hoop, and without much bilge. You can pack your apples tight in such a barrel, and they will carry tight on board the steamship.

The following committee was appointed: Messrs. A. H. Pettit, L. Woolverton, Alex. McNeill, George E. Fisher, A. W. Peart, and R. M. Palmer.

REPORT OF COMMITTEE ON BOXES.

The Committee on Boxes submitted the following resolution: "That this Committee recommends the use, so far as possible, of the California package for fruit."

A. M. Pettit: I beg to move the adoption of that resolution. Mr. W. Rickard seconded, and the motion was carried.

D. J. McKinnon moved, seconded by Mr. Rickard: That the Minister of Agriculture for Canada be memoralized to enforce legislation that no apples of lower grade than No. 1 shall be sold in boxes printed in red or reddish colors.

Mr. McKinnon: This resolution does not meet my views, nor the views of those who maintain that no apples other than No. 1's should be shipped in boxes, but it will permit British Columbia growers, who have no barrels, to ship No. 2's in boxes, provided the boxes are marked in black.

Mr. Rickard: I do not think we should submit any recommendation until we know exactly what we want. In my opinion, if we are going to make a reputation for Canadian box apples, we should ship nothing but No. 1's in boxes. I do not know exactly how to deal with British Columbia, but Mr. McKinnon thinks that a distinction in the color of the marks will answer.

A. E. Sherrington: I move in amendment, that the whole box question shall stand over till next season. This motion was seconded by Mr. Harkness, and carried.

SPRAYING APPLE TREES.

By Joseph Tweddle, Fruitland.

It is proper attention to the details of the work that makes the difference between success and failure in orchard spraying. No great results are to be expected unless we have the conditions right to start with. It is of little use spraying an orchard that has not been pruned for three or four years, as the growth will be too thick to admit of the trees being sprayed in a thorough manner. The orchard must, therefore, be given a thorough pruning before commencing to spray. This thinning and pruning is also necessary in order to give the trees the light and air necessary for the proper development of the fruit. In addition to proper pruning, it is essential to have the soil conditions right in order to get fruit that is perfectly developed as regards size, color, and flavor. When these things have been attended to, we may proceed to treat the tree, fruit and foliage for the destruction of injurious insects and fungous growths by spraying.

In the work of spraying there are also a lot of details that must be attended to, in order to secure the best results. If Bordeaux mixture is to be used, it is essential that it should be properly prepared.

In speaking to you as commercial growers, I would not go into the details of making the ordinary Bordeaux mixture. I may say, however, that the most common error made is in bringing together the dissolved lime and bluestone before adding the full quantity of water. If this is done, chemical action results which renders the mixture altogether useless as a fungicide. In order to avoid this, we must add half the necessary water to the dissolved

lime, and the remaining half of the water to the dissolved bluestone, and then combine the two. This plan will give a perfect Bordeaux mixture and an efficient fungicide. We have obtained splendid results by a more convenient process, namely, by diluting our lime in enough water to strain it through a fifty to the inch brass wire strainer, and filling the spray barrel nearly full of the lime and water, and then adding our dissolved bluestone. It is very important to keep the mixture well agitated just before and while spraying. I do not consider that there is any necessity for spraying in winter time, but we start operations as soon as there is foliage to protect. The trees should be given two sprayings, if possible, before the bloom starts. Directly the bloom is off the trees we go at it with all hands and three pumps, so as to get over the orchards within a week after the blossoms drop. The apple curculio does its work at that particular time, causing many rough, uneven specimens, and the only way to prevent it from stinging the fruit is to get promptly to work. For this work we prefer white arsenic to Paris green for mixing with Bordeaux; but it must be properly prepared, or it will burn the foliage. We use two pounds of fresh lime to one pound of arsenic, and boil in two gallons of water for forty-five minutes, using four quarts of this to 40 gallons Bordeaux. With this mixture we cleaned the curculio right out this year (we use Vermorell nozzles, 20 to the inch), and I can recommend it to careful people as being very much better than Paris green.

I think it is very poor practice to attempt to spray against the wind. We always spray on the windward side of the trees. After we have sprayed one side, we wait until the wind changes, which usually occurs in from one to three days, making the circuit in a week, and then spray the other side. The only failures we have had were when the winds were very variable, and we were in a hurry to finish up the work, in cases of immediate danger. If the season is particularly favorable to the development of the codling moth, we usually keep right at it, giving an application every two or three weeks. About the 15th of June, we usually manage to catch the bulk of the first brood, and the second brood about the middle of August. We also use the bandages.

As to the treatment of scab, I may say that 48 hours' rain, with high temperature, will germinate the spores of this fungus, and bring it on so fast that it will get rooted in the leaf or the apple before the foliage dries. You will therefore understand how important it is to have the fungicide on the trees beforehand (fore-sprayed is fore-armed), but if not on before, get your pumps going just as soon as possible when this condition occurs. I do not agree with those who say that the Bordeaux mixture will not stay on the trees when the rain comes. I have found foliage covered with the mixture at the end of the season, after the rains of all summer.

The codling moth is very destructive in our district. It will sometimes thin the fruit to such an extent that we do not get half a crop. I understand that arsenate of lead, with the Bordeaux, is coming into use as a remedy for this pest, and that it is perfectly harmless to the foliage, and does not easily wash off.

The President: I think that Paris green washes off, but the Bordeaux mixture does not wash off so easily.

Mr. Tweddle: I do not see how that can be when the poison is mixed with the Bordeaux. I should like to say something as to what returns a properly managed orchard will give. I have been shipping apples to Germany this season, and have just received the returns. My Greenings netted me $3 per barrel; Baldwins, $3.12, and Spies, $3.82. From four and a half acres of orchard, which I rented at $65 per year, we packed 800 bbls., 80 per cent.

No. 1, for which I netted $2,000 for my apples this year, f.o.b. here. From another orchard, covering 25 acres, and rented for $100 a year, we packed 1,150 bbls., and I realized $3,000. The Baldwins gave me 95 per cent. of No. 1 fruit, ard the Greenings 80 per cent. But, of course, I did the work necessary to produce the finest of fruit. My neighbors begged me to take their apples at 75c to $1.00 per bbl., but they were scabby, and I would not take them if I got them for nothing, as I would not ship them.

In making statements of such crops and prices before the public, I think it is right for me to properly qualify them, or they may appear extreme and misleading. Let me say that the past season was an ideal one for apple growing, excepting for the attack of scab. With thorough pruning and spraying, perfect fruit was easy to secure. The season was cool and moist, causing perfect fruit, and at the same time it was unfavorable to the propagation of insect life; hence, where general conditions were nearly right, the whole crop set and came to perfection, for in such cases no June drop occurred.

In the 4½ acre orchard, yielding 800 barrels, we have grown winter cover-crops of rye, and plowed them down in the spring, and several pruned each year. This was the fourth year of my lease. In the 25-acre orchard, the yield of 1,150 barrels was only one-quarter of the amount per acre produced in the 4½-acre orchard. The difference was caused by this orchard being badly injured for years before I took it, in the spring of 1901, by canker worm and general neglect, which allowed me only two seasons to prune it of its tangled masses of brush and destroy the worms; also to work up the soil, which I did not get completed, a part of it being still in sod. Two years hence this orchard, under similar climatic conditions, ideal culture, and general care, should yield from 3,000 to 4,000 barrels of choice apples.

In regard to the high prices, I may say that just as favorable conditions prevailed. Prime, clean stock was very scarce, and with a record of five years' honest packing, the consignee was enabled to secure me the highest prices going. In many cases the fruit was practically sold before arrival. It takes time and patience to work up to these results, but it pays, and pays handsomely.

THE TRADE IN FANCY FRUITS.

By L. Woolverton, Grimsby, Secretary Fruit Experiment Stations of Ontario.

I beg leave to leave out the word "export" in this connection, and deal with the business in general. I have long been convinced that the hope of the fruit growers is in the production and sale of a superior article. The markets are glutted with poor stock in apples to-day, but there are always people who will pay a good price for high grade fruit.

The production of such fruit is first in importance, and will only be attained by the few men who are willing to fight scale, insects, and fungous so faithfully as to win the victory over them; to manure and cultivate his trees till they are full of vitality and vigor; to prune and thin until every bud, on every branch, left to produce fruit, shall yield the best and finest grade.

If every fruit grower would do this, perhaps the prices would come down; but fortunately for the few, only the few will ever do this, and those few will eventually reap a rich harvest.

For years I have been putting up my largest and finest peaches in the six-quart basket, and ordinary grades in the twelve-quart, and even on the public auction market the six-quart basket of choice fruit sold for about the same money as the twelve-quart ordinary grade.

I found the same with cherries, and have received every year an average of 50c per six-quart basket of Mexel cherries, no matter how cheap other varieties were.

Even in Astrachan apples, in Toronto, the nearest large market, I have shipped regularly the largest and finest in baskets, and had them sold at from 30 to 40 cents, when common stock brought only 15 or 20 cents.

I began some ten years ago to apply the same practice to apples, putting up the finest in bushel boxes, and forwarded them to Edinburgh, to Antwerp, and even to Sydney, in New South Wales, with most encouraging results, the finest netting me about $1 a bushel. And since we have our grades settled upon, I have been able to contract for my Spys with one Old Country buyer at $1 per box f.o.b. Grimsby.

Since cold storage facilities have come about, I have, with others, taken advantage of it for all the tender fruits, and though I have only failure to report in peaches and tomatoes, I have fair success to report in Astrachan and Duchess apples, and Bartlett pears, the latter reaching 7s 6d for the best for half-bushel cases in Glasgow market.

A sale of 414 packages of Bartlett pears and King apples in Glasgow market realized prices ranging from 4s to 7s 9d for half bushel of pears, and from 4s 6d to 6s 6d per bushel for apples.

The great difficulty is to secure satisfactory consignees. We have had our sales made by public auction, and now conclude we could do much better could we have had our goods sold by private sale. We are, indeed, credibly informed that the buyers put their heads together, and one bids for all, and then divides the spoil with his fellows. Thus the middleman gets the benefit of all our fancy packing, and we get but too small an advance on ordinary packing.

Several firms in Great Britain offer to handle such fancy packages of choice fruit through travellers, thus placing them by private sale at the best value, and this we believe the ideal plan.

Indeed, it does not matter where we place such stock on sale, in Chicago, Winnipeg, Ottawa, or Toronto ; or in England, Germany, or South Africa, if properly sold, it will bring excellent value.

It will be a grand day when we can have co-operative cold storage near home, and send out our fine stock on orders through the year just when it is most wanted.

The size of the box that we ought to use for fancy apples is still unsettled. We began with one 24 x 12 x 12 outside, holding a full bushel, and measuring for storage two cubic feet. Of these about two and one-half equalled a barrel. To make even measurement, we adopted a box 22 x 10½ x 11½, which we reckoned would go three to the barrel ; and now we are advised by brokers in Great Britain that a box 21 long x 11 wide x 9 deep inside, measuring four to the barrel, is the box most known in Covent Garden, and on which the price per box is based. The latter box, of which we have a sample here, takes three layers deep of apples instead of four.

An average of four to five shillings a box for one measuring four to a barrel is an excellent price, even for fancy stock, but when you get the same for a box only three or even less to the barrel, you are out of pocket.

THE ONTARIO FRUIT EXPERIMENT STATIONS.

By L. Woolverton, Secretary.

Nine years ago we planned out the present system of fruit testing stations, so distributed as to cover the whole Province. The object was (1) to test the absolute value of all fruits, and to discourage the cultivation of those that were of least value in the commercial orchards. (2) To test and report upon the real value of new varieties which gave promise of merit, thus helping Ontario fruit growers to avoid wasting their money on useless novelties, and to know which of them really possessed merit. (3) To carefully test the adaptability of the whole list of desirable kinds to the various parts of the Province, and keep fruit growers so informed of the results that they may be guided in planting only such varieties as will succeed in their locality.

Out of these has grown a fourth object, viz., the condensing of all this information into one permanent volume, to be known as "The Fruits of Ontario," which, when completed, shall give reliable descriptions and photographs of all our desirable varieties, and give each planter full information regarding them. With this object in view, the Secretary has planted about eight hundred varieties at Maplehurst, and each of the thirteen experimenters situated in various sections, from Brockville, on the St. Lawrence, to Wabigoon, have planted from three to five hundred varieties each.

All these varieties are now beginning to come into bearing, and notes will be taken of the characteristics both of tree, plant, and fruit, year by year. The work is now beginning to assume vast proportions, and the small amount of $2,600, which has so far been given for this work each year, must soon be largely increased if the full advantage of the work of the various stations is to be made use of for the good of the Ontario fruit grower.

As you are already aware, the work of all the experimenters is directed by the Board of Control, through its Secretary, and the Board is kept thoroughly posted about the actual work and merits of the experimenter, by Prof. Hutt, who makes a tour of inspection each year,and makes a full report to the Board.

Besides this, each experimenter is required to make a yearly report to the Board, before receiving the last half of his yearly grant ; and these reports, with that of the Inspector, and the work of the Secretary, who condenses them into uniform shape, and visits the stations for the careful study of the various fruits in their different localities and conditions, altogether form the Annual Report of the Fruit Experiment Stations of Ontario, which must grow each year in value and interest to the fruit growers of Ontario.

Peaches. By W. W. Hilborn, Leamington.

I consider that the most important part of the experimental work performed by any of us is to give you the information we have gained. That I think can best be done by giving you a list of the varieties I consider most favorable for orchard culture in the district I represent. I have planted about 150 varieties, and of these about 100 have fruited, but not all of them have fruited sufficiently for me to speak definitely concerning them. I have omitted all extra early or clingstone varieties, because in the past too many trees of the early varieties have been planted, and the early sorts injured the sale of the better fruit that comes later on. While there is a place for a few, there is great danger in getting too many of the early varieties.

The Triumph is the earliest yellow peach we have. It is a little small, but with proper cultivation it will reach a good size. It must be thinned

and well fertilized. I do not consider it a really first-class peach, because it deteriorates in size in a few years.

Q.: What about the Greensboro' ?

A.: It is a large peach, but there is a prejudice against its green flesh. The Yellow St. John is the first really first-class peach we have. Brigden, or Garfield (which are the same), come next, and there is very little difference in the time of ripening between it and Early Crawford. Then follow in the order named, the Early Crawford, Fitzgerald, Yellow Rareripe, New Prolific, Engol Mammoth, and Elberta.

When we first grew the Elberta we found it more subject to curl leaf than almost any other variety. Now that we can perfectly control that, we consider it one of our most profitable varieties, and no other kind, perhaps, stands shipping better.

Q.: How do you control curl leaf ?

A.: It is easily done, by spraying with Bordeaux before the buds start ; one thorough spraying is sufficient.

Q.: Do you use arsenic or Paris green at the same time ?

A.: No ; there is no object in doing so.

A Member : A weak solution of blue vitriol controls it perfectly in our orchard.

A.: I find that it has a tendency to wash off.

Mr. Tweddle : Have you not found lime and sulphur better than Bordeaux ?

A.: It could not be better, because the Bordeaux is completely effective. The Golden Drop does not equal the other varieties named in order, but it is a paying variety, and should be included in every list. It comes in at a time when the other varieties are not on. It is of fair size, but is inclined to overload, and requires thinning. Next comes the Smock and the Salwy. From these twelve varieties I have selected six as my choice for commercial planting in my district, where a less number of kinds are required. They are : St. John, Bridgen, Fitzgerald, Engol Mammoth, Elberta, and Smock.

Q.: Why do you leave out the Crawford ?

A.: I consider the Brigden a little better peach, and in some respects hardier in bud, and of just as fine appearance. If there is any difference, it is a little earlier. Then follows the Fitzgerald, so that you do not require the Early Crawford.

Q.: What about the New Prolific ?

A.: It does well in some soils, but does not give such good results on the average. I will now proceed to the hardy varieties. Early varieties, like the Alexander, are very hardy, and you could grow them almost anywhere, but I am not including them in my list for the reason stated already, that there has been too many grown. For the hardy list I have selected the following : Fitzgerald, Barnard, New Prolific, Longhurst, Crosby, Tyhurst, Golden Drop, Bronson, and Lemon Free. This list is in the order of ripening, and not in order of merit. I would class the Tyhurst and the Longhurst as the two hardiest varieties in this list for our district.

Q.: Which are the least liable to danger from winter frost ?

A.: It is hard to pick them out, because they might ripen too late in any particular section, and then you would have to take something that ripened earlier.

Q.: What do you mean by hardiness ?

A.: Hardiness of the fruit bud. There is very little difference in the root ; it is not worth mentioning ; it depends upon the conditions surrounding the tree. Tyhurst and Longhurst ripen about the middle of September with us.

Mr. Sherrington, Walkerton : They ripen too early with us. The Early Crawford has ripened with us, and a seedling from it, known as the Bruce, is the best we have in this section.

Q.: What about the Duke of York ?

A.: It has not been much tested. It is very much like the Crosby. So far as we have seen, it is a splendid peach, hardy, and produces large crops.

Grapes. By Murray Pettit, Winona.

My experimental work with grapes started in 1881. I planted about fifty varieties in addition to my vineyard, and kept increasing the number until I had about 100 varieties, in 1894. Of these about the only varieties I consider worth mentioning are the following : Armenia (Roger 39), Doctor Collier, Moore's Diamond, Woodruff Red, and the Mills. The latter shows weakness of vine, and is inclined to overload. It is an excellent winter grape —no better for keeping—and it ripens by Christmas. I think it superior to any other long-keeping variety.

In 1895 six varieties were sent to test. Of these the Brilliant is the only one of much value. In 1896 eighteen varieties were sent out, and none of them would I recommend. Among them was the Allice, which was highly lauded by the originator. It was sent out under seal at $2 per vine, but was nothing but the old Diana under a new name, which we have grown for thirty years. This will show you what a lot of humbug there is about these new varieties.

In 1897 six varieties wer sent out, and the only one worthy of note is Campbell's Early, which is of very good quality for a very early grape, but its chief quality is its earliness. I think it should take the place of Champion, as it is better in appearance and flavor.

The following list I consider profitable in our district for commercial purposes, given in order of ripening : First, Champion. This has been the most profitable in our section this year. Then, Worden, Lindley, Delaware, Niagara, Concord, Wilder, Agawam, Requa, Catawba, and Vergennes. The latter is an excellent late keeping grape, and a good yielder, but there is little to choose between that and Agawam. It is inclined to overload if not pruned very closely, and then it does not make enough vigorous wood for next year's crop.

Q.: What do you think of Moore's Diamond ?

A.: It might be included in the list.

Q.: Where would you put it in order of ripening ?

A.: After Worden. Its principal value is in its earliness, quality and appearance. It is not as productive as Niagara, but you will get a much higher price, as it is the first of the white grapes that comes in. If you want a nice early white grape for home use, grow a few Lady.

Q.: Is Moore's Diamond a good yielder ?

A.: Not as good as the Niagara.

Q.: What about Brighton ?

A.: It is of little value where you can grow the Red Rogers.

Q.: Do you recommend Campbell's Early for commercial purposes ?

A.: I have not had it in fruiting long yet. but I think very favorably of it, and want to test it further.

Q.: Are there any small green grapes in the bunches ?

A.: Not with me.

Q.: What about the Eton ?

A.: It is soft and of poor flavor—of no use, I consider.

Q.: How many out of the new varieties you have tested would you plant in a commercial orchard ?

A.: Until I have tested Campbell's Early longer, I could not recommend one.

Q.: Do you grow your vines on sand or clay ?

A.: On pretty heavy land, with stiff sub-soil.

Q.: Would you recommend the Salem for planting ?

A.: No ; it is subject to mildew, and bursts when it rains before it is fully ripe.

Q.: What are your objections to Moore's Early ?

A.: Not vigorous enough ; and you do not get enough fruit.

The market for grapes could be extended fully one-half if the following points were given attention to. The first point to be observed is pruning. Many growers allow too much wood on their vines, and the consequence is that the fruit is poorer in flavor and later in ripening. Another mistake is the shipping of mildewed grapes and unripe fruit. This has cost our growers thousands of dollars. It is a very easy matter to sulphur your vineyard to prevent mildew. Another mistake is holding the fruit too long before placing it in the hands of the consumer. Grapes are never better than the moment they are picked off the vine, and the sooner they are used after picking the more the consumer will enjoy the fruit. Tons and tons are held for days at the point of shipping, and then sold to jobbers. In one case I saw 18,000 baskets in a station fruit shed, some of which had been there for ten days and had been held for some days at the point of picking before that. The condition of these grapes—picked by cheap labor, and more or less bruised by throwing into the basket—the condition they are in when they reached the consumer can readily be understood.

Blackberries and Currants. By A. W. Peart, Burlington.

It is a difficult thing for an experimenter to decide at this stage of the work in the Province as to which are the best varieties to recommend. It is far easier to say which are unprofitable. If I were asked the question, Which is the best variety of currants ? I confess I could not tell you. Taking one year with another, I find there are several varieties that are pretty nearly equal. For currants, I find that the best soils are rich ones, with damp subsoil. With blackberries, I think that the best results are obtained in my district on a moderately dry, rich soil, having a quicksand bottom. I have not found many of the new varieties of currants I have tested to be superior to the old varieties. Of the red currants planted in 1896, I consider the following the most profitable : Wilder, Cherry, Pomona, Fay's Prolific, Red Victoria, and North Star.

Q.: Can you name one out of the lot ?

A.: I should not like to give one, because seasons vary, but I am rather partial to the Wilder ; it is very productive, is large, and of fine quality, and has all the qualities that go to make a profitable commercial variety. This year, however, it has developed leaf blight, which went through one part of the Province in currants. It completely stripped some varieties, and others lost a large percentage of their leaves. New Victoria, Raby Castle, and Old Victoria lost none, however.

Q.: What was the nature of the blight ?

A.: The leaves first turned yellow, then grey, and then dropped off.

Q.: Can you suggest a remedy ?

A.: I do not know that I can ; perhaps spraying with the Bordeaux mixture at the proper time would prove a remedy.

The reason I like the varieties named is that they are from medium-sized to large varieties. I have discarded some old varieties, such as Raby Castle, Red Cross, Red Dutch, and Versailles, because the currants are too small to be profitable in a commercial way. There is a difference of a cent to a cent and a half per quart in the price. Belle of St. Giles is a large and beautiful currant of fine quality, but it is not very productive, and for that reason I would not plant it.

Q.: How does the Wilder compare in size with the Fay ?

A.: It is as large, and in my opinion higher in quality.

Of the black currants tested, I think most of the following : Saunders, Naples, Black Victoria, and Collins' Prolific.

Q.: What about the Black Champion ?

A.: It is not sufficiently productive with me. I am scarcely able to say much about Collins' Prolific as yet, but it seems variable in fruiting. Last year each bush gave seven quarts. They are rank, strong-growing bushes. This year they averaged only two or three quarts each. In regard to the whites, I have two varieties. The Grape is the larger and the more productive, but the Imperial is of better quality. In blackberries I consider the following the leading commercial varieties for the district : Agawam, Kittatinny, Ohmer, Snider, Stone's Hardy, Taylor, and Western Triumph. The Kittatinny and the Ohmer are large varieties, and the others medium-sized.

Q.: Is not the Agawam immensely larger than the Snider ?

A.: No ; slightly only ; I classify it as a medium-sized berry. The Ohmer is a new variety, and is doing well. The Gainor is also a new variety, and is doing fairly well, and should be tested a little longer. Wilson's Early promises well, and gives a fair crop of large berries of good quality.

Mr. John Hall, Rochester : The Perfection currant is doing well in Western New York State. It was originated by Mr. C. G. Hooker, of Rochester, N.Y., and is a cross between Fay's Prolific and White Grape. The season for ripening is the same as Cherry and Fay. The color is bright red, and it is a good grower. The size of the fruit is very large, larger than Fay and Cherry, and the clusters are very long. It is more productive than the Fay, and resembles the White Grape in this respect. Quality very fine ; not so acid as the Fay and other red sorts. As a table currant it cannot be surpased. A very important fact is that it has a long stem from fruit to attachment to branch, making it easy to pick.

Raspberries and Commercial Apples. By A. E. Sherrington, Walkerton.

I have about fifteen varieties of blackberries. The hardiest and most productive in this section are the Eldorado, Agawam, and Snider. For fancy varieties I recommend Gainor and Rathbun. For black currants I would select Black Naples as the most successful in this district, and in reds, Fay's Prolific.

I want to confine my remarks to the varieties that have proved most successful and profitable in this district. In raspberries I have tested about 65 varieties. The most profitable early variety with us is the Reliance. It is hardy, fairly vigorous and productive. The fruit is not large, bright red, and is a good table berry. The Turner is one of the hardiest varieties we have. It is about equal to the Reliance in vigor, and is fairly productive. It is a little darker in color than the Reliance. The quality is first-class for a table berry. Both these varieties are too soft for shipping. The objection to the Marlboro' is that it is inclined to dwarf, and it is not a good table berry, but it is firm and dry, and is all right for preserving and shipping. It is early and productive.

Q.: What is your soil ?

A.: A clay loam, mixed with limestone. For medium and late varieties the Cuthbert is, I think, the queen of berries. It is a hardy, strong grower, berries large, and quality first-class either for table or preserving. It has only one fault, that is that it continues growing too late in the fall. The Phoenix is very hardy, and very productive ; quality good. It is a heavier cropper than the Cuthbert, but not quite so good a berry, but it comes in later, and is profitable in that way. Of the light-colored varieties, the Golden Queen, out of half a dozen varieties, is the only one worth planting, and it is of no use for commercial purposes.

The purple berries, such as Columbian and Shaffer, are not profitable as commercial berries in this section.

James Metcalf, Blyth : I have grown the Columbian extensively, and find it quite marketable and the most productive berry I have. It is a very vigorous grower.

Mr. Sherrington : In blackcaps, Conrath is first on account of its earliness ; then Hilborn, then Smith's Giant, in the order of ripening. Conrath is a very vigorous grower. It is hardy, healthy, and productive, and the fruit is of good quality. Hilborn is also vigorous ; fruit large, and quality first-class. It is, I think, our best blackcap. Smith's Giant is also very vigorous ; fruit very large, and is proving to be very productive, while the quality is all that is necessary.

Q.: Have you tried the Older ?

A.: Yes. It is a good berry, but rather weak in its growth.

Q.: What about the Miller ?

A.: Very good, but not equal to those I mentioned as regards fruit. A great many Hilborn raspberries sent out were not true to name, and did not give satisfaction.

Q.: Do you spray ?

A.: I spray all my raspberries just the same as I do apples and everything else. I begin in the spring, and continue till blossoming, giving one spraying after bloom.

Apples and Cherries. By G. C. Caston, Craighurst.

We have been making some experiments with the Russian varieties, but without much success. We have failed to secure a good winter apple from among them. The Bogdanoff comes closest. This variety makes good stock for grafting good commercial apples on. I have been preaching the gospel of top grafting for the last twenty years. Another Russian variety is the Boiken. It has no claims as a table variety, but is a fairly good cooker. It is a clean apple, and a great bearer. So far, my experience with it is quite favorable ; but I think we should be careful about recommending anything until we are very sure.

Of the seedlings of the Fameuse, or Snow, we have the Shiawassee Beauty. It has not the same tendency to scab as the other Fameuse seedlings, but it is not quite so good in quality, nor is it a very long keeper. The season would be about November. Few are aware of the great difference that exists in the ripening and maturing of fruit in our more northern locality. To judge properly of our winter apples you should see them pretty well on in October, which is one reason why we cannot properly compete at such exhibitions as the Toronto Industrial. Our Spys do not mature till the end of October.

There is one apple I have no hesitation in recommending for our section ; it is a cross between the Spy and the Wagner, but it should always be top grafted. I can recommend it as a commercial variety.

Q.: For export ?

A.: I think so ; but I have not had any experience in exporting. But I do not think we should devote all our attention to export fruit. There is a developing market in Northern Ontario and in the Northwest.

I can also recommend the Peerless, which is a seedling of the Duchess. It is early maturing, is free from scab, and has good quality and uniformity.

Mr. Macoun : What advantage has it over the Wealthy ?

A.: Wealthy is nowhere in it.

Q.: Where do you place the quality ?

A.: I consider it the best cooking apple in Canada. If the maximum points were ten, I would give it elven. I believe it would be a great acquisition to the Old Country market.

Mr. Macoun : I think the Wealthy is not only a better apple, but a more profitable one. I secured 96 barrels from 136 trees planted six years. They brought from 6s 9d per case, 138 apples in a case. They were shipped in October in ordinary storage.

Mr. Caston : The Spy is the commercial apple par excellence in this country, because it comes to its greatest perfection in Ontario. Everyone wants the Spy in our home market, and in shipments to Algoma I find that they want the larger proportion to be Syps. Top graft that apple every time on hardy stock, such as Tolman Sweet.

Q.: It is beginning to scab badly in our section ?

A.: We have to spray ; but I think it is the commercial apple of this country.

Q.: Can you get the Spy into bearing sooner by top grafting ?

A.: That is one of the advantages of the method. I have also tried a number of Russian Cherries, and we have certainly got something good in them. You cannot grow the finer varieties of cherries outside of the fruit belt, but you can grow the sour cherry for canning purposes. Outside of the dessert class, the Osthein will be valuable ; also Orel No. 24, Russian 207, and Bessarabian.

Q.: Which are the three best sour cherries in order of ripening ?

A.: Most of these varieties are medium to late.

Q.: What is the season of the Osthein?

A.: It is medium.

Q.: Is it better than the Montmorency?

A.: I have not tested it.

Q.: Have you any better early variety than the early Richmond?

A.: Yes; the Russian 207, in our locality.

Pears. By R. L. Huggard, Whitby.

As requested by your Secretary, I am expected to say something on that most worthy, and perhaps least understood, of all the fruits—the pear. I will not attempt to get at the origin of the pear, but we have abundant evidence that it was well known and considerably cultivated before the Christian era. It was a common fruit in Syria, Egypt, and Greece in the earliest times of the Romans, who have the credit of introducing it into Italy. But historians generally agree that the delicious qualities of the pear were not developed till about the seventeenth century, since which time it has been steadily gaining in quality and flavor. But through such men as Prof. Van Monk, Mr. Knight, and many others, who have made a lifelong study of the pear, and also practiced the art of hybridizing so successfully, we have now a class of fruit which, for richness, juiciness, and flavor, is excelled by no other fruit grown.

But in the limited time at my disposal, I had better confine my remarks to the more practical part of the pear, viz., how to grow pears to get the best results. The first consideration is to get the right kind of land to grow the pear on. Here I would just repeat what I have often stated elsewhere, that I know of no variety of pear that will produce the best results on wet or springy land; but the ideal soil for a pear is a stiff clay subsoil, with a rich clay loam surface, from 10 to 12 inches in depth; but any soil should be well underdrained before the planting is done. The selection of the varieties should be well considered, also the market where the fruit is to be disposed of; and those varieties which have been tested, and have proved hardy and productive, and bring good prices in the market, should be planted.

And surely out of nearly 3,000 known varieties the planter can select five or six varieties that will succeed. I consider it very unwise to plant very many different varieties. The pear has perhaps fewer insect enemies than almost any other fruit tree, and is therefore less trouble to grow than the apple, plum, or peach. Then through the exertions of our scientists and agricultural professors, whose bulletins are doing such a good work in Canada, the fruit grower is kept posted on these injurious insects, so that every grower can have the remedy if he will properly apply it. It has been often stated that "He who plants pears, plants for his heirs," but I can assure you that that couplet is not literally correct, as here are very many varieties that begin bearing the next year after planting, and continue bearing annually for many years, although varieties, like people, differ according to location, soil, etc.

The pear is not a native of this country, although many varieties succeed better here than they do in their native climate. It is said that the pear attains its greatest perfection in Belgium, but according to recent market reports from Bristol, England, Canadian pears have brought considerably higher prices than the same varieties from Belgium, so we may naturally assume that ours were the best.

As has been often pointed out, the gathering of the fruit should be done before it ripens on the tree. It is an easy matter to determine when the fruit is ready to pick, as by taking hold and gently raising the fruit; if ready it will easily part from the branch, although the fruit may be hard and solid, as it should be, when gathered. If intended for market, the fruit should be forwarded as soon as possible after gathering, especially the earlier varieties, as they get into the consumer's hands in much better condition than if kept a considerable time before shipping; but if intended for home use, they should be placed in cases in a dark, dry, cold cellar, to allow them to mature slowly. Late varieties, as winter pears, may be put into barrels, but I prefer bushel cases for earlier sorts; and shortly before being required for use, they should be placed in a situation where the thermometer registers 65 to 70 degrees, where in a few days the fruit will become mellow, juicy, and rich, especially if a piece of woolen cloth is first spread over the bottom, and also between each layer of fruit. In fact, it makes nearly all the difference between a rich, luscious fruit, and a harsh, coarse-grained commodity, in the way in which it is ripened.

Out of nearly 150 varieties that I have grown there are only about 25 or 30 that I consider profitable commercial varieties, in the district in which I live; for although hardy enough, they refuse to produce either quantity or quality to be commercially profitable. The people of this country have yet a good deal to learn with regard to pear growing, as the same attention has not been given to the subject as to apples and peaches, but I

believe the time is close at hand when, through the medium of cold storage, the pear will rank in importance with the apple as a commercial commodity.

I have no data when pears were first introduced into this Province, but there are pear trees growing near Windsor, and also near Newmarket, that are evidently over 100 years old, and are still large, healthy, fruiting trees. They are said to have been brought from France by the Jesuit Fathers, who formerly occupied that section. The fruit on most of these old trees resemble the Buffinor in appearance, but have the flavor of the Clairgeau.

But it matters little, at this day, where the pear came from. The question is, "Can we grow pears profitably in Ontario?" Much depends on the grower. The next is, "Can we, or do we, grow too many pears now?" There is ample room for discussion on this subject.

But I feel assured that if double the quantity were grown of the proper shipping varieties, our people would enjoy increased receipts from a very nominal outlay.

Our great Canadian Northwest will also require and use a large proportion of our fruit product just as soon as transportation facilities are put on a proper basis, which, I hope, will be attempted before this annual meeting is brought to a close.

Q.: What are the names of half a dozen of the best varieties, in your experience?

A.: I would say: Bartlett, Clapp's Favorite, Sheldon, Bell's Lucrative, B. Clairgeau, President Drouard, Duchess, Seckel, Lawrence, and Winter Nelis.

Q.: What new varieties would you recommend?

A.: Dr. Jules Guigot. This is a later pear, and a good pear to ship anywhere; then Seneca, which is earlier, and Dempsey, which is a native of Our Province, and a very excellent pear.

APPLES. By W. H. Dempsey, Trenton.

Q.: What varieties are you finding the best in your district?

A.: None of the new varieties that I have under test would I set aside for the old varieties as yet.

Q.: How many new varieties have you been testing?

A.: Something over 300 varieties. In 1894, when I started the station, I had about 140 varieties under test in my own grounds, and have now increased the number to 300 apples, besides other fruits. The most promising of the new varieties, in the order of ripening, are Red June, Jefferson, McLean, Saunders, Beauty, Sutton's Choice, Winter Banana, York Imperial, and Gano. Some of these varieties have good qualities, but not good enough to take the place of the older varieties.

Q.: What do you consider three or four of the best fall apples out of the whole lot?

A.: Duchess, Trenton, Gravenstein, Fameuse, and McIntosh Red.

Q.: Would you include Blenheim Pippin.

A.: No; it is an early winter apple; I would recommend it only in some localities.

Q.: What about the Wealthy?

A.: I would take Trenton or Snow in preference.

Q.: Give the names of half a dozen winter apples?

A.: Hubbardson's Nonsuch, Westfield Seek, Cranberry Pippin, Ontario, Spy, Stark, and Ben Davis.

Q.: Is this in order of merit?

A.: No; in order of time.

PEARS AND PLUMS. By Harold Jones, Maitland.

My work is of purely local value. The varieties I can grow are considered of very low commercial value in other parts of the Province. Plums have not hitherto been a success in our section. Hundreds of trees have been planted in Leeds and Grenville, but they always die out. In my own grounds I planted my plums in 1896. I have about 170 trees, two or three of each variety. The thermometer at my station goes to 25 deg. to 30 deg. below zero, and I have been endeavoring to find varieties that would stand such conditions. Of European plums I have about 40 varieties. Some have died out, some have showed weakness of bark or branch, and will eventually die. Out of that number the only ones I can recommend are the Lombard and the Whittaker. These have remained perfectly healthy, and have attained the age of six to nine years. The Lombard bears three years out of five. Upon the Island of Montreal they have a great many varieties that are seedlings from European plums brought in by the Jesuits, and planted in the early history of Canada. Some years ago the Quebec Fruit Growers' Association took a careful inventory of them, and classified and arranged them. Two of the best they have in the collection are Nos. 53 and 54.

Prof. Macoun: No. 53 is now called the Raynes, and No. 54 the Mount Royal. They can be had from Mr. Dunlop, of Montreal.

Mr. Jones: These are just nicely started with me, and I believe it may be possible to get something of value to our section from this collection. These are considered the best varieties in the lot.

Q.: What is the color?

A.: They are blue plums.

I have fifteen varieties of Japanese plums, all recently planted except Abundance. All have lived except one. Abundance fruits irregularly, and gives a scanty crop. The same may be said of the Burbank, the Wickon, and the Gold Plum. I cannot recommend or condemn any of the Japs for our section as yet.

It is to the American or native plums that we must look for something valuable for our section. I have eight or ten varieties growing, and some of them are of very fair quality. They are excellent for cooking and jam making. Among the best I have fruited is the Milton, a bright red plum. It is not of high quality, but is an early ripener.

The Whittaker is the best plum I have fruiting. It is a rapid, vigorous, strong grower, does not break down with weight of fruit or foliage, is very free from disease, and is of good quality for its class. Next in order of ripening is the Hammer. It is hardly as large as the Whittaker, and the skin is too thick to be a fine plum. It also has a tendency to burst open about the time of ripening. Next in value is Forest Rose. It is similar to the Hammer, but breaks under foliage and fruit. These four are all hardly in every way.

In regard to pears: Flemish Beauty is successfully grown in our section. It grows large and fine, and is of good quality and texture, and compares favorably with fruit coming from any part of the country. The Keiffer is also a very satisfactory pear, and the heaviest bearer we have, but the quality is rather low, as all will admit. I have also the Howe, planted in 1896, which is bearing nicely. The Riston is hardy, healthy and vigorous, and the fruit is of fine quality, but it is too small to be of much commercial value. What Russian varieties have been sent me have died rapidly from blight.

STRAWBERRIES. By E. B. Stevenson, Jordan.

Among the early varieties we have the Michael, August Luther and the Van Deman. Michael is the best money-maker we have on the moist, sandy soil around Jordan. The Van Deman would do better in the Guelph district. The Monitor is a new variety, and I would advise all strawberry growers to plant some. It is large, a bright red, firm, and has no small berries. It keeps its size to the end, and yields a big crop. I can also recommend Johnson's Early and the Smith Seedling.

Q.: Do you recommend all these?

A.: The grower will have to find out which variety will suit his soil; the strawberry is peculiar in this respect. The Bederwood and the Clyde do well everywhere. The latter does well in all sorts of soils, and is one of the best early varieties.

W. Fisher: I would not give it room. It is no canner, has no color, is no shipper.

Mr. Stevenson: Some growers will not grow anything else. It will ship as good as any for a near market, if you pick it at the right time. If you keep it picked, it will return you as much money as any of them. I admit it is light in color, but it is fairly firm, and an immense cropper.

W. W. Hillborn: It does well with me.

Mr. Stevenson: For medium late varieties I recommend Haveland, Tennessee Prolific, Saunders, Glen Mary, Sample, Brandywine, and Splendid.

For late to very late, I would give Aroma, Gandy, Joe, Klondike, and the Hunn. This season showed up the late varieties, and I found Joe, which is a new one, among the best of them.

I find that the best method of growing is to grow in narrow rows. The best strawberries grow at the edges of the row, and the more edges you have the more fine berries you will get. Narrow rows yield finer berries, and give a better return than wide matted rows. Plant the rows three feet apart each way. Cultivate both ways for a time, and as soon as the runners begin, cultivate one way only. In some sections the plants require covering in the fall. They do not need it in our section, but they are the better for it. The covering can be raked into the pathways in the spring, and used as a mulch, and it will keep the berries clean. The first season it should be cultivated eighteen inches wide between the rows. In the fall give a dressing of unleached hardwood ashes, and cover with straw. In preparing the land, the best plan is to have the land in roots for two seasons, manuring each crop well, and then manure again before planting the vines.

One man in our section who followed the plan outlined secured the first season six hundred 24-box crates, or 14,440 boxes. At five cents a box, that would mean $720. For the second year he had over 12,000 boxes, which at the same price would give $600. The varieties were Williams and Clyde. Three acres of new land, belonging to another grower, planted to Williams, Michaels, and Clydes, the latter representing about one-third, yielded 1,200 crates, and he told me he cleared $1,100 the first year, after paying all expenses. There are two cases showing that land properly prepared and properly cultivated, and kept free from weeds, will yield as much, if not more, than any other fruit.

In each case the yield the second year was nearly equal to the first.

The wide matted row must go, if the best results are to be received from the strawberry, the "Queen of Fruits."

The Ben Davis Apple.

The President: Notwithstanding what has been said against it, I do not think that those who have planted the Ben Davis should be at all discouraged. Do not top graft with something else yet. There is no apple grown up to the present time that has given better commercial results, and no apple that is more called for in the English market, and it is a good cooker at a time when other apples are over.

Mr. Woolverton: I have a clipping from an Illinois paper giving the experience of fruit growers there with the Ben Davis. The Fruit Growers' Journal, of Cobden, Ill., says: "The current receipts of apples in this and other leading markets of the west at present, and for some time past, show that over 9-10ths of the receipts are of the Ben Davis variety. Last Saturday four boatloads unloaded on our levee 10,000 barrels of apples, fully ¾ of them from Illinois, and the remainder from Missouri. A canvass of the subject among the receivers disclosed the fact that 9,500 barrels were Ben Davis, and railroad receipts show a similar record. Now, this proportion is out of all reason, greatly to the detriment of the apple industry, and an injury to the apple growers at large.

"For years the Ben Davis has been found a profitable apple from a commercial standpoint, and this has led to a heavy run on the nurserymen for such trees. The demand not only continued without abatement, but rapidly increased, to the exclusion of all the better sorts, and we are confronted with the startling fact that a large number of the best varieties grown have given way to one of the poorest—an apple hardly fit to eat or cook—and yet every market, the entire southwest, is now flooded with it. The inevitable result is before us, as the Ben Davis is now selling at figures that average only a trifle over half that the other sorts are bringing.

"A more discouraging feature is still in store for the Ben Davis, for most of the orders coming in for apples now request no more Ben Davis. Even the country merchant, who orders only five or ten barrels, invariably adds: "Don't send any Ben Davis." Thus much lower prices still for it seem assured, while the other sorts will not suffer decline, because they are wanted by the trade everywhere."

Mr. McNeill: I see by Woodall's Catalogue that the Ben Davis is specially asked for in the British market. (Not supplied.)

Q.: What is the cost, as compared with the King?

A.: The price of the King was eighteen shillings, and of the Ben Davis twelve shillings. The cost of growing the King is about 45 shillings, and the Ben Davis about five shillings.

REPORT OF COMMITTEE ON FRUIT EXHIBITS.

By A. E. Sherrington, Lake Huron Station.

Apples: 33 plates. Of these the striking varieties are Ontario and Mann.

A. Shaw, Walkerton: 13 plates apples, 1 plate Duchess. Of these 2 plates seedlings, which do not appear worthy of mention.

John Whitehead, Walkerton: 13 varieties. Excellent specimens of Swazie, Pomme Grise, and 4 of Spy, 1 Snow.

Chas. Young, Richard's Landing, St. Joseph's Island: 11 varieties, as per list. It is striking to find Yellow Transparent in fair condition at this date. McMahan White is one of the best of this Algoma collection.

A. W. Peart, Burlington: 7 varieties apples, 4 varieties pears. Apples are clean and well formed. Anjou and Easter Beurre pears are good types of their kind.

Central Experimental Farm, Ottawa: 13 plates, 12 varieties. This collection is particularly clean and handsome. La Victoire, a Quebec seedling of Fameuse, somewhat larger than the parent, is worthy of mention. Milwaukee, a Wisconsin, promises well for the north. Arctic, a Mars apple, of Baldwin type, well spoken of in Grand Isle.

Robert Thompson, of St. Catharines District, exhibits for that region a collection of 30 varieties. The most striking variety is Baldwin, beautifully colored.

R. L. Huggard, East Central : 28 plates of apples, 26 plates of pears. Among the apples are Ontario, Wolf River, and Spy, in good condition.

Duchess, shown by W. H. Bunting, of St. Catharines : In storage since August 4. Are apparently in good condition, but are found to be rotten and discolored at the core.

M. Pettit, Winona, Ont.: 22 varieties of grapes, in excellent condition. Particularly good types of Agawam, Goethe, and Catawba are shown.

G. C. Caston, Craighurst : 17 varieties. Apples are all handsome, and highly colored. Peerless, a Minnesota seedling of Duchess, is a promising fall apple. Of winter apples in good condition are Ontario, Spy, and Canada Red.

J. E. Hambly, Cedar Springs : Eight varieties of handsome, well-grown specimens, handsomely colored. Gano, Spy, Rhode Island, King, and Salome are specially worthy of mention.

W. M. Orr, Fruitland : Two varieties apples, 2 pears, good, handsome ; 3 grapes, excellent Vergennes.

Fonthill Nurseries : 50 plates of apples. Among newer varieties are Huntsman, Mammoth Black Twig, Bismarck, York Imperial, and Sutton Beauty.

R. M. Palmer, Department of Agriculture, British Columbia : Display of handsome, highly-colored, large apples, all more or less peculiarly ridged and elongated, after the manner of Pacific Coast apples. Prominent among them are Northern Spy, Red Cheeked Pippin, Spitzenberg, Ben Davis, Van de Vere, English Golden Russet, Northern Spy, Blue Pearmain.

Joseph Tweddle : A display of Northern Spy, magnificent in size and color.

W. W. Cox, Collingwood : Good specimens of Ontario, Wagener, Wolf River, and Cranberry Pippin.

W. H. Dempsey, Trenton : 36 varieties of apples. Excellent specimens, Spy, Windsor, Chief, Ontario, Blenheim.

Harold Jones, Maitland : Fine specimens of the Fameuse group, including McIntosh, Scarlet Pippin, and Fameuse. Milwaukee is shown in good form.

C. L. Stephens, Orillia : A collection of Orillia-grown fruit, including samples from J. P. Cockburn, of Gravenhurst, who exhibits Winter, St. Lawrence.

Other exhibits: Hairy vetch—a cover crop ; plant shown by Joseph Tweddle, Fruitland.

Your Committee beg to make the following comments : We would commend those exhibits which contain specimens illustrating most typically the varieties represented. We do not wish to encourage large collections of poorly-grown specimens of well-known kinds. The exhibits are largely made in the interest of the locality in which our annual meeting is held, and, therefore, should be primarily educational.

JOHN CRAIG,
W. T. MACOUN, Committee.

FRUIT GROWN IN ALGOMA.

Richards' Landing, Nov. 26th, 1902.

L. Woolverton, Grimsby :

Dear Sir: I have sent by express a small box of apples, directed to you. Hoping you may have a pleasant time.

No. 1, a seedling of my own, or supposed to be ; anyhow, it certainly came out below the graft. No. 2, also supposed to be a seedling ; I did not grow this myself. No. 3, sent for comparison ; not desirable. No. 4, Wealthy. No. 5. Wallbridge. No. 6, Alexander. No. 7, Duchess. No. 8, Yellow Transparent. No. 9, Wagener. No. 10, Tallman. No. 11, Gedner.

These are not by any means show or fancy apples, but just a fair specimen of what I would call No. 1. If you call any of them very good or extra, let me know.

I am, yours truly,

CHAS. YOUNG.

RESOLUTIONS.

Moved by G. C. Creelman, seconded by Alex. McNeill : "That this Association desires to place on record its appreciation and admiration of the work done by Mr. A. E. Sherrington in connection with this Convention. Since the meeting was announced, one year ago, Mr. Sherrington has been indefatigible in his efforts, and has not confined his work to the Town of Walkerton. He has made a personal canvass through the Counties of Huron and Bruce ; has organized local Fruit Growers' Associations at six points in the district, and has revived the local Horticultural Society in this town. All of these bodies have assisted in making this Convention the splendid success it has been, and we take great pleasure in presenting this resolution to the meeting." Carried.

Moved by M. Pettit, seconded by H. Jones: "That this Association desires to tender its warmest thanks to the good people of Walkerton for the very hospitable manner in which we have been entertained since coming to this beautiful town, to the Mayor and Council for the excellent accommodation they have placed at our disposal in the use of their Town Hall and committee rooms for our several business meetings, and to the splendid orchestra which contributed so much to making the evening meetings attractive ; and we wish the Horticultural Society organized here a most successful and useful career in the work upon which it has entered under such favorable auspices." Carried.

The Convention then adjourned.

HORTICULTURAL SOCIETIES.

At the regular meeting of the Ontario Fruit Growers' Association, held at Walkerton in December, an innovation was aodpted in the holding of special sessions for the members of the Horticultural Societies, at which many valuable addresses were given on topics of interest to the amateur gardener. Such was the success of these meetings that it is hoped to have a two days' session this year entirely devoted to the subject of floriculture and gardening. At Walkerton the members of the local Horticultural Society turned out in large numbers to hear the addresses and take part in the discussions on the cultivation of roses, perennials, annuals, hardy shrubs for the lawn, and kindred topics. Mr. T. H. Race, of Mitchell, the well-known amateur rose grower, presided at these meetings, and had associated with him such well-known florists as R. B. Whyte, of Ottawa; J. S. Scarff, of Woodstock; Wm. Hunt, of the O. A. C., Guelph; Chas. Webster, of Hamilton; Dr. James Fletcher, of Ottawa, and others. The papers published herewith are among those read at these meetings.

The "Notes on Floriculture," by Mr. Hunt, and the splendid articles on "Conifers" and "Maples," by Mr. W. T. Macoun, of Ottawa, which are reprinted from the "Canadian Horticulturist" of last year, have been so highly spoken of, that it has been deemed wise to put them in this compact form for constant reference.

THE BENEFITS OF HORTICULTURAL SOCIETIES.

By J. S. Scarff, Woodstock.

Having heard so many able and eloquent addresses from the gentlemen who have preceded me, it is difficult to add anything to what they have already said.

The subject assigned me has been written about and discussed from time to time. I cannot say much that will be new or of value to any hearers, and I can but fail in the attempt of trying to give a few observations, having been a somewhat close observer of everything pertaining to horticulture and floriculture for the last 20 years. During these years I have seen many advantages and improvements that have come through our local Horticultural Society in the city of Woodstock, and other cities and towns throughout the Province.

The great volume of information which has been collected and distributed among the thousands of horticulturists and floriculturists throughout this Province has been chiefly through the various Horticultural Societies of Ontario, and I am glad to know that the past year has been a successful one, both in the increase of membership in these societies and the increased interest taken in their meetings.

The study of horticulture and floriculture is not of recent date. History informs us that the Greeks and Romans delighted in horticulture, and to them we are indebted for many of our most useful plants. They cultivated flowers very extensively, and with great success, but long as their cultivation had been carried on, it had by no means reached perfection.

Looking back during the last thirty years reveals the fact that great progress has been made in floriculture in all parts of the civilized world.

Apart from what Horticultural Societies have done, I am also pleased to see throughout the country the manner in which our universities and higher educational institutions are taking up the work of landscape gardening and kindred subjects. Floriculture, when broadly pursued, is an

education in itself; it requires great powers of observation and induction, and it has also a great moral influence.

The methods adopted during the last few years have been very much improved in Ontario, and great benefits are derived by the members of the Fruit Growers' Association, through the journal of The Canadian Horticulturist, the official organ of the Fruit Growers' Association, which a few years ago was only a small 16-page monthly journal, but has now developed into a 48-page magazine, so ably edited by our esteemed friend, L. Woolverton, M. A., of Grimsby, and is distributed monthly to every member of this Association. It is now extensively quoted by British, American, and other foreign horticultural journals, and it is constantly improving, taking a high rank with the best horticultural journals in America.

As was suggested some years ago, regular monthly meetings are a necessity of our local Horticultural Societies. Each night some special subject should be selected for discussion. A great many of the societies have adopted this plan, and good results have followed at these meetings. The younger members are induced to prepare a paper for the evening, and by this means much good has been done.

Another feature of interest at these monthly meetings is where members bring new plants of different varieties; also well-grown fruits and flowers. Thus, by comparison of results and discussion, good must follow.

The local Horticultural Societies are an interesting feature in the work of the Fruit Growers' Association, and are looked upon with great favor by the Department of Agriculture. The affiliated Horticultural Societies are proving to be far more successful in their operation than the Agricultural Societies, which are carried on in many places chiefly for the benefit of a few professional prize winners.

One line of horticultural work which is becoming quite prominent, and is being fostered and encouraged by the local Horticultural Societies, is the improvement of civic parks, boulevards, private residences, and school grounds, in many of the cities and towns; also during the summer months the holding of garden meetings at private residences, where a great many object-lessons are obtained, and which are largely attended and much appreciated. I would call the attention of my hearers to page 438, October number, 1902, of "Canadian Horticulturist," which describes one of these meetings held in the city of Woodstock.

Our local Horticultural Society is also holding successful annual floral exhibitions, which are continued for two days.

During the year we distributed to the members, fruit trees and bulbs to the amount of $60, in addition to the premium distribution of trees, shrubs, and vines from the Association; also the illustrated monthly magazine, "The Canadian Horticulturist."

Not having had the pleasure of visiting this beautiful town in the summer, I cannot say to what extent your citizens have gone in decorating their homes with lawns, shrubs, and flowers; but since coming here I heard some of your citizens say that, being so far north, the weather is too cold to raise flowers with any degree of success.

Some twenty years ago, when I made my first visit to Manitoba, there was scarcely a tree, shrub, or flower, to be seen in the city of Winnipeg. They all claimed that, owing to the severe winters, they were unable to raise trees or shrubs. This last summer I spent a couple of months in that city, and I am pleased to say that they don't need to take a second place to any of our cities. Their parks in the different parts of the city are

beautifully laid out with trees, shrubs, lawns, flower beds, etc., and are well kept. Many citizens also have front gardens, lawns, and window boxes, which would be a credit to some of our more pretentious cities in this country.

I was told while in the city that the Horticultural Society was largely the means of promoting such improvements, and what they can do in the Northwest country surely you can do here. What Horticultural Societies have done in other places can be done in the town of Walkerton through the influence of the members of your local Horticultural Society.

The great mass of the people are beginning to realize the importance of the movement in behalf of civic beauty. Back yards that have been mere receptacles for rubbish, etc., can be transformed into places of beauty. Front yards that have been ill kept can be made into beautiful lawns and flower beds. Public parks and streets can be made into walks of beauty through the influence of the members of a good, live Horticultural Society.

Not many years ago the great city of Cleveland was called the "Forest City"; to-day, through the energy and influence of horticulturists, that city has now come to be famous as "The City of Flowers." The same can be done in all our Ontario towns and cities. It is surprising also to note the improvement of late years which has taken place in the minds of the children, showing such a good knowledge of flower culture. Our duty is to encourage the children in the art, in order to cultivate a taste for it. Give them something to do in the improvement and beautifying of our homes. Talk the matter over with them, and let them know that they can help you along. They like to have responsibilities put upon them. Let them feel that you trust them, and they will not disappoint you. It will make them better fitted to take their place as men and women in later life.

In years gone by too many men considered flowers as fit only for the pleasure of women and children; but in recent years things are changing. Men are now waking up to a realization that they have lost a great deal by not having given more attention to them.

"THE TOWN BEAUTIFUL."

By C. L. Stephens, Orillia.

The beautification of the town in which we live is an object which commends itself to every patriot, and

> "Breathes there a man with soul so dead,
> Who never to himself has said
> This is my own my native land."

Certainly there are none such amongst those whom I now see around me. The first essential of a beautiful town is beautiful homes—the individual homes of the people—whether it be the palace of the millionaire or the humble cottage of the artizan. There is no true woman who ever rests satisfied with seeing the outside surroundings of her home continually in a state of mess and disorder, which may, to the unobservant eye of her better-half, be but the normal and proper condition of things; but to her finer perceptions they stand in need of a remedy, and her first attempt at improvement is the raking up of litter, etc., and then, if space at all permits, the planting of a flower or shrub or anything available which will make a show of greenery or color; one flower or plant only creates a desire for more and more again, and so the desire grows on that it feeds upon. In course of time a vine-embowered cottage or beautiful garden of flowers is the result.

and not one only so beautified, but a whole neighborhood, a whole village, a town becomes the place of beautiful homes. We find examples of this process of growth all over our fair Dominion, from ocean to ocean; wherever the cabin of the settler contains a woman, will be found this desire for tasteful homes and surroundings, which finds its first expression in the planting and care of a few flowers. The woman having thus by her exertions and example brought about the conditions of beautiful homes, the duty, chiefly, of the man begins in the making of a beautiful town; not that this is solely the duty of the man, but in his capacity as the taxpayer he has to oversee and pay for the necessary work, encouraged and advised, of course, by the gentler sex. In this work of town improvement or bautification, as considered apart from water and light supplies, and such other public necessities, the exertions of our Horticultural Societies may profitably and legitimately be engaged. This may be done in various ways. The most feasible would seem to be: the creation, first, of a public interest in the matter of streets, boulevards, sidewalks and planting of street shade trees; then engaging the co-operation of the town authorities, and any other active public organizations in the town to use their joint endeavor to see that all moneys expended and all work done in connection with any of these branches shall be used to the very best advantage. The judicious planting and pruning of trees and proper care of boulevards have a greater effect on the general appearance of a town than almost anything else, and here the judgment and advice of competent persons should always be availed of. I might here suggest that the maple, although a splendid tree, and dear to the hearts of all Canadians, is not an ideal shade tree for street planting. It grows too low; at 8 or 10 feet from the ground it branches out, and makes a thick, close head, so that in 15 or 20 years it becomes an obstruction to light and air, and it has to be entirely removed, or some butcher gets at it with a saw, and cuts off nearly all the top, leaving a most unsightly array of bare trunks and stumps; in a few years there is again a growth of head thicker and closer than ever, and the same treatment results. The elm I conceive to be the very best of all trees for street planting. With very little care it can be grown to branch at 25 or 30 feet from the ground, and to gradually extend its giant arms over the adjacent houses and street, forming a grateful shade high up, and admitting plenty of air and light—two most important matters. I would most strongly recommend the elm for street planting.

A town or village can never be made beautiful so long as live stock of any kind is permitted the free use of the streets; therefore, what is commonly called a "cow by-law" should be a first step toward the object sought; then as matters progress, the removal of all street fences in front of ornamental grounds should be encouraged, so that the passing public may enjoy their share of the beautiful flowers and foliage, which, as we have seen, were the beginning of their beautiful town. The force of public opinion will, in such a town, naturally provide that whatever money may be needed to carry out the public parts of this work shall be raised in the usual way. Having now provided for the "Town Beautiful," with its many vine and flower embowered homes, whether the palatial residence of the millionaire, the luxurious mansion of the successful merchant, the less pretentious home of the mechanic or clerk, or the more humble cottage of the laborer, all alike surrounded or fronted by the well-kept lawn or boulevard, with its well-made streets and sidewalks, its fine shade trees, properly pruned and cared for—all alike beautiful and pleasing to the eye—it remains but to con-

tinue from year to year, I might say from day to day, the effort to maintain the condition arrived at, to make your town a place of beauty and a joy forever.

OUTDOOR ROSES FROM A CANADIAN STANDPOINT.

By C. M. Webster, Hamilton.

Viewing rose culture from a Canadian standpoint reveals many points essentially different from the conditions which obtain in the broad States to the south of us. In the matter of hardiness, for instance, our winter, always more or less rigorous, will forever preclude for outdoor culture the great variety of Tea Roses which are so highly thought of in the Southern States. We are here usually compelled to cultivate them as annuals, or rather to take them up annually for protection, or protect them quite heavily if left out doors. With the best care we can never secure the large sized, well-established, wonderfully prolific bushes, that are so common where the winters are not severe. Different methods must be pursued, selection must be confined to the most satisfactory kinds only, but though in most parts of the country the cultivation of this class of roses is attended with a little extra work and some uncertainty, they are nevertheless everywhere prized for thir beauty and prolific blooming qualities. Much that is printed about roses in United States catalogues and floral periodicals refers to the latitude of Philadelphia and Washington and is the cause of endless dissatisfaction when put into practice by Canadians. For the above stated reasons only, a review of rose-growing from a Canadian standpoint would be time well spent.

How much of Canada may be considered a standpoint from which to view the question of outdoor roses? There must certainly be a northern limit, just as there is a limit for the growth of all deciduous vegetation. When however we take into consideration the recent report of our Dominion Superintendent of Forestry, that corn, tobacco, muskmelons and even tomatoes reached maturity in the Peace River valley, which the map shows to be as far north as the middle of Labrador ; we must agree that the area of country eligible for plant growth is large.

As a result of extensive correspondence, I am able to state that Hybrid Perpetual Roses are cultivated with good success in Newfoundland, also is the Laurentian mountains, the highlands of Quebec, where many of the wealthy of that Province now maintain summer residences; coming westward we find that the north shore of Lake Superior is extremely cold and trying to plant growth, at the C.P.R. station called Schreiber, I understand that Moss Roses have been coaxed to grow in spite of the fact that frosts occur at night even in the midsummer months. In the locality of Winnipeg certain hardy roses give entire satisfaction. At Regina, in the Province of Assiniboia, Rugosa Roses, Moss Roses and some of the hardiest of Hybrid Perpetuals have been wintered for several years. In that province the wind is found to be more of an enemy to roses than the severe frosts, and it is found desirable to plant in the shelter of windbreaks. The most northerly point in the Prairie Provinces about which I have accurate information about the cultivationof roses is at Prince Albert in the Province of Saskatchewan, where very fair success with cultivated varieties of roses has been obtained. Northern British Columbia furnishes food for more than passing thought. It is claimed that in proximity to the coast roses may be grown with entire satisfaction to a very northerly latitude, while in the southern part of that Province and on Vancouver Island is found the Canadian Paradise for roses. On the Island it is

quite common to pick the flowers of Tea Roses outdoors at Christmas, and all the most tender kinds will winter outdoors with scarcely any protection. At all the most northerly points there is a factor in plant growth which is sometimes lost sight of after the chilling thought of the profound depths which the thermometer reaches;—that is the article with which Kipling tried to advertize our country, the Beautiful Snow. I will endeavor to make my meaning plain by two little instances.

On certain islands in Lake Superior, off Port Arthur, many market gardens are found, in fact, there is more cultivated land on this little island than on many miles of the mainland, and there gladiolus bulbs and potatoes are often left quite safely in the ground without protection. In spite of the fact that the thermometer reaching about 40 degrees. below zero, it is not at all an uncommon occurrence.

A few years ago a customer in the Muskoka district sent an order for outdoor roses which he wished to plant immediately, that was in early December, he said if possible to send them on at once. He received an answer that our facilities enabled us to ship at any time, but as there was already a substantial crust of frozen ground at Hamilton we judged he would have to wait till spring. A prompt reply was received from the customer containing instructions to ship at once. he wished to plant through the snow. There is the explanation. In many parts the snow begins to accumulate before the ground freezes, and in almost every instance it falls deeply enough and lies constantly enough to prevent any great amount of frost from reaching the ground. This beneficent protection applies only to bush roses, such as are below the snow line. Climbing Roses should be laid down, at least until their hardiness is ascertained, and Tree Roses so much grown in Great Britain, France, etc., are better left out of the Canadian gardener's calculations altogether. Unless his residence be in British Columbia or the most southern counties of Ontario, they are too difficult to protect, and one good hard winter usually freezes them back to the stock they are worked upon, and terminates the usefulness of the plant.

I should also mention the Province of Alberta, where excepting in the most northerly part and possibly the section farthest removed from the sheltering Rockies, roses are eminently satisfactory. Now as to the older settled parts of Canada. Ontario as far north as Lake Nipissing may be set down as favorable for the queen of flowers. From Montreal northward along the St. Lawrence the climate is very trying, being very cold, and the snowfall is uncertain because of the modifying influence of the gulf. New Brunswick is, in that portion which is tempered by the Atlantic, a splendid climate in the summer and not severely cold in winter ; the same may be said of Nova Scotia and Prince Edward Island. There are numerous fine rose gardens in those parts.

Altogether Mother Nature has endowed our fair ccuntry with a good climate so far as the production of good rose flowers is concerned. We may not be able to grow successfully the Tree Roses, the Climbing Noisettes, nor get the degree of satisfaction from the Tea Roses that they do further south, but so far as this continent is concerned I firmly believe that, in the magnificent outdoor class the Hybrid Perpetuals, the trophy of excellence will eventually lay with Canada. The United States rose exhibitions may very soon hear from Canadians in the matter of outdoor roses as they have heard from Messrs. Dale, of Brampton, and Dunlop, of Toronto, in regard to roses grown under glass. At the exhibition of the American Rose Society, at New York, these two firms have for the last two years captured many of the most cherished first prizes.

I intended to dwell briefly on culture and best varieties, but will have to be very brief as I have already taken up too much time.

The question of budded plants versus those on own roots seems to be never settled. To my mind there is a great advantage in budded plants where quick results are desired, but they possess no permanent advantage over those on their own roots, and constant care is needed to prevent suckers from the stocks from appearing and sapping the strength of the good roses. Own root roses are especially desirable for cold portions of the country, for in the event of a cold winter when plants may be frozen close down to the ground, an own root plant, possessing as it does many latent eyes below the surface, will usually grow again and will invariably produce the true rose, so long as any portion of the branch or root grows.

I consider the following ten Hybrid Perpetuals as good a selection for color, form and fragrance as can be made, Jean Liabaud, Anna de Diesbach, General Jacqueminot, John Hopper, Magna Charta, Margaret Dickson, Madame Chas. Wood, Alfred Colomb, Madame Gabriel Luizet and Earl of Dufferin.

For the ten hardiest Hybrid Perpetuals the following would be chosen, Baronne Prevost, Caroline de Sansal, La Reine, Jules Margottin, Baron de Bonstettin, General Jacqueminot, Abel Grand, Paeonia, Marquis de Castellane, and lastly Madame George Bruant, which though not a Hybrid Perpetual and not double enough to be called a first-class bloom is exceedingly hardy and very pure white in color. There are several of the species that while not of use for exhibition purposes, are exceedingly hardy and showy, and are first-class material with which to begin a rose garden in sections where success is at all doubtful. Among the best known species are : The Province Rose commonly known as the Cabbage Rose. The Moss Roses, among which the strongest growing varieties should be selected. Rosa Damascena the Damask Roses. The Persian Yellow Rose, which is, I believe, botanically classed as the Austrian Briar or Rosa Lutea. Rosa setigera the parent of the valuable climbing variety Prairie Queen. Rosa Rugosa in several varieties. Rosa rubiginosa the English Sweet Briar is perfectly hardy in Ontario and desirable as a garden rose, it is worthy of a trial in more severe localities as well as its splendid hybrids known as Lord Penzance's Sweet Briars.

In conclusion, the rose, besides being the "sweetest flower that blows" is inseparably linked with the traditions of Old England, and consequently with the sentiment of every British subject, and that the rose will never reach a climax of popularity in this the most loyal of Britain's possessions we may feel assured.

Mr. T. H. Race, of Mitchell, suggests the following as being the most suitable for most points in Ontario. Beginning with the dark shades this list will cover the range of colors : Baron de Bonstetton, Gen. Jacqueminot, Alfred Colomb, Lady Helen Stewart, Mad. Chas. Wood, Magna Charta, Francoise Levet, Mrs. Sherman, Crawford, Common Moss, Crested Moss, Mad. Plantier, and the climbing Caroline Goodrich.

BEDDING GERANIUMS.

By Wm. Hunt, O. A. C., Guelph.

It is oftentimes a most difficult task to select the best varieties of these most useful and popular bedding plants, and those most adapted for bedding out purposes, from amongst the numerous varieties now offered by florists and nurserymen. Despite the fact that many of the most prominent landscape architects and gardeners consider that a bed of scarlet or of any decidedly prominent color of geranium is somewhat out of keeping and shows bad taste if planted on front lawn, the geranium is still the one universally popular bedding plant amongst the great majority of flower-lovers The increased demand for these plants every season of recent years has brought to the front many beautiful varieties and types that have proved most useful as decorative plants, whether for the greenhouse or window in winter, or for the lawn and flower-garden in summer. Those of us who remember the varieties of bedding geraniums grown upwards of a quarter of a century ago, such as Scarlet Stella, which, though beautiful in color, would, with its narrow petaled flowers and its loosely formed truss, bear no comparison (especially in form) with such varieties as J. P. Cleary, or even of the better known Alphonse Riccard, Gen. Grant and others having good records as bedding varieties at the present time. The old pink Christine and the Dwarf Scarlet Gen. Tom Thumb grown so extensively about the time that Scarlet Stella was such a favorite, have all been superseded by many varieties of greater merit, not only as decorative plants for the garden but also for cut flower purposes for use in the home. Although the old fashioned varieties that I have mentioned had of necessity to be dropped from our list they will be remembered by old-time plant lovers as having been most useful in their day and as being the progenitors of the beautiful varieties and types now in existence.

With the introduction of the really double-flowering varieties, Glorie de Nancy (scarlet) and Madame (pink) about the year 1866, came a new era in geranium life. These were the heralds of the beautiful semi-double varieties that are so popular at the present day. Both of the varieties mentioned caused quite a sensation at the time of their introduction, but like many other new types of plants did not apparently meet the requirements of the flower-loving public even at that time. Their strong rank habit of growth and the density of their flowers in the truss, made them undesirable as either greenhouse or garden plants. Like the earlier type of the single-flowered varieties before mentioned these, however, were useful in their day, and were the pioneers of the lovely double and semi-double varieties now so extensively grown and admired.

Amongst the double and semi-double varieties of geraniums useful as bedding plants, there is none more reliable and deservedly popular than the rich crimson flowering variety, S. A. Nutt. Whether planted in masses or used in ribbon borders, or even as a simple plant in the border, this variety, with its dwarf and free flowing habit, is generally regarded as the peer amongst what may be termed the ironclad varieties of geraniums, having a good robust constitution.

Amongst Scarlet Geraniums for bedding, C. Morel seems destined to become a great favorite. The trying season of 1901, with its alternate intervals of intense tropical heat for a few days, followed by a quite temperate spell for the same period, seemed unable to dim the lustre of its vivid scarlet flowers, or check it in its sturdy growth. Unless it develops some unexpected form of deterioration, the same as the Bruant geranium has of recent years, viz., in going back almost to a single flowering variety, C. Morel must have a place amongst the scarlet bedding geraniums.

Alphonse Ricard is also a reliable variety, succeeding well under very adverse circumstances, its flowers also give us a pleasing relief with their soft orange shading. Raspail Improved I do not consider a good bedding variety, as it does not stand the sun well and is too upright in its habit of growth to make it a good bedding variety. Beaute Poitevine is a good, bright salmon, flowering kind, and succeeds well outside in summer.

For a pink flowering variety Jean Viaud can be recommended. Where this variety was tested last season it gave good results, stood the hot sun well, the flowers retaining their form and color even when severe heat and heavy rain storms sadly marred the beauty of many other varieties growing near it. The old dwarf-growing variety Waddington, that has deservedly earned for itself the name of "Pink Bedder," as well as many other synonyms, cannot yet be discarded from the list of pink geraniums. For a small bed or for ribbon effect this variety is, in my opinion, still unsurpassed as a bedder, but is of little use as a pot plant or for winter flowering purposes.

Amongst the lighter-colored double varieties, La Favorite, for a white is probably the best white-flowered bedding variety. Hermine, that produces its ivory white flowers in such profusion, when grown as a pot plant for the window or greenhouse in winter, is not adapted for a bedding geranium, the hot sun stunting its growth and often stripping it almost entirely of its small delicate foliage. Gloire de France, another good variety when grown as a pot plant, is also of very little use as a bedding variety. Its pretty pink and white flowers and its pretty marked foliage, however, make it still one of the best varieties for a window, or for the conservatory.

Amongst the single flowering kinds, Gen. Grant, for a scarlet, still holds a place, and is very effective when massed in large beds, or when used in ribbon or mixed borders.

Meteor is another good variety, not quite as intense in color as Gen. Grant.

John P. Cleary comes as near what is considered a perfect flower as any of the single flowering varieties, and where tested has stood the sun extremely well. A fully developed truss of this variety is a pleasing sight to all who love a soft orange scarlet flowering geranium.

Mrs. E. G. Hill is not yet surpassed for habit of growth and for producing a wealth of bloom under almost any condition of growth.

Dryden is a single flowering variety that promises well as a bedding variety. Its finely formed and beautifully blotched and tinted rose-red flowers, make it quite an acceptable addition to the list of single bedding geraniums.

Amongst the silver-foliaged geraniums there is nothing can outdo Madame Solleroi, especially as an edging or border plant. Mountain of Snow is about the only other variety of silver-edged geraniums worthy of growing as a bedding plant.

Tricolors and bronze geraniums cannot be included amongst the list of bedding geraniums, being far more difficult to succeed with than even the most delicate of our summer flowering begonias. As pot or window plants they still have a place, but are of too delicate a nature to succeed as bedding plants.

There are many more varieties of geraniums that could be spoken of as good bedding varieties other than those I have mentioned. Those that I have mentioned are varieties that will give good satisfaction with perhaps less care and attention than many other varieties; a fact that has influenced me materially in recommending them for out-door decorative purposes.

HARDY ANNUALS.

By P. W. Hodgetts, Toronto.

Many of the annual flowering plants of our garden cannot, in our climate, be planted out before the first of June. These require greater warmth for the germination of the seed and growth of the young plant than is usually found in Ontario before that date and succeed best when raised in the house or in hotbeds and transplanted to their place in the flower beds when the really hot hot weather has set in. These plants are known as half hardy or tender annuals in proportion to the amount of cold they can stand and yet make a successful growth. Among these, are Asters, Verbena, Salvia, Dianthus or Pinks, Phlox and Lobelia. All of this class can be sown in the open ground, but not till the weather has become settled and warm. The hardy annuals are those, the seed of which may be planted as soon as the ground is ready in the spring, and which germinate rapidly and grow vigorously without the aid of artificial heat. Usually these are planted in April or May, depending on the length and severity of the winter, and the location of the beds where the seed is to be sown.

Now, just a few words as to the location and the preparation of the beds. Annuals, as a rule, make their best growth right out in the full sunshine, where they get all the warmth possible. Among the few exceptions are the pansies and forget-me-nots which seem to like the shadow, part of the day. For soils, we can by care and constant cultivation succeed with even the hardest clay, and some annuals will grow and thrive in places which are seemingly nothing but rock and sand. On account of their adaptability to all kinds of soil and conditions, the annuals are our favorite plants and bring cheer to many a home with their bright and sweet-smelling flowers. While growing thus under poor conditions, they more than repay the gardener who has the opportunity to use the best of soils and takes the trouble to prepare such in the best way possible.

The beds should be thoroughly prepared and manured as soon as possible in the spring, the whole surface being dug over to a depth of 10 or 12 inches, and the first few inches may often be profitably turned over again and then smoothed and levelled with a fine rake. A dressing of well-rotted leaf mold, sods and cow-manure will repay the trouble of procuring and applying the same. Anyone who intends keeping flower-beds year after year should make a practice of preparing a compost-heap in some out-of-the-way corner of the garden, and there should be thrown all the leaves and grass rakings, sods, weeds, and similar material from the lawn and beds, and it should be supplemented from time to time with a load of cow manure. This material when well rotted and mixed together forms the ideal application for the flower beds where you hope to grow your annuals.

To get back to our annuals again, we must get our seed selected. Purchase good varieties from reliable firms and buy the colors separate, so that in arranging the plants in the beds, one will know just what combinations of colors will be formed. The habit of the individual varieties should be known, as whether they are dwarf or tall-growing, spreading or erect, continuous blooming or otherwise. Plants which bloom for a short period only, may profitably be sown at intervals of ten days or more, so as to have a succession. Tall-growing varieties show best in the rear of borders or in the centre of other beds. Then the low-growing plants show off to better advantage, having the foliage of the taller-growing ones as a back ground. The same pleas- perennials in a border, where there is of necessity portions of the ground

uncovered. Annuals generally are most effective when sown in masses with due appreciation of the colors to be in proximity. Many prefer the beds of one variety and many colors, as a bed of petunias or poppies : while others prefer the judicious use of a mixture of varieties either indiscriminately or in certain groups. At the Agricultural College last year, one long bed or border was laid out in blocks, each of which was planted with one variety and in most cases one color. No special care was exercised in the arrangement of the varieties, Calendula, Centaurea, Salpinglossis, Poppies,Phlox,Petunias,etc.,following one another in seemingly endless variety. The effect was novel and yet pleasing as one looked down the long bed with its great variety of blossoms and foliage. As the early kinds blossomed and died away, they were at once replaced with others from the neighboring boxes or supply beds, and so the picture never faded all summer long, and was a never-ending source of pleasure to the thousands of visitors to the College during the summer.

A very pretty and attractive border may be formed by the use of the tall-growing perennials or even some of the annuals as a background with irregular groups and single plants of the annuals interspersed to form the foreground. In such a border, the correct use and combinations of colors and sizes determine largely the beauty of the whole, and much originality in these lines may be displayed there. The use of the hardy annuals for ribbon and pattern beds is not desirable, as they are, largely, plants requiring freedom of growth and not such as will withstand the clipping and trimming necessary for such artificial work. Their chief aim in life seems to be to produce beautiful flowers, not beautiful foliage, and they certainly succeed when given a fair chance.

Having prepared the surface of our beds, we take the first opportunity in the spring of putting in the seed. If the surface soil is apt to bake and form a crust, a slight sprinkling of sand will tend to remedy the defect and give the tiny seedling, when it springs up, a chance for life. Wherever seed is sown, a label should be placed at once to prevent destruction of the young plant during the weeding, which is sure to be required before the young plant is old enough to be identified. Very fine seed, as that of the poppy, may be sown right in the surface of the soil, while most seeds may be put down to a depth of three or four times their own diameter. As soon as the seed is in, the surface of the ground should be firmed by pressing with the hand or a flat board, to promote the supply of moisture at the surface of the soil and surrounding the seed.

A good many of our hardy annuals will not stand transplanting and should be sown where they are to grow and flower. Among these are the Poppies, the Lupines, the Mallows, and the dwarf Convolvulus or Morning Glory. Others only bloom for a short period, especially if the blossoms be left uncut, and with these a succession of bloom can be obtained by planting seed at intervals of ten days or a fortnight. With plants that will transplant readily, a good method is to raise them in beds or boxes, thinning them out and removing them to their places in the flower beds, as they get to the proper stage of growth. In this way, when the varieties that blossom and die off early are pulled up, other kinds of later blooming season may be put in to replace them, thus keeping up the beauty of the beds till the frost comes. With some varieties, as the nasturtiums and sweet peas, a constant picking of the bloom is necessary to prevent the premature dying of the plant, due to the strain necessary to produce seed. Indeed, this applies more or less to all annuals, and even extends to the fruiting of our orchard trees where, as is well known, excessive crops of fruit one year tend to weaken the trees so that no crop is borne the following season.

Cultivation during the season is necessary to success in all lines of orchard and garden work and should be carried on continually during the summer weather in connection with the flower beds. After each rain, as soon as the surface is dry enough, get out your hoe or rake, and stir the soil about the plants. Do it frequently. It is better to err by doing it too frequently than not often enough. You will be more than repaid by the results, both in freedom from weeds and increased growth and health of the plants. Keep it up during the hot summer weather when the rain comes at rare intervals and the plants wilt from lack of moisture. It is surprising what a beneficial effect a simple stirring of the soil will then have in increasing the supply of moisture available for the plant roots.

Now just a few words on the annuals most suitable for us to grow in this country.

Climbers.

These we could not do without, as they form the standard covering for unsightly fences and porches, or for growing upon trellises to obscure the views of the back yard or garden.

The Morning Glories are still among the most popular for these purposes. They are noted for their hardiness and vigor of growth, and with their pretty, trumpet-shaped flowers of rich and varied colors, they will always be one of the most popular climbers. The tall or climbing Nasturtiums have of late years been superseded largely by the dwarf varieties for general bedding purposes, but are still worthy of a front place among our climbing annuals. They are luxuriant climbers or trailers and may be used with good results in hanging baskets. The new varieties include brilliant and varied list of colors, rose, salmon, scarlet, pink and white and either spotted, blotched, mottled or striped in numerous shades and combinations of colors. The Cypress Vine forms a very vigorous scarlet or white flowered climber. Another popular climber is the Canary Creeper or Canary Bird Flower. It is known for its fine foliage, and bright yellow flower shaped like a bird with spreading wings. This climber will grow to a height of eight or ten feet in good soil, and while not so hardy or vigorous as the others mentioned, is worthy of cultivation. The last in my list and perhaps the most popular is the Sweet Pea. On account of its hardiness and the extreme beauty, and sweetness of its flowers, it finds a place in every well-kept flower garden. Of late years great improvement has been made by Eckford, Henderson and Burpee in this plant, and their strains are now acknowledged to be the best.

Tall-Growing Annuals.

Among these are the Poppies, Centaurea, Calliopsis, Schizanthus, Salpiglossis, Calendula, Malope, Clarkia, Argemone and Larkspur.

The Poppies are vigorous growers attaining a height of 2 or 2½ feet before the end of the season, and where planted in clumps or masses make a splendid display. One of the prettiest single-flowered varieties is Miss Sherwood, a pink bloom of 3 to 3½ inches in diameter. Another very fine one is the well-known Shirley, which has a slightly smaller bloom in shades of pink, white and salmon. Then there are the double-flowered and fringed varieties in scarlet, pink and salmon. All of these are worthy of a place in our gardens, and are easily raised from seed but will not transplant readily. A border of these poppies in many shades and varieties was a great attraction during last season on the G.T.R. station grounds at Hamilton.

Centaurea Cyanis or as it is commonly called, Corn Flower, is one of our old favorite annuals. Most varieties grow to a height of 2 or 3 feet and

blossom freely, forming a good source of supply for cut flowers. The blue shades hold their color well while the pink and white shades soon fade. Among the good kinds are Emperor William, tall-growing and vigorous, and Victoria, a dwarf species growing in clumps and with small blossoms from 3-4 to 1 inch in diameter.

Calliopsis or Coreopsis is another splendid free-growing plant for cutting purposes. Many of the varieties reach a height of 3½ feet during the season and blossom continuously. As a cut flower it has few equals as it keeps fresh for such a long time on the table. Calliopsis elegans picta is a very pretty variety, with large red centre, and sulphur yellow border. C. Drummondii is of dwarf habit and slightly larger blossom. It is a very free bloomer with a small dark centre and golden yellow border. Other varieties of orange, yellow and brown shades may be obtained and are all good.

Calendula or Pot Marigold is another old favorite which has undergone many changes of recent years and is now much improved. The flowers, which run from 2 to 3 inches in diameter, are borne on long stems and when massed make a splendid show. The plants are vigorous growers and bloom freely, but the blossoms tend to grow smaller toward the end of the season. Meteor is an orange and cream-colored variety of good shape. Prince of Orange and Double Nankeen are both fine varieties with blossoms of brilliant orange and yellow shades. C. Officinalis ranunculoides is a distinct type, with broad orange-colored petals. Other varieties show varying shades of light yellow, orange, yellow tinted with orange, and greenish white but many of these do not hold their color and soon fade.

Malope grandiflora, a relative of the garden mallow, is another plant well worthy of a place among our annuals. It is not often seen in our garden being comparatively new. The plant is very vigorous and of spreading habit and bears many pretty bell-shaped flowers very useful for decorative purposes. There are two varieties, M. grandiflora, rosea and alba, rose pink and white respectively. The blooms of this plant, like the Calliopsis, are splendid keepers and are very useful as cut flowers.

Another of the useful plants furnishing flowers for decorative purposes is the Mexican Poppy or Argemone grandiflora alba. It was described by Mr. Hunt of the O.A.C. in the October number of the Horticulturist as follows: "Although the growth is coarse (3 ft.) the abundance of its pure white petalled flowers will especially commend it to florists as it gives an abundance of blossom during the month of August, if sown in the open border in April. This plant has a habit of closing its flowers when on the plant at night and during dull weather, but when cut, they remain open constantly. Although the stamens in the centre of the flower are yellow, it is of such a soft shade and texture that this feature is not as objectionable as it is for florists' flowers. For short time work it ought to be of value to florists, as large white flowers are so scarce oftentimes before the Asters make their appearance."

The Salpiglossis, another tall-growing annual, produces flowers which for richness of color can hardly be matched. The flowers vary from 1½ to 2 inches in diameter and are shaped somewhat like the Nasturtium blossom. S. variabilis coccinea has small blossoms of a maroon color with gold splashed throat. S. variabilis albo-lutea has larger flowers of pale yellow turning to white at the edges. S. variabilis venosa is very fine with purple blossom and orange-tinted throat. S. variabilis nigra, as the name implies, is very dark maroon with prominent yellow stamens. S. variabilis rosea is also an excellent variety with rose pink blooms.

Clarkia in two varieties, pulchella and elegans, furnish an abundance of many colored flowers of single and double forms. The blossoms are of brilliant hues and odd shapes and when the plants are massed, the bloom completely hides the foliage. C. pulchella is a low-growing single variety, while C. elegans is tall and double.

Schizanthus is another free blooming plant which makes a fine show for a short time in July and August and then dies off rapidly. Like Clarkia it comes in many shades and forms a mass of bloom above the plants themselves. The blossom is small and peculiar in shape giving the name Butterfly Plant.

The Larkspurs or Delphinium are well known as perennials and deserve attention as annuals also. The flower spikes grow from 3 to 4 feet in height and are splendid plants for the background in borders. There are several pretty colors, light and dark blue, white and pink being most prominent.

Another tall-growing annual of use for cut flowers is the Chrysanthemum. Like the Larkspur, it is more known as a perennial and green house plant. The annual however has been much improved of late and some of the markings are especially fine. By sowing the seed early, an abundance of flowers will be produced in August and September, and these will be found very useful for table and home decoration.

Low-Growing Annuals.

Among these, the best are Portulaca, Mignonette, Candytuft, Shortia, Eschscholtzia, Viscaria, Xeranthemum, Hawkweed and Cacalia.

The first three are old favorities and are so well known as hardly to need description. Portulaca can now be obtained in very pretty colors, either pure or mottled and spotted, bronze, pink, carmine, rose, sulphur yellow, golden yellow and pure white. Portulaca Beddmani has a very pretty pure white blossom. All the colors can now be obtained separately and make a better show than when mixed.

Of the Mignonettes, one variety known as odorata grandiflora, produces a fine and fragrant flower spike. Other good kinds are Glory of Anjou and Allen's Defiance.

Among the varieties of Candytuft the dwarf whites generally give the best effects. Little Prince is a free bloomer, pure white, vigorous and spreading with flower spikes over an inch in diameter. Another dwarf is White Empress with large and showy spikes. Another variety "New Carmine" has spikes of carmine hue and plants of higher growth.

One of the newer annuals is Shortia Californica, a low spreading plant with fine cut foliage and poppy-like blossoms of bright, yellow color. It is a free bloomer and vigorous grower.

Another annual, Eschscholtzia, or California Poppy, produces pretty blooms of golden, rose and cardinal shades. It is a showy plant with large blooms, is very vigorous, and is well worthy of a trial. It will not stand transplanting and needs plenty of room to grow, but once established furnishes a succession of bloom all summer. E. Californica is one of the older varieties. Golden West produces single golden yellow flowers. E. alba plena is a double white kind, while Rose Cardinal is, as the name implies, a rich rose color.

Viscaria, another desirable annual, has a growth like the pink, and a small bloom of mixed pink and white color. The growth is vigorous and pretty, and the plant spreading, and well worth having in the border.

Xeranthemum annuum is a type of the everlasting flowers, and its pretty blossoms may be cut, and kept like the wild everlasting. The blooms show

several shades of pink and white, and are from 3-4 to 1 inch in diameter. The plant is easily grown and is quite hardy.

Hawkweed is a pretty annual with a bad name. It is practically a pink dandelion, giving a profusion of bloom, and lasting almost all season. It should not be allowed to get out of the garden, as it might, like the yellow dandelion, become, as the name implies, a weed.

SOME PERENNIALS I HAVE GROWN.

By Major H. J. Snelgrove, Ph. B.

All who have read Ernest Seton-Thomson's charming book, "Some Wild Animals I Have Known," could not fail to be fascinated with the moral beauty of the animal character which he portrays so vividly in such four-footed heroes as the Pacing Mustang, his dog Bingo, or Raggylug, the Cottontail Rabbit. Such a graphic history of animal life brings us in closer kinship and warmer sympathy with the highest forms of nature.

As a lover of flowers, I would fain wish that some great artist would do for our fair garden favorites what Ernest Seton-Thomson has done for the wild animals, by investing them with moral attributes, and presenting psychological pictures of the most beauteous forms of plant-life. To illustrate my meaning, let me quote the pretty story of the Briarbush which Raggylug learned from his mother :

"Long ago the roses used to grow on bushes that had no thorns. But the squirrels and the mice used to climb after them, and the cattle used to knock them off with their horns, the possum would twitch them off with his long tail, and the deer with his sharp hoofs would break them down. So the Briarbush armed itself with spikes to protect its roses and declared eternal war on all creatures that climbed trees or had horns or hoofs or long tails. This left the Briarbush at peace with none but Molly Cottontail, who could not climb, was harmless, hoofless and had scarcely any tail at all."

It was Henry Ward Beecher who said :—"Flowers have an expression of countenance as much as men or animals. Some seem to smile; some have a sad expression ; some are pensive and diffident; others again are plain, honest and upright, like the broad-faced sunflower and the hollyhock."

Cowper truly wrote : "There is not a flower but shows some touch, in freckle, streak or stain, of God's unrivalled pencil."

I presume that each one here present may be regarded as an interpreter of the divine language of flowers and so can say with the poet :

"Sweet letters of the angel tongue,
I've loved ye long and well,
And never have failed in your fragrance sweet
To find some secret spell—
A charm that has bound me with witching power,
For mine is the old belief,
That midst your sweets and midst your bloom
There's a soul in every leaf."

But my task on this occasion must necessarily be more practical than poetical. It is my intention to describe a few of the best hardy perennial flowers which we have successfully introduced to Cobourg gardens through the distributing medium of the local Horticultural Society. It has always been our policy to foster as much as possible the cultivation of perennials, because we find that although the initial expense may be a trifle greater than the cost

of annuals, yet the results are so infinitely more abiding and satisfactory as to repay us fourfold for any extra expense at the outset.

In passing, I would say that many of the ancient flowers which had an honored place in our dear mother's old fashioned garden are not surpassed to-day by the latest novelties imported from foreign nurseries. Who does not remember with fond delight the clumps of tear bedewed Bleeding Heart, the flaming red "Pinies," the gaudy Tiger Lilies, or the bonnie bushes of Prairie Rose and Flowering Almond beside the garden gate?

Poor Tom Hood's sweet song touches tenderly the heartstrings of every old boy:

"I remember, I remember,
The house where I was born;
The little window where the sun
Came peeping in at morn * * *
* * *
"I remember, I remember,
The roses red and white,
The violets and the lily cups,
Those flowers made of light!
The lilacs where the robin built
And where my brother set
The laburnum on his birthday—
The tree is living yet."

But while revering the old flowers, we are behind the age if we do not recognize the fact that to botanical exploration and hybridization which have been prosecuted with indefatigable enthusiasm in all the older countries especially are we indebted for many new varieties, whose blossoms are beautiful to behold.

I use the word "perennials' as a short form of the phrase, "hardy herbaceous perennials," which are non-woody plants, whose roots live over the winter from year to year while their tops as a rule die down to the ground. Nearly all perennials should be lifted now and then, because the crowns which produce the flowers bloom only two or three seasons and then die and unless lifted and divided the stocks become unattractive. Another good reason for lifting and resetting is that, being mostly strong rooted plants, they are sure to impoverish the soil.

The following well-tested species are described alphabetically, not in order of preference:

1. Achillea, whose virtues are said to have been discovered by Achilles, The Pearl is a gem among border flowers, and most useful for cutting, especially for cemetery decorations. Its double white blooms are exquisitely pure in color and very numerous on the stalk. Its culture is easy.

2. Anemone (Windflower). This showy plant flowers from spring till autumn. The Japan Anemones are invaluable for cut flowers, being stately plants for mixed borders. Alba and Coupe d' Argent are the finest of fall bloomers. They thrive best in fresh, rather rich sandy loam.

3. Aquilegia (Columbine) from Latin Aquilegus, the water drawer, is one of the most beautiful and popular of all hardy plants. It is best propagated by seed, which is slow in germinating. Aquilegia Corrulea, the Rocky Mountain Columbine, should have a place in every border. The flowers are of the most lovely and delicate sky blue and white, with very slender spurs tipped with green. Light sandy soil, moist with good drainage, sheltered but exposed to the sun, is what this elegant plant prefers.

4. Campanula (Perennial Bell Flower). There are about 300 species of this genus, for the most part of great beauty and invaluable as cut flowers. The Canterbury Bell is the most popular of all Campanulas. Although

England is the natural home of this garden favorite, its cultivation is easy in this country, where it can be grown from seed in any rich, well-drained sandy loam. The dwarf varieties are fond of rockeries.

Platycodon Grandiflorum, a handsome species of the Campanula, is found growing wild in China and Japan. Its blue or white bell-shaped flowers are very desirable. The stems should be kept tied up during the season and they should be allowed to die off naturally in the autumn, otherwise the crown may be injured.

4. Centaurea, a showy border plant of easy culture in ordinary garden soil, flowering during the months of July and August. Atropurpurea, royal purple; Declinata, pink; and Macrocephala, yellow, produce striking specimens of these thistle-shaped flowers.

5. Coreopsis Grandiflora. A golden yellow perennial which should be grown far and wide. It is fine for cutting and easy of culture.

6. Delphinium (Perennial Larkspur) named after the dolphin, an animal which it is said to resemble, is one of the most beautiful of all flowers and of rare value for cutting purposes. It is gorgeous in color and stately in habit. I know of no flower which exhibits more splendidly the various shades of that Imperial color, blue. The Forget-me-not is loved for its fresh azure; the Gentian for the shade which is called by its name. The Delphinium possesses both of these in its repertoire of tints, together with the depth of the sapphire and the hue of purple; and as the mountain snows shine more resplendent in a setting of blue sky, so the striking white central petals of the Delphinium form the best of all possible contrasts to the color of the surrounding sepals. It is almost impossible to convey anything like an adequate idea by mere description of perfect columnar spikes of bronze blue which are freely borne by the Delphinium. During the past decade this splendid flower has been improved out of recognition, being prolific in new varieties. The culture of this popular perennial is exceedingly simple. A rich friable loam will suit it finely, but any soil even hot and sandy, if well watered and manured and exposed to the sun will give excellent results. Deep preparation of the soil is important. This perennial may be propagated by root division or by cuttings. An avenue of Delphiniums lining a walk or a drive is a grand sight.

7. Digitalis (Foxglove). Latin digitus, finger, is a fine genus of half hardy plants. Their long inflated flowers suggest spires or towers of bells; the strong vertical lines of their flower stalks rising from rich and luxuriant masses of cauline leaves, giving always an appearance of strength to the rambling outline of the herbaceous border. This is old-fashioned and dignified, but wholesome company in the choicest garden. The popular name, Foxglove, is said to be a corruption of Folk, meaning little folk or fairies. A light well-enriched soil, not too dry, and impartial shade, suits it admirably.

8. Doronicum Plantagineum Excelsum, (Leopard's Bane). This is one of the best and most satisfactory of herbaceous plants. It commences to blossom early in the year, and continues till late in the autumn. The flowers are borne upon long straight stems high above the basal crown of foliage which render them very convenient for cutting. I have seen them fresh and unfaded after being in water ten days. The marguerite-shaped flowers, with long narrow rays, are of the brighest yellow. It succeeds well among shrubs as well as in borders.

(9) Gaillardia Grandiflora. Among hardy perennial plants Gaillardias are conspicuous for perpetual profusion of flowers from June to November. The abundant blossoms produce a gorgeous effect in borders. Thanks to the

careful selection of the hybridizer, there has been a vast improvement in size, form and range of color on the old varieties of Gaillardia. It is highly recommended for cutting purposes, as the flowers will last for a long time in water, and can be cut with ample self-supporting stems. It is content with simple treatment, but thrives best in light, open, well-drained soil, and should have the full benefit of sun and air.

(10) Iris (Greek word for rainbow). The beauty of the Iris is proverbial. The rhizomatous varieties belonging to the Germanica family are large, stately and fragrant, exhibiting beautiful variegations of color. They delight in deep, rich soil. Coal ashes will protect the rhizomes during the winter.

(11) Lobelia. Few plants are more effective or richer in color effects during their blooming season than Lobelia Cardinalis, or Indian Pink, one of the most showy of all native flowers ; Lobelia Syphilitica, purple; or Lobelia Firefly, brilliant scarlet. As the native Lobelias inhabit wet, low places, the best results under cultivation are to be expected in moist, cool spots, soil deep and rich, with good drainage.

(12) Lychnis. No garden, however small, should be without some representatives of this favorite perennial. The little dwarf Alpina, with its pink, star-like flowers begins to bloom in April, and continues until the hot weather sets in. Chalcedonica, whose petal limbs resemble a Maltese cross, probably of Japanese origin, brick red to scarlet, is one of the most distinct and desirable, growing about three feet high. Another approved variety is Vesperina, whose large, double white flowers are produced in great profusion all summer, taking the place of Carnations when white flowers are scarce. Splendens is a distinctly new and beautiful variety, whose large, double blossoms of a bright firey rose color are arranged very closely. They are of the easiest culture in ordinary garden soil. Several species of Lychnis are among the best known of old-fashioned flowers, such as the Mullein Pink and Ragged Robin.

(13) Papaver Nudicaule. The glory of the arctic regions. Iceland Poppies are admirable for the front of a mixed border or in a small bed by themselves. Their graceful, brightly-colored, cup-shaped flowers, borne on long, naked stems, are invaluable for cutting for the table. As a perennial the P. Nudicaule is short-lived, while the Oriental Poppy is long-lived. The latter produces immense numbers of the most gorgeous flowers of great size and wide range of color, creating a magnificent effect. Oriental Poppies may be massed in the border, grouped on the lawn, or mixed with shrubbery.

(14) Paeonia. The Paeony is the fashionable flower par excellence. Botanical historians tell us that the plant derives its name from Paeon, a physician and erstwhile disciple of AEsculapius, the god of healing. The ancient legend runs that Paeon cured Pluto of a wound received from Hercules, and when this fact became known to AEsculapius, it aroused feelings of jealousy within his breast to such an extent that he secretly killed Paeon. Pluto, out of gratitude to Paeon for saving his life, determined to perpetuate the latter's memory for all time by changing him into a flower, henceforth to be known as the Paeony. Herbaceous Paeonies are, in my opinion, the noblest and grandest of all the hardy perennial plants. The cut flowers, produced in great profusion, in an almost endless variety of lovely tints, are unrivalled for decorating vases and bowls. In delicacy of tint and fragrance, the Paeony more easily approaches the Rose than any other flower. To show the wonderful development that the herbaceous Paeony, which justly claims the title of "Everybody's Flower," is capable of undergoing, let me say that in 1855

only 24 double varieties were known. Now more than 1,000 varieties are grown. The single-flowering kinds are not so popular as the double ones, because they do not keep as long when cut, and fade more rapidly when on the plant. They will grow in all kinds of soil, but do best in a deep, rich, rather moist loam. They are gross feeders. An annual top dressing of cow manure, put on in November, should be forked in in the spring. The roots should be watered, especially when in bloom. Liquid manure will give good returns. Paeonies have nothing to fear from pests, not being attacked by any insect, animal or fungous disease, neither do they require any covering from the severest weather.

(15) Autumn Phlox. Their neat habit, bright-colored flowers, profuseness of bloom, and ease of culture make herbaceous Phloxes favorites everywhere. Among these beautiful hardy perennials the colors are most frequent in reds, but there are many charming purple, white, violet, and parti-colored varieties. The Autumn Phlox will thrive with little attention, but should be renewed by dividing the clumps in the fall, after growth has ceased. By this process the plants do not become weak and hidebound.

(16) Pyrethrum. A handsome member of the famous Chrysanthemum family. Nothing can surpass the almost infinite variety of the Pyrethrum, which is deservedly becoming more and more popular in this country. The Aster or Chrysanthemum-like flowers are bright and showy in the garden, and elegantly borne on long stems, most convenient for vase decoration. In fact, they are absolutely invaluable for cut flowers from spring to autumn. Flowers succeed flowers without stint, and the blossoms are not injured by storm or sun. They grow freely ; any good garden soil will suffice for them, but they are rich feeders, and, therefore, the ground should be deeply dug and liberally enriched with manure. The ideal soil for the Pyrethrum is rich, sandy loam, sufficiently porous to prevent stagnant moisture accumulating about the crowns of the plants, because crown-rot will make sad havoc with them. Over 400 varieties have been catalogued, embracing most varied shades of color, from the purest of white to the richest of crimson, and even yellow.

(17) Rudbeckia "Golden Glow." It was in 1896 that J. L. Childs found this double-flowered Rudbeckia among some wild plants that had been sent to him by a correspondent. It has been pronounced the best perennial of recent introduction. It is of striking habit, distinct foliage and prolific bloom, beginning to flower early in July and continuing all through the summer. It frequently attains a height of seven feet. Its large, yellow flowers are produced in immense quantities on long stems, and resemble fine golden Cactus Dahlias. As a cut flower it is unsurpassed. If cut back severely when through blooming and well watered, it often produces a second crop of flowers. Being a vigorous grower, it should be assigned to a sunny corner, where it can reign alone the proud monarch of the border.

HARDY DECORATIVE SHRUBS AND PLANTS.

By Wm. Hunt, Superintendent Greenhouses, O. A. C., Guelph.

The selection of a suitable list of ornamental shrubs and plants for lawn decorative purposes is oftentimes a difficult matter for those who wish to beautify the surroundings of their home with these permanent occupants of the lawn or flower garden.

A bed of annuals or of greenhouse plants, if not a success during one season, can easily be changed the following season to something more ap-

propriate. Not so with hardy decorative shrubs, climbers, etc. These take a year or two, at least, before they even commence to show anything like their true characters of form and habit, and their suitability; or, as is too often the case, their non-suitability for the positions they are to occupy—that is, when badly selected. Too little care and forethought is generally exercised in the selection of these plants by the majority of amateur landscape gardeners.

How often can be seen some of the most beautiful varieties of flowering shrubs, such as the Tartarian Honeysuckle, Syringas (Mock Orange), Lilacs, Cydonia Japonica, and many more of the larger growing shrubs, planted in positions where they can never have an opportunity to make the

Weigela Rosea.

grand specimens they are capable of making, and develop their full beauty of form and flower. The average-sized lawn, as generally seen at the present time attached to villa residences, or the grass plot in front of the farm house, is no place for the stronger growing class of shrubs I have mentioned, unless, perhaps, to hide some unsightly building or fence. The central portion of small lawns, at any rate, should not be planted with these large specimens of shrubs; possibly one or two might be planted on the margin of a fair-sized lawn, without undue crowding or obstructing the view too much. A large shade tree or two, however, would be far more preferable, planted in the open lawn, than large-sized shrubs, besides being more useful as a summer shade; and would not have the same unpicturesque appearance that some ornamental shrubs present, when not in flower.

Take, again, the conifers and evergreen trees and shrubs. How often

do we see specimens of the tall-growing Norway spruce fir, and the common red cedar, planted quite thickly on lawns of small dimensions; where, in a short time, they have to be clipped severely every year to keep them from monopolizing the whole lawn. This clipping not only destroys the beautiful symmetrical form of these trees, but gives them a decidedly rusty-looking appearance during the greater part of the year, besides being a constant source of expense and trouble to keep them in shape.

The proper position for the stronger growing pines and cedars, if used near a small lawn at all, is to use them as wind-breaks, or as marginal screens, to hide from view some objectionable feature of the landscape in the background. I am aware that these cannot be classed as shrubs, but as

Lilac, Charles X.

so many of them are planted on lawns, and often present such an objectionable appearance, I could not refrain from mentioning them in this connection.

I do not wish to depreciate in the least, by the remarks I have made, the grandeur and beauty of the larger growing conifers and evergreen trees, as well as the shrubs, I have mentioned. Given their proper positions and environments on large lawns, or in parks of great extent, or in positions where they can each fully develop their individual beauties of form and flower, there is no class of trees and shrubs that will add more grace and beauty to landscape scenery than the many varieties to be found amongst the tall growing conifers and the flowering shrubs before named.

I have been tempted to condemn, as strongly as I have done, the in-

judicious planting of these trees and shrubs on small lawns, from the fact that one sees so many otherwise beautiful and attractive lawns entirely spoiled by the planting of unsuitable trees and shrubs. Just a word here to the nurserymen in this respect. "If more detailed descriptive matter, as to the habit and growth of trees, etc., were given, rather than such highly-colored plates and flowery descriptions often made use of in catalogues, there would be far fewer disappointments and comparative failures, and, as a natural sequence, there would be a greater demand for this class of nursery stock."

There is nothing, however, that adds more to the home-like appearance of even the most unpretentious residence than a well-selected and judiciously

Large-flowered Syringa.

planted collection of ornamental and decorative shrubs, to say nothing of hardy climbers and perennial border plants. Planted around the margin of a lawn, either singly or in a border, they give a look of permanency, as well as a constant succession of color and blossom, that annuals and most summer plants fail to do, desirable as these latter are.

I have selected the following list of varieties of flowering shrubs, with a few short descriptive notes as to habit of growth, as well as time of flowering, suitable for planting around and on small lawns:

1. Forsythia intermedia : A variety of the Golden Bell Flower ; hardier than the other Forsythias; flowers early in spring, in April or early in May;

will grow to a height of five or six feet, often occupying a space of four or five feet in width. One plant will brighten up a whole lawn with its golden drooping flowers.

2. Spiraea prunifolia flore pleno : Double white flowering spiraea. Very free flowering; will grow to a height of four feet; flowering period, about the end of May. Makes a splendid specimen plant.

3. Diervilla or Weigela rosea: Four feet high; flowers in June.

4. Diervilla or Weigela Mons. Lemoine: Similar to D. rosea, but considered to be hardier ; June. Cannot be dispensed with in even a small collection of shrubs.

5. Caragana arborescens: Siberian Pea Tree, 5 to 6 feet. July. Very hardy.

6. Prunus flore albo. pleno: Double flowering almond, 3 feet; May. Fine for use in the foreground.

7. Spiraea Van Houttei : Four feet ; flowers early in June ; one of the best varieties. Graceful drooping habit.

8. Deutzia gracilis : Very dwarf habit ; 2 feet ; flowers about second week in June. Can be planted near the edge of a walk or border.

9. Spiraea Thunbergii ; One of the earliest flowering spiraeas, being often in flower early in May. Of dwarf habit, 3 feet; makes a pretty globular shaped shrub. Foliage very pretty and effective in autumn.

10. Hydrangea paniculata grandiflora: Large specimens, sometimes 3 or 4 feet in height. Produces its large, creamy white panicles of flowers in August and September, that often last until early frosts. Hardy. The flowers of this plant can be cut before severe frosts, and placed in a vase without water, where they look bright and nice the whole winter.

Evergreens.

Amongst the dwarf conifers and evergreens for planting on lawns, the Junipers and Thuya (Arbor Vitae) furnish the most desirable varieties; Juniperus suecio nana, or Swedish Juniper, and J. Hibernica, or Irish Juniper, being two good kinds. These will grow to a height of five or six feet, or perhaps more, and are of very erect conical habit. Fine for the centre of a lawn, as they do not materially obstruct the view.

Amongst the Arbor Vitae, the variety Little Gem is perhaps the dwarfest and prettiest, having dark green foliage, and attaining a height of only about two feet usually ; makes a good lawn hedge.

Thuya compacta and T. globosa are both good hardy varieties of dwarf habit, and pretty foliage, making nice globular-shaped specimens about 3 ft. high

Thuya Tom Thumb is a splendid dwarf variety, suitable for a hedge, or for planting singly on lawns.

Amongst hardy evergreen shrubs, the dwarf growing Mahonia aquifolium is the most hardy. A shaded position suits this shrub best. Its foliage is a good substitute for holly at Christmas; it is often called Canadian holly.

Many of the more tender Cupressus, Thuyas and Junipers of Eastern origin might be recommended for parts of Southern Ontario, but their hardiness in the northern districts is very doubtful.

Climbers.

Amongst varieties of Clematis, many of the beautiful varieties of the Jackmanni type can be recommended for Southern Ontario, and for favored spots farther north, but cannot be classed as really hardy. They are, how-

ever, easily protected in winter. There is one variety of Clematis, however, —a native of Canada and the States—not generally known, that makes a splendid covering for a wire trellis, or even a picket fence, viz., Clematis Virginiana. When covered in July or August with its large clusters of small white flowers, it is a pretty sight, the flowers contrasting beautifully with its clear, glossy green foliage. A vase of its star-like blossoms and tri-lobed dark green foliage makes a most acceptable ornament for the table or mantel during the hot months of July or August, when flowers are often very scarce. It will succeed in almost any kind of soil, and is not particular as to the aspect, as I have found it flourish on the north side of a building equally as well as on the south or east side.

The Clematis vitalba, or Travellers' Joy, is another hardy and desirable variety for trellis work, or any position where a real hardy climber is required.

Possibly a much larger collection of desirable hardy shrubs and plants might be made, but those I have recommended can be relied upon to give good results, if only ordinary care is taken in their planting and after management.

And now, a word or two on the planting and pruning of flowering shrubs:

Each shrub should be planted so that it has room to develop and mature itself into a perfect specimen, without there being any necessity for the needless and detrimental practice of clipping flowering shrubs. All the pruning that these shrubs require can, if commenced when the trees are young, be done by thinning out here and there the most prominent shoots and branches. This can be done in the fall or early spring, or, in many cases, when they are in flower, without harm to the plants, if not thinned too severely. These summer cuttings will supply good decorative material for the table or for jardinieres indoors.

The clipping process, before referred to, should never be permitted, as it removes about all the flowering wood for the next season. When tempted to apply the clipping shears to flowering shrubs, endeavor to picture to yourself the wood that you would remove, covered as they would be in summer time with their loads of blossoms, and you will refrain from applying the shears to them. Better to leave them untouched, than to clip and mutilate them so as to make them unsightly and useless for decorative purposes.

If a marginal border is decided on for the planting of the shrubs I have named, add a few clumps of hardy perennials dotted here and there, so as not to unduly crowd either shrubs or perennials, as the latter spread rapidly when established. A good list will be found in the following kinds that will give a succession of blooms from April until October or November: Dielytra spectabilis, or Bleeding Heart; Aquilegia Oxysepala and A. chripantha, Campanula persicifolia alba, Gaillardia grandiflora, German Iris in variety, Paeonies in variety, Spiraea filipendula alba pleni (double Spiraea), Achillea (the Pearl), Hemerocallis flava (Lemon Lily). Add to this a few varieties of Perennial Phlox, and you will have a bright looking lawn the whole summer. A few clumps of Lilium Tigrinum, or Tiger Lily, and the Lilium candidum will complete a useful, showy, and hardy list of shrubs and plants for the decoration of any moderate-sized lawn, that will give pleasure to the owner and to all who see them.

CANADIAN MAPLES.

By W. T. Macoun, Horticulturist Central Experimental Farm, Ottawa.

If there is one Canadian tree which is known to young and old it is the maple. That patriotic song, "The Maple Leaf Forever," is one of the first which the little children learn to sing at school; and often it is sung in the refreshing shade of the maples on a hot June day, when the value of the maple as an ornamental shade tree is pointed out to the scholars by the teacher. Then, the maple sugar and syrup in the early spring impress the maple on the minds of Canadian youth more than perhaps anything else. Those of maturer years sing the same song, enjoy the same shade, and many also the sweets of the sugar maple. The latter also admire the form and foliage of the trees and the economical value of the wood for furniture and other purposes. The emblem of Canada is thus well and favorably known to young and old.

While almost everyone, from the little child upward, is familiar with the maple, comparatively few, especially in our cities and towns, can distinguish the common species from each other, and still fewer know all the species which are to be found in Canada. It is in the hope of making the different species better known that these notes are written.

There are ten native species of maples in Canada, all of which are perfectly hardy at Ottawa, with the exception of the Large-Leaved Maple (*Acer macrophyllum*) which kills outright, and the Vine Maple (*Acer circinatum*) which, although it becomes hardier from year to year, cannot be called more than half-hardy.

Six of the species grow to be large or medium sized trees, while four are but small trees or shrubs.

The technical descriptions given in this article are taken from the "Cyclopædia of American Horticulture," as they are simpler and more concise than those found in botanies; but the nomenclature is principally that used in the "Catalogue of Canadian Plants" (Macoun), which is most familiar to readers of the "Canadian Horticulturist." These changes have been made in the names, but both old and new are given. The illustrations are from photographs kindly furnished by Mr. F. T. Shutt.

1. Sugar or Rock Maple (*Acer saccharinum*, Wang; *Acer saccharum*, Marsh).—"Large tree, 120 feet, with bark; leaves 3-5 lobed, cordate, 3-6 inches long, with narrow and deep sinuses; lobes acuminate, sparingly dentate, usually glaucous and glabrous beneath; fruit with little spreading wings." It is found from Nova Scotia to the western end of Lake Superior, and in scattered places to the Lake-of-the-Woods and northward to Lake St John, Lake Temiscamingue, and to the long portage on the Michipicoton River, north of Lake Superior: It is the most valuable and one of the most beautiful of all Canadian maples. It is one of our best timber trees, the wood being highly esteemed for many purposes. Being hard and tough, it is used where strength is required, as for axles of wagons, handles of tools, etc., and, on account of its fine grain and the fact of its taking a good polish, it is much utilized in furniture making, the well known Bird's-Eye Maple being obtained from this species. As fire wood, the Hard Maple has few equals, and many a log has warmed Canadian homes on wintry nights. The sap of the Sugar Maple gives it a unique place among Canadian trees, for although other trees yield sap which may be converted into syrup or sugar, there are none which produce it which equals the Sugar Maple in richness and palatability. Sugar making is quite an important and profitable industry in some parts of Ontario and Quebec, and the supply of pure syrup and sugar never seems to equal the demand. The continued tapping of the trees does not

appear to lessen the vigor of them, and trees which have yielded many a quart of sap live through several generations of tappers. It is as a shade tree, however and on account of its brilliantly colored foliage in autumn, that the Sugar Maple is best known to those living in cities, towns and villages. For street purposes it stands without an equal, being of fine shape, dense foliage, comparatively free from insect pests and fungous diseases, and long lived. In October the foliage of this species and the Red Maple assume those varied, delicate, and gorgeous tints which help to give such character to our forests, brightens up our city streets, and give autumn a gayness which the falling leaf alone dispels.

The Sugar Maple thrives on almost all kinds of well drained soil, but makes little growth where the ground is constantly wet and cold.

2. Black Maple (*Acer nigrum*, Michx ; *Acer saccharinum nigrum*, Torr & Gray).—"Large tree, 120 feet, with black bark ; leaves cordate, with sinus mostly closed, generally 3-lobed, with broad sinuses, the sides of the blade mostly drooping, green and pubescent beneath ; lobes acute, entire or obtusely toothed ; fruit with diverging wings."

For a long time this was regarded as merely a variety of the Sugar Maple, but it now ranks as a distinct species, and rightly so, for it has quite a different appearance from the former, and is fairly well distributed throughout Ontario, from Ottawa westward. It is not as attractive a tree as the Sugar Maple, the foliage being much duller, but it makes a striking object, as the leaves differ so much from the other large maples, the lobes being almost or quite entire. The wood of this tree ranks next to the Sugar Maple in quality. This tree also yields sweet sap, but is not used in sugar making to any extent.

Red, Scarlet or Soft Maple (*Acer rubrum*, Linn).—"Large tree, 120 feet ; leaves 3-5 lobed, 3-4 inches long, green above, pale or glaucous beneath ; lobes unequally and crenately serrate ; flowers red or scarlet, rarely yellowish ; petals 5 ; fruit glabrous."

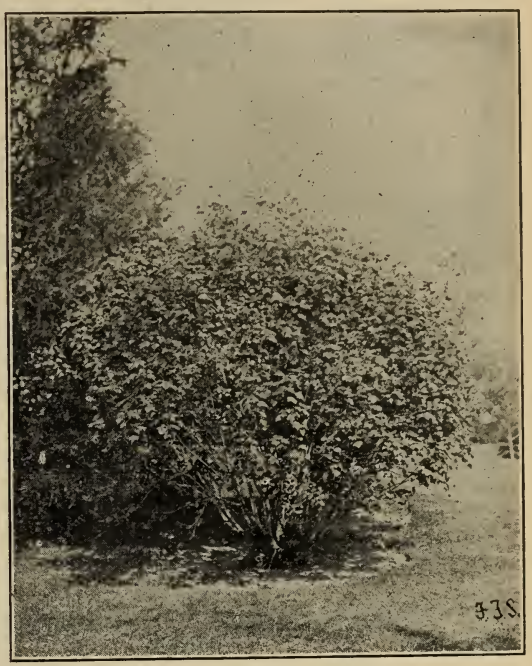
The range of this maple in Canada is from the Atlantic Ocean west to the Rainy River and a little further north than the Sugar Maple.

The Red Maple is not as useful a tree as the Sugar Maple. Although a prominent Canadian tree, its value for timber, fuel and sugar is not nearly equal to the other, but it is quite, if not more, ornamental. Beginning in the early spring before the leaves make their appearance, the scarlet blossoms, which are so profusely borne, brighten our streets at a time when they are much appreciated, and in the month of June the bright red fruit continues to make this tree attractive. It is, however, in the autumn that it shows to best advantage, when the leaves take on the bright scarlet and lighter hues which make the maples famous. Odd trees will be found assuming bright tints early in the autumn, and the contrast between these and the deep green of the surrounding foliage is very marked.

When the soil is suitable, the Red Maple makes quite as good a tree for streets and parks as the Sugar maple, but often it is planted in ground where it will not thrive and it dies before reaching its prime. This tree, unlike the Sugar Maple, does best in wet soil, and is found in the wild state in swampy land or bordering lakes and rivers, being often called the Swamp Maple. Large numbers of the Red Maple are planted as shade trees in our cities and towns, and where the soil is moist they succeed well, but if the soil is naturally somewhat dry, and becomes dryer where permanent walks and roadways prevent air and moisture reaching the roots of the trees, they gradually sicken and die. Many such trees may be seen in the City of Ottawa to-day.

4. Silver or White Maple. (*Acer dasycarpum*, Erhr ; *Acer saccharinum*, Linn.—" Large tree, 120 feet ; leaves deeply 5-lobed to 5-cleft, 4-6 inches long, green above, silvery-white beneath ; lobes deeply and doubly serrate ; flowers greenish-yellow, apetalous ; fruit pubescent when young."

The Siver Maple is not as well distributed as either of the preceding species. It is found in New Brunswick in a few places, and is quite rare in the Province of Quebec, but is abundant in the Province of Ontario. It appears to succeed farther north than either the Sugar Maple or Red Maple, a few specimens planted near the Canadian Pacific Railway at Portage la Prairie, Man., being quite hardy. It has also been planted at Brandon, Man., and although not perfectly hardy does not always kill outright.



Smooth Maple.
(*Acer Glabrum*, Torr.)

This tree is less valuable than the Red Maple for timber or fuel, being very soft ; nor does it color as highly in the autumn as either the Red or Sugar Maple, but it is a more graceful tree than either of the others, being of more spreading habit and having more finely cut foliage. Like the Red Maple, this species thrives best in moist ground, and where the conditions are favorable attains a great size. It is a very rapid growing species, and on this account is often planted in preference to other kinds.

The Silver Maple blooms earlier than the Red Maple, but the flowers are not so attractive. The fruit, which is of large size, ripens about the middle of June, at Ottawa, and is very noticeable when lying on the footpath. There is a well known cut-leaved pendulous variety called Wieri which is a very graceful tree.

5. Large-Leaved Maple (*Acer macrophyllum*, Pursh).—" Tree 100 feet high ; leaves cordate, deeply 3-5 lobed or cleft, pubescent when young, pale green beneath, 8-12 inches across, middle lobe mostly 3-lobed ; racemes pendulous ; fruit with yellow, bristly hair, largely winged."

The Large-Leaved Maple is confined to the Province of British Columbia and is only found there in the valleys along the coast in the southern part of the province and on Vancouver Island. It is a majestic tree, and reaches a great size in favored spots in British Columbia. The leaves are of great size, often measuring a foot in diameter, which distinguishes this maple very readily from other Canadian species. Unfortunately, it winter kills at Ottawa. Nor do I know where there is a large specimen growing in Canada outside of British Columbia. The leaf in the illustration is a very small one, but gives an idea of its shape.

6. Ash-leaved Maple, Box Elder (*Acer Negundo*, Linn ; *Negundo aceroides*, Moench.—" Large tree, 70 feet ; leaves pinnate ; leaflets 3-5, ovate or oblong lanceolate, coarsely serrate or 3-lobed, mostly glabrous, 3-5 inches long ; flowers before the leaves, staminate flowers in pendulous corymbs, pistillate flowers in pendulous racemes."

A separate genus was formerly made of this tree and it was called *Negundo aceroides*, but in recent years it has been included with the maples. The Box Elder is not found in a wild state in the Maritime Provinces and in the Prov-

1. *Acer saccharinum*, Wang. 2. *A. nigrum*, Michx. 3. *A. rubrum*, Linn. 4. *A. dasycarpum*, Ehrh. 5. *A. macrophyllum*, Pursh. 6. *A. negundo*, Linn. 7. *A. pennsylvanicum*, Linn. 8. *A. spicatum*, Lam. 9. *A. glabrum*, Torr. 10. *A. circinatum*, Pursh.

ince of Quebec. In Ontario large trees have been found in the valley of the Humber, near Toronto, and near Chatham, which were thought not to have been introduced; but apart from these two localities, it is not found wild to the writer's knowledge else in the province east of the Kaministiqua River, which is west of Lake Superior. It becomes more abundant westward, and is very common in Manitoba and the Northwest Territories. On account of its very rapid growth and ease of culture, this tree is often planted in Ontario for shade and ornamental purposes. It, however, usually proves unsatisfactory, being unshapely and breaking down easily. The fruit also remains on the female trees during winter, making them quite unsightly. In Manitoba and the Northwest Territories, however, this tree has great value. It is a veritable ironclad and withstands the severest winters. It grows to be a handsome and shapely tree on the prairies, and is very useful for shade, for windbreaks, for firewood, and for other purposes. What the Sugar Maple is to Ontario, the Box Elder is to Manitoba and the Northwest Territories. The male and female flowers of this maple are borne on different trees.

7. Striped Maple (*Acer pennsylvanicum*, Linn).—"Tree rarely 40 feet; bark greenish, striped with white lines; leaves slightly cordate, roundish obovate, 3-lobed at the apex, 6-8 inches long, finely serrate, ferrugineously pubescent beneath when young; racemes glabrous, drooping."

The Striped Maple is common in Nova Scotia, New Brunswick, Quebec, and in Ontario as far as Lake Superior. It is a very handsome little upright tree, with large attractive foliage and curiously striped bark, the stripes being well defined and very noticeable. The flowers, which are yellowish green,

Flowers of Sugar Maple.
Acer Saccharinum, Wang.

are borne in pendulous racemes and add to the attractiveness of the tree. This maple delights in cool, shady woods, and does not thrive in the open as well as most of the species. The leaves are not highly colored in autumn, but become a pleasing yellow.

8. Mountain Maple (*Acer spicatum*, Lam).—"Shrub or small tree, rarely 30 feet; leaves 3 or slightly 5-lobed, coarsely serrate, pubescent beneath, 2½ to 4½ inches long; racemes rather dense, long, upright; fruit with diverging wings, bright red in summer."

This is a very common maple in damp or wet woods from Nova Scotia to the northern part of Manitoba and as far north as York Factory along the Hudson Bay. In the east it is little more than a shrub, but in northern Manitoba it becomes a small tree. As this species grows more in the open woods than the Striped Maple it usually succeeds better in cultivation. It has its own good points and is well worthy of a place in the ornamental grounds. It blooms during the month of June, and the flowers are followed by bright red fruit which makes the tree quite attractive; the leaves, also, are more or less highly colored in autumn.

9. Smooth Maple (*Acer glabrum*, Torr).—"Shrub or small tree, 25 feet, quite glabrous; petioles bright red; leaves deeply 3-5 lobed or 3-parted, 1-5 inches across, dark green and shining above, pale or glaucous beneath; lobes doubly serrate"

This is a western species and grows wild from Vancouver Island eastward to Banff, in the Rocky Mountains. It has succeeded remarkably well at Ottawa and has proven quite ornamental, the red petioles of the leaves and the red branches contrasting well with the glossy green foliage. The largest specimen at the Experimental Farm is about twelve feet high and twelve or thirteen feet across. It is asserted that there are two species in what was formerly regarded as one, and that the form found along the western coast is quite a distinct species from that growing in the mountains. If this division is made we shall have eleven species in Canada instead of ten.

10. Vine Maple (*Acer circinatum*, Pursh).—"Small tree, rarely 40 feet; petioles and peduncles glabrous; leaves 7-9 lobed, 2-7 inches across, glabrous; lobes acute, doubly serrate; flowers in drooping corymbs with purple sepals."

The beautiful little Vine Maple has quite a limited range in Canada, being confined to Vancouver Island and to the valleys near the coast along the mainland of British Columbia. The leaves of the Vine Maple are paler green than the other species, which gives them a more delicate appearance. They are somewhat similar to the Japanese *Acer palmatum*, and it is possible that the two were originally derived from the same species. The handsome flowers, fruit and leaves, and graceful appearance of this maple, make it very desirable for ornamental purposes where it will succeed. At Ottawa it is only half hardy, though one specimen has now been nearly hardy since 1897.

FICUS ELASTICA.

By Wm. Hunt, O. A. C., Guelph.

The *Ficus elastica*, or Rubber plant, as it is commonly called, is without doubt one of the best and most enduring of decorative plants, either for the greenhouse or the more trying conditions that exist in a window or room of a dwelling house. Although its habit of growth is not as graceful as many well known house plants, such as palms, aspidistra, etc., the thick leathery leaves of this

Ficus will often retain their bright glossy appearance for a much longer period than most varieties of house plants including those just mentioned, even under more adverse treatment. The propagation of the rubber-plant is, however, the most difficult problem for the amateur plant grower to solve, in connection with its culture. Large plants have frequently to be cut back in order to secure a more shapely plant, or to keep its strong growing branches within reasonable bounds. It is seldom, however, that the growth taken from an ill-shaped plant is successfully propagated. A description of some of the methods usually adopted by florists in the propagation of the Ficus will perhaps be acceptable to readers of the *Horticulturist* who may perhaps have a plant that may require cutting back so as to make it more shapely and symmetrical looking. The pruning or cutting back does not injure the plant unless cut back too severely, as it soon breaks into new growth again if not cut back too far into old wood. Even in the latter case it is only a question of time before it starts into growth again.

Ficus Cutting, Showing Incision.

Mossing Cuttings. — This method of mossing partially severed cuttings of the Ficus, is probably the best and surest method of propagation for the amateur to attempt. For the operation of mossing, a fairly strong and healthy branch or shoot should be selected. One or two of the leaves should first be cut away at the place selected for the base of the cutting. The selection of the part of the branch that is to form the base of the cutting is an important point toward being successful in the cutting taking root, as the wood must not be too old and hard, or too soft and pulpy. Usually, the wood is in a suitable condition about ten or twelve inches from the terminal point of the shoot or branch. After the removal of the leaves, as before mentioned, an incision should be made on the under neath side with a sharp knife, as shown in the accompanying cut. The incision should be made in a slanting direction, running from the base of the cutting toward the tip, and from a half to three-quarters of an inch in length, and should extend about two-thirds through the branch, leaving the remaining one-third of the branch uncut. The incision should terminate close under a leaf joint if possible. After the incision has been made a small thin piece of chip, about one-sixteenth of an inch thick, should be inserted at the termination of the cut. This is done to keep the incision open, so as to allow the thick sap to flow clear away from the incision, as otherwise it would congeal and prevent the cutting from callusing and rooting. The chip should be long enough to extend just through the cutting.

A small stick, or piece of wire should be tied along side of the cutting for a few inches above and below the incision, to keep the cutting in its proper position. Sufficient wet moss should then be wrapped around the cutting so as to cover the incision fully an inch thick after it has been bound tightly around The wrapping of moss should extend about three inches above and below the

incision, tapering gradually to each end, as shown in the cut. The moss should be bound tightly around the cutting with raffia or fine twine. Sphagnum moss is the best if it can be obtained, if not, ordinary green moss can be used. The bandage of moss should never be allowed to become dry, but should be kept quite moist by syringing or sprinkling with water once or twice every day. In about five or six weeks after the mossing process the cutting should be examined, when, if rooted, it can be severed entirely from the plant, as shown in engraving and potted. If not rooted the moss should be again put around the cutting as before described, and left for a week or two longer. If on examination the base of the cutting shows signs of decay instead of rooting, it should be severed entirely from the plant. In this case the cutting could then be shortened a joint or two at the base, and placed in a four-inch pot filled with sharp sand. Place the pot in a shaded warm part of the green-house or window and keep the sand moist. A plant may possibly be obtained in this way.

The best time of the year for striking cuttings of the Ficus, whether by ordinary or moss cuttings, is during July and August. A warm,

Rooted Ficus Cutting.

Mossed Ficus Cutting.

sheltered, and fairly well shaded position in the greenhouse or conservatory, is the best place for the plant to ensure success with this method of mossing cuttings. A greenhouse, however, is not absolutely necessary to be successful, as I have rooted cuttings by this method out of doors during the hot months of summer by standing the plants in a warm, well sheltered position.

In potting the cutting most of the moss should be first removed and the plant securely staked. The leaves should also be tied together fairly tight, so as to prevent the cutting from shifting about in the pot. Use light sandy soil for the first potting, and not too rich. Water the cutting rather sparingly until it has become well rooted in the pot, and keep it in a warm shaded place for a time. I have attempted to describe as clearly as possible the method of rooting cuttings by mossing them. Some allowance, however, must be made as to depth

and length of incision, length of cutting, etc, as these must of necessity vary a little according to the growth of the branch made use of.

Single Joint Cuttings: These cuttings consist of a single joint with leaf attached. The best part of the branch to secure these cuttings from, is from a few joints above and below the part of the branch described as suitable for cuttings for mossing Insert the cutting firmly in sharp sand, so that the base of the leaf and stem at the joint is just under the surface of the sand. A shallow box about two inches deep, well drained and filled with sand, will perhaps be better than pots for these cuttings, as they are less liable to be shifted about in the sand. These pots or boxes—as the case may be—of cuttings can be placed in a warm shaded part of the greenhouse, or in a frame that should be covered closely with a sash thickly shaded, so as to exclude the direct rays of the sun. Careful watering, so as to keep the sand always fairly moist is necessary to be successful with these cuttings. I have known cuttings of this kind to strike root successfully when the pots have been placed in a window. Single joint cuttings, however, must be taken in the hot weather if they are to be rooted successfully. The after treatment of the single joint cutting will be the same as recommended for the mossed cuttings.

Ficus Cutting with "Heel."

Terminal Cuttings: These cuttings and the method of taking them differs very little —except so far as the strong growth of the Ficus necessitates—from a gernanium or almost any ordinary cutting or slip. The cutting may possibly be a little shorter than that recommended for mossing, especially if the growth of the cutting is short and close jointed. The leaves of these should be tied up fairly close together and inserted in sand, one in a three or four inch pot and the cutting securely staked. The staking is a very necessary part of the operation, as the weight of the leaves may cause the cutting to move or shift about in the sand and thus prevent its rooting. The same position, etc., will suit these as recommended for single joint cuttings. Oftentimes short cuttings can be taken from the large branches of an old plant with what is known as a "heel" attached. This "heel" is simply a small piece of the stem, from which the cutting is growing, taken off, with the cutting as shown in the cut. If these kind of cuttings can be obtained they will, as a rule, root more readily than the terminal or plain cuttings before mentioned. Terminal cuttings should be cut off near to and close below a leaf joint, as they strike more readily than if severed mid-way between the leaf joints.

I have recently had several letters from subscribers to the *Horticulturist*, asking for information respecting the propagation of the *Ficus elastica*, hence my reason for writing such a lengthy paper on this subject. I may, however, say in conclusion that the method of mossing cuttings as described for the Ficus, can be successfully applied to other plants, more especially to the tall and overgrown stems of Dracenas and Cordylines, that have a natural habit of becoming tall and unsightly looking as decorative plants.

SEASONABLE NOTES.

By Wm. Hunt, O.A.C., Guelph.

FEBRUARY.

The Greenhouse.

The propagation of bedding out plants will be one of the main features of February work in the greenhouse. Coleus, ageratum, alternanthera, heliotrope and cuttings from similar plants will root readily now in sand. Shade them from the hot sun for a few hours at mid-day.

Carnation cuttings root best in sand in shallow boxes, two inches deep. Place the boxes near the glass in a cool part of the greenhouse ; 50° at night and 60° in the day time suits carnation cuttings splendidly. Keep the sand moist but not soddened with water.

All ferns should be re-potted at once, if not already done. January is the best time to re-pot ferns, before the young fronds have made much headway.

Cyclamens and Freesias, that have done flowering, should still have sufficient water to keep the soil fairly well moistened. Pick the decayed flowers, and seed pods (if any) from these plants ; it will help to strengthen and mature the bulbs for next season.

Annuals : It is a little early for sowing annuals, even for early flowering, but a few pots of petunia and verbena seed can be sown toward the end of the month. Lobelia seed should be sown at once so as to secure good sized plants for hanging baskets, window boxes, etc. Cuttings of all trailing plants for hanging baskets., etc., should be started without delay.

Azaleas that are out of flower should be syringed every day to promote new growth, and keep down red spider. Fuchsias should be syringed daily.

Use more copious supplies of water for syringing purposes, as the heat of the sun increases. Syringe early in the day, and on warm sunny days if possible. Use plenty of water on the floors. Evaporation of moisture is good for the plants, and keeps down insect pests.

Easter is early this year. Easter lilies, to be on time, will require to be brought into a warm part of the house.

Holland bulbs for Easter flowering should be in the greenhouse now. Better be a week too early than a week too late. The flowering period of plants can be retarded, or the flowers retained, much better as a rule, than they can be forced into flower. Undue forcing is dangerous, even by experienced plant growers.

Give a little air on hot sunny days, 70° to 75° in day time and 55° to 60° at night is a good temperature at this season of the year. Close ventilators early in the day.

The Window.

Plants in the window will begin to feel the increased heat of the sun. The latter will necessitate a close watch being kept for insect pests. The best way to avoid trouble with the insect pests is to try and prevent them from making their appearance at all. Keeping all growing plants such as fuchsias, cyperus, geraniums, calla lilies, etc., fairly well moistened at the roots, and syringing or sprinkling the foliage of the plants two or three times a week with luke-warm water, are about the safest preventives of the appearance of insect pests. A little weak tobacco water in the water the plants are syringed with, applied once a week, will prevent the attacks of some of these enemies of plant life. No plant can flourish when attacked by insects, and it is very hard to get rid of them when once they have gained headway.

Chrysanthemum plants, that are wanted to be kept for cuttings, should be kept in a rather cool temperature, about 50° suits them. They require less water now than when in flower.

Seed sowing: There are few seeds that can be sown to advantage just yet, except perhaps those recommended for the greenhouse, such as petunias and verbenas, both of which require quite a length of time before good sized plants will be produced.

Cold dips: Watch out for sudden cold dips. February and March are treacherous months in this respect. The hot sun in the day time often lures the plant lover into a feeling of false security and induces neglect in taking proper precautions against the extreme cold often experienced at night at this season of the year. If by any chance your plants should be frozen, place them at once in a warm corner of the room where the temperature is a few degrees above freezing. Cover the plants up carefully and keep them in the dark for twenty-four hours until the frost is out of them. You may perhaps in this way save them, if not frozen too badly. I consider this treatment preferable to deluging the plants with cold water, as is sometimes recommended. Even if the latter course is taken with the plants, keeping them dark for a day or so will help them materially. Avoid bringing plants that have been frozen into a high temperature, and keep them away from bright sunlight for a week or two after they have been frozen. They will also need less water for a time, until root action and growth have well commenced.

Abutilon Savitzi.

Chinese Primula.

MARCH.

The Greenhouse.

Toward the end of the month, or at least early in the month of April, it will be necessary to give partial shading to palms and ferns as well as to newly potted cuttings or young seedling plants. If the shading is delayed too late in the season many of the plants (especially the young growth of palms) will suffer from sun scald. There is even greater danger in this respect at this early season than later on, when ventilation can be given more freely than now during the treacherous weather often experienced in March. Bright hot sun, accompanied

with keen, biting, frosty winds, makes it difficult to give ventilation sufficient to keep down the temperature without exposing the plants to danger. A light shading will prevent the hot sun from doing any great damage on bright, cold days, when perhaps it is difficult to open the ventilators. Plants in flower will scarcely need shade for a week or two yet.

Water must be used more freely than hitherto, not only to the roots of plants, but on the floors as well as overhead syringing. Sprinkling the floors liberally with water, early in the afternoon, will benefit the plants very much.

Freesias. Pots of these useful greenhouse plants should be given an ample supply of water, after they have done flowering, if good strong flowering pips or bulbs are required for use next season. Freesias commence to form young bulbs just about the time the plants are in full flower, so that it is necessary to give them water several weeks after they are out of flower. The drying off or resting period must not be commenced until the young bulbs have attained to almost mature growth, which is usually three or four weeks from the time the old bulbs are out of flower. After this period water can be withheld gradually until they are dried off completely, when no more water must be given them until time to re-pot them in August or September.

Roses. These, whether in pots or planted out, will require regular daily syringing on bright days. A little fertilizer will be found beneficial now that a more active growth has commenced.

Cyclamen. Continue to water cyclamen rather liberally, even when they have done flowering. In fact at no time should the soil become quite dry, even during the summer resting period. Pick off all the seed pods unless seed from them is required, as the production of seed reduces the strength and vitality of the corms or bulbs considerably.

Fuchsias. These should be coming into flower nicely now. A little shade, plenty of water at the roots and a gentle syringing every day will help fuchsias greatly. A little fertilizer once a week will also help them along.

Azaleas. Syringe azaleas every day when they are out of flower. Water at the roots must be given in sufficient quantities to thoroughly moisten all the roots.

Primulas. Less water should be given these plants when out of flower. The double variety (Primula alba plena), as shown in the engraving, should be propagated as soon as they are out of flower. Cuttings of this useful variety strike readily in sand in a shady position. This double variety of the Chinese Primulas is one of the best and most satisfactory for an amateur grower. Like all other primulas it delights in a well drained soil, with a good admixture of leaf soil added to rich loamy potting soil, as well as a little sand mixed in.

Annuals. Seeds of these for early flowering can be sown now. Better results will, however, probably be obtained by sowing them a month later.

Bedding Stock. Cuttings of coleus, ageratum, lobelia and all bedding out plants should be taken now. Heliotrope and abutilons strike readily now from tender growth. One of the most valuable additions to the list of bedding plants recently is the pretty dwarf growing Abutilon Savitzi. Its bright silvery marked leaves and its compact habit of growth promises to bring this new variety into great popularity as a bedding plant.

Flower Garden.

March is a trying month for half-hardy plant life out of doors. A light covering of some protective material such as straw, long manure, etc., will be found beneficial to many plants laid bare by their winter blanket of snow having been melted away from them. A little protection now for a few weeks will be more needed than earlier, even though the frost may not be quite as severe.

Bulbs. These should not be uncovered until danger of severe frost is over. Remove the covering by degrees, as sudden exposure to light and air (and perhaps late frosts) will likely injure the flowering heads.

The Window.

Late in March, or early in April, is a good time to re-pot all the hardiest kind of window plants, such as geraniums, cyperus, ferns and plants required for summer decoration.

Tuberous Begonias. Old tubers of these plants can be started into growth now. Shake out the old soil carefully from the tuber if it has been kept in the pot during the winter. Good, rich, loamy potting soil with a small quantity of soil mixed with it suits these pretty summer flowering plants splendidly. Soil that a geranium will grow well in will suit tuberous begonias. Use plenty of drainage in the pots; water the soil once throughly after potting. Water should then be given sparingly until the plants have well started into growth.

Summer Flowering and Foliage Begonias, including Rex varieties, can be potted. The same remarks regarding drainage and watering will apply as for tuberous begonias, but the soil, especially for the Rex varieties, should have about one-fourth part of leaf soil added to that recommended for the tuberous variety. Amongst the newer varieties of begonia suitable for the window are B. Thurston, B. Haageana and B. nivea, whilst older varieties such as B. Sandersonii, B. fuchsiaoides, and of course Begonia rubra cannot be omitted.

Annuals. Seeds of those can now be sown so as to secure early flowers. Although the antirrhinum is not classed strictly as an annual, it can be grown as easily and successfully as any of the annuals. The newly introduced dwarf flowering varieties make a splendid display as border plants and will give a supply of flowers during the burning days of July and August, when flowers are often scarce. These dwarf growing varieties also succeed splendidly in pots in winter. The beds of these plants at the recent Pan-American exhibition were very much admired and proved conclusively the suitability of the new types of these old favorites for bedding plants. These are very easy to raise and a few plants should be found in every flower garden.

The Scabiosa is another annual that will give good results during the hot months of summer and on until late in autumn. A pot or two of these sown early in April and planted out the second or third week in May will, with very little care and attention, provide a bountiful supply of flowers for decorative purposes A bunch of the multi-colored types of scabiosa with a few spikes of antirrhinums. and mignonette sticking up above the somewhat flat flowers of the scabiosa, relieved here and there with a few sprays of fern or foliage, will make amost acceptable vase of flowers for table or house decorative purposes. The scabiosa, like the snap-dragons, are not very exacting as to the nature of the soil, flourishing in either a loamy or a stiffer soil with almost equal vigor and profuseness of flower. A rich soil, however, brings much larger flowers and richer and more intense shades of color. A dozen or two plants, each of the snap-dragon and scabiosa, planted out in the garden will not only beautify the flower garden but furnish an almost unlimited supply of cut flowers the entire summer. Both of these varieties are largely grown by commercial florists, a fact that proves their usefulness for cut flower purposes.

APRIL.

The unusually fine weather experienced here in this section of Ontario during the early part of March, makes it somewhat difficult at this date—March 12th—to outline very closely what operations may be necessary or adaptable for

the month of April amongst the plants and flowers. With the mercury registering about 52° at midnight 70° in the shade at mid-day, and the pleasant warbling of robins and greybirds greeting one on every side, to say nothing of reports of sowings of sweet peas, etc., having already been made in the open ground, it is difficult to realize that we are three weeks and more from the beginning of April, or yet clear of winter weather. It is spring seasons such as this that tempt those who have tender or half hardy plants to expose them somewhat too abruptly from their warm winter quarters to the uncertain weather conditions that often these seductive spells of summer in early spring. The transfer of plants from their winter quarters to out door life always requires the exercise of care and discretion, much more in seasons such as the present one when spring promises to be unusually early.

A word or two of timely warning may prevent the loss of some favorite plants. I am aware from my own past experience that reminders of this kind are necessary at this season of the year, when we are perhaps too eager in anticipating the delights of summer in the garden, by undue haste in exposing tender or half hardy plants to uncertain weather conditions outside.

Canna, Mad. Crozy.

The Greenhouse.

Bedding plants. The latest struck cuttings of these should now be potted off, so as to become established in the pots prior to being hardened off outside later on.

As a rule carnations, geraniums, mignonette, early sown asters and other comparatively hardy plants can be transferred to a cold frame outside. A sash as well as other protective material should, however, be in readiness to cover them up with in cold weather. Coleus, heliotrope, lobelia and the more tender varieties are safest in the greenhouse until the danger of frost is past. It is always wise to shade plants for a few hours in the hottest part of the day for perhaps a week until the growth has become hardened to the more exposed position that a sash and frame gives, especially if the plants have been kept in a very close greenhouse. The little dwarf growing bedding plants known as *alternanthera* are often very difficult to secure cuttings from for propagation purposes. A good warm (not rank) hot bed is the best place to put stock plants of alternanthera in to secure rapid growth. Plunge the pots or boxes into earth or ashes up to the rim and keep them close except on sunny days. Young plants as well as stock plants can be made to move rapidly by this treatment. Heliotrope, coleus and achyranthes can be treated in the same way, but these last mentioned require more air than the alternantheras do, on bright days, and perhaps a little shade on very hot days.

Cannas. Roots of these plants should be brought from underneath the benches or from the warm cellars where they have been wintered in. If the clumps are large it will be best to divide them up into clumps having from two to four good strong eyes. This can be done by simply breaking away the one section from the other with the hands. The use of the knife in this operation should be avoided if possible. Pot the small clumps into fairly light soil and water thoroughly once. Very little water will be required afterwards until the plants have become well established. Cannas treated in this way can be brought on early, and give immediate results when planted out. The pots of these can be stood down on the walks to start them, if the situation is not too dark, and care is taken that they do not get too much water. The possibilities of the canna as a summer decorative plant are only commencing to be realized. The recent introductions of dwarfer growing, large flowering plants will assist greatly in advancing their present popularity. It is quite possible, taking the coleus as an example in this respect, that we may see as great an advancement in cannas in regard to decorative foliage during the next decade as there has been with coleus, when compared with the first introductions of the "East Indian Nettle," as coleus were at first commonly termed. Imagine a canna of dwarfer habit than the Charles Henderson (three feet), a spike of flowers equal to the flowers of the Burbank Canna, and foliage that will vie with the beautiful markings and rich coloring of a *pandanus veitchii*, or of a spotted diffenbachia, or with the deep rich shadings of a maranta; and you will have an imaginary glimpse of what I predict will be a near approach to the ideal canna of the future. But this is prediction and not seasonable notes on the culture of the canna.

Annual Larkspur.

The foliage of the canna, especially when young, is very tender, and on that account requires care on first taking the plants out of doors. Late in May or early in June is about the best time to expose them outside.

Shading. Plants will require careful shading and an increased supply of water as the heat of the sun increases. Water and syringe the plants early in the day. Close ventilators early in the afternoon. Give increased ventilation as required.

The Herbaceous Border. About the end of April or early in May is the best time to attend to herbaceous plants in the flower garden. Any dividing or transplanting of the early flowering perennials should be done as early as possible. The pretty little pink and white flowering *phlox subulata*, or moss phlox, as it is sometimes called, should be divided and transplanted very early. A better time to do this, however, is early in September, so unless the growth has got very straggling this can be left over until early fall.

Both the herbaceous and tree pæonies should be transplanted early if done at all. Dielytras and clumps of German Iris should be divided early. All of the plants just mentioned will, however, grow and thrive and produce their flowers in abundance for three or four years without being divided. After that period transplanting is beneficial, as larger flowers, higher colored and more luxuriant foliage can be obtained than by leaving them in dense matted clumps for too long a time.

Herbaceous spireas (*Spiræa aruncus* and *S. filipendula fl. plena*) can also be transplanted early. About the first week in May will be early enough for most of the later flowering perennials. A good general rule to work on at this season of the year in regard to transplanting perennials is to divide and transplant them when the young growth is about an inch high. Exact dates for a week or so cannot be given as the best time for these operations, as situations and seasons vary so much, but about the end of April and early in May is about the right time in this section of Ontario.

Best Twelve Herbaceous Plants. I am often asked what I consider are the best twelve varieties of herbaceous perennials. The following twelve species, many of which can be had in several varieties, will be found to be hardy, easy of culture, and will come into flower in succession from early spring until late autumn. This latter feature, viz., successive flowering period, I consider one of the main points to be thought of when planting a border, or even a few plants of herbaceous perennials. Hardiness, and an adaptability to grow readily in almost any soil, is another point that has been taken into consideration in making up this selection, as well as their suitability for cut flower purposes. They are given here in about the order that they will come into flower. I have also given the average height of the plants, a point lost sight of sometimes and one that causes dissatisfaction oftentimes later on.

1. *Iberis sempervirens*, 6 inches.
2. *Dielytra spectabilis*, 2 feet.
3. *Iris Germanica*, 18 inches (in variety).
4. *Herbaceous Paeony*, 2 feet (in variety.)
5. *Gaillardia grandiflora*, 18 inches.
6. *Campanula persicefolia alba.*
7. *Aquilegia*, 2 feet (in variety).
8. *Hemerocallis flava*, 2 feet.
9. *Phlox paniculata*, 2 to 3 feet (in variety.)
10. *Pyrethrum hybrida*, 18 inches.
11. *Achillea*, The Pearl, 2 feet.
12. *Rudbeckia lanceolata*, 5 feet.

This will be found to be a good list of twelve iron-clad border plants, many of which can be had in great variety, especially the iris, paeony, aquilegia and phlox. I would very much like to have added the delphinium, coreopsis, and one of the thalictrums and the beautiful little gypsophilla paniculata so useful for cut flowers, but I could not see my way clear to omit any of the foregoing list. The thalictrums are most useful for cutting for bouquet green, but succeed best in a shaded position, such as on the north side of a fence or building.

Hardy Roses. These should be pruned as early as possible, if not already done. Prune closely, leaving from 4 to 6 inches of last year's growth below where the shoots are pruned off. Any planting of these, or of hardy shrubs or trees, should be done at once. Fork over the rose beds after pruning the bushes. A little fertilizer, such as bone meal, very rotten stable manure, forked in around rose bushes or flowering shrubs will help them materially.

Annuals. These can be sown outside now. A small frame made of boards and placed in a warm position with a few inches of good soil will be a good place to sow most annuals in. They are easier cared for in the early stages of growth treated in this way than if sown in the open border. Mignonette and nasturtium, and perhaps stocks, are best sown in pots or in the place they are to grow in, as they do not transplant very easily.

July.

Flower Garden.—Constant surface stirring of the soil in flower beds or borders will not only destroy weed crops, but will also materially help the growth of all kinds of bedding plants. Deep stirring of the soil is not necessary, if the ground was properly prepared before planting. A very small three or four-toothed rake, or a light scuffle hoe, are the best tools for this work, which should be done when the soil is fairly dry, and before it has had time to crust over very hard on the surface.

Staking and Tying. These operations are often left until the plants are badly damaged by wind or rain storms, or perhaps entirely ruined by not being attended to earlier. It is always a good plan to have stakes for such plants as dahlias, ricinus, etc., driven in near the plants requiring support. Many a fine plant has come to grief because a stake could not be found handily just when the plant needed tying. In the matter of tying up plants always endeavor to stake and tie plants so that they are as natural looking as possible after the operation is performed. Avoid the close bunching process of tying that makes the plants look more like bundles of stems and foliage, than growing plants. Another point deserving attention when tying plants is to endeavor to place the stakes in such a position that they will be hidden from view as much a possible by the foliage. Use soft twine for tying purposes, so as to prevent as much as possible damage from friction, and use neat sizeable stakes.

Decayed Flowers. These should be kept picked off regularly, unless required to remain on the plants to help produce seed. Decayed blossoms are not only unsightly, but also exhaust uselessly the vitality of the plant. In this respect do not forget that daily picking of sweet-pea blossoms, and not allowing them to go to seed, not only improves the size and depth of color of later blossoms, but also helps materially to extend the flowering period of the plants.

The Greenhouse. If ferns and exotic plants occupy the greenhouse during the summer months, the glass must be heavily shaded. These plants will require plenty of water at the roots and a moist atmosphere maintained by daily syringing, as well as heavy sprinklings of water on the floor when the ventilators are closed. Where choice ferns and exotic plants are growing the ventilators should be closed an hour or two before the sun ceases to shine on the greenhouse.

Roses and Chrysanthemums. If roses and chrysanthemums occupy the greenhouse, much more ventilation is necessary, and far less shading required than for ferns, etc. In fact the shading for both roses and chrysanthemums should be very light, as close shading induces a weak spindled growth that is not conducive to good flowering results. Roses and chrysanthemums should have liberal supplies of water at the roots and daily syringing on bright days. Pick every bud off the roses as soon as the bud is formed, so that the whole strength of the plant can be used to produce a good stocky growth of wood.

Begonia, Weltoniensis Alba.

Freesias. These useful winter flowering bulbs should now be kept quite dry and dormant until they are potted on. They can be left in the soil they were grown in, and the pots stood away in a dry, cool shed, or the bulbs can be picked out from the soil and put in a pot or box, with sufficient dry sand or earth thrown over them to keep them from getting too dry and shrivelled. In either case keep the bulbs quite dry, and in a cool place. A shelf in a shed is a good place for them. August and September are the best months for starting freesias into growth.

The Window Garden.

Window-boxes form the most prominent feature for window decoration during the summer months. It is oftentimes a difficult matter to secure flowering plants that are suited for shaded positions on the north side of the house. Foliage plants and ferns can be easily selected for these positions; flowering plants in variety are not so easily obtained. Many varieties of summer flowering begonias can be had however that will give splendid results in windows or on verandahs where the sun shines for perhaps only an hour or two, morning and evening. Amongst the most effective and easily grown kinds is the pink flowering Weltoniensis begonia, also the white flowering variety Weltoniensis alba (See cut), the former being the more robust and easier to grow of the two kinds. Being of a semi-tuberous nature both of them can be kept partially dormant during the winter, but must not be dried off completely in the same way that the tuberous varieties are.

Begonia, Bruant.

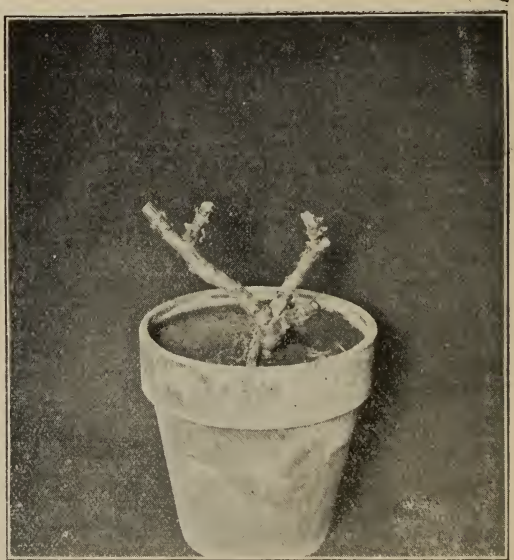
Another good variety for summer flowering is the dwarf growing, white flowering begonia Bruant (See cut). This pretty little begonia can be easily kept during the winter, its bright, glossy, green foliage being most acceptable even when not brightened up with its ivory white blossoms. It must not be given as much water, however, during the winter as when it is in active growth in the summer time. The Begonias mentioned as bedding varieties in last month's journal are also good varieties for culture in windows, either as pot plants or in window boxes. These Begonias will be found to be

be quite an acquisition to the comparatively limited list of flowering plants suited for window boxes in shaded positions.

Geranium before being cut back.

Geraniums for winter. This is a good time to commence preparing a stock of these ever popular and useful plants for winter flowering in the window.

It is quite possible that many readers of this journal have a favorite geranium plant that has become g a u n t and unshapely in growth similiar to the one shown in the accompanying illustration. Instead of planting it out in the border, as is often done to try and make a shapely plant of it before autumn, it would be far better to treat it as shown in the engraving by giving it a severe cutting back. If the growth of the plant is very soft and sappy the cutting back process should be deferred until the plant has been stood outside in the pot in a sunny position for the wood to harden a little. It can then be pruned back as shown in the cut, by pruning the growth back to within a few joints of the hard growth of the stem. After the pruning back, the plant should be put in a partially shaded position near a building or fence. Very little water should be given until it shows signs of growth but the soil should never become really dust dry. As soon as growth commences, shake the plant out of the earth and re-pot it into a size smaller pot in rather sandy soil. Plunge the pot up to the rim in sand or coal ashes, and water well once, after that water only when the soil shows signs of dryness. In about five or six weeks the plant will require a larger pot, probably two sizes larger than what it was potted back into before. When it has become established in this size pot it will probably be time to take it into the window where it should give good flowering results. Old geranium plants give good results if treated in this way; much better oftentimes than young plants taken from cuttings. The cuttings, however, taken from the plant when cut back should be placed in



Geranium after being cut back.

sand, either in a pot or shallow box. These will also make nice little plants by autumn for the window. The tips of the shoots should be taken for the cuttings, five or six inches being a good length for the cutting. By treating overgrown, gaunt specimens of geraniums in the way I have attempted to describe, many plants that gave good flowering results last winter can be had in better shape and condition than during last season. It is useless and unnatural to expect even the all-enduring geranium to flower and grow the whole year round. This pruning back and partial resting process, as described, gives a good shapely plant as well as allowing it a partial rest which all plants require in greater or less degree to be successful.

Calla Lily.

AUGUST.

Freesias. A few of these pretty little Cape bulbs should be started now for early winter flowering. Reserve some bulbs for later potting, so as to have a succession of their sweet-scented flowers from December to April. Plant five or six bulbs in a 4 or 5-in. pot. Very rich soil is not necessary; soil that geraniums will grow well in will suit freesias. Cover the tips of the bulbs so that they are almost a quarter of an inch under the surface of the soil. The top of the soil should be about half an inch from the rim of the pot to allow room for watering. Stand the pots outside where it is not too sunny, never allow them to dry out, and do not keep the soil soaked with water all the time. Let the pots stand outside until early in September, then remove them to the window or greenhouse. Place them in a cool part of the house, as the freesia dislikes forcing. Larger blooms, and more of them, are the results of letting freesias take their time in growing.

Calla Lilies. These should now be re-potted if they require it. Do not overpot them. Too large a pot often means lots of leaves, but no lilies. Sometimes a top dressing is better than re-potting. This is done by taking about an inch or so of the old top soil, and putting some good rich soil in its place. Keep the calla lilies outside in partial shade until there is danger of early frosts. Water well when once established in the pots.

Pelargoniums. These are often known as "Lady Washington" geraniums. August is a good time to cut the old plants well back. Cut the growth of the past season back to within an inch or so of its base. Water the plants very sparingly until the stems show signs of growth. When the young buds or growth is scarcely one-eighth of an inch long, the plants should be shaken out of the soil they are in. If too heavily rooted, which is not often the case, cut off the tips of the roots and re-pot the plants into a size smaller pot. Use two parts of good loamy potting soil, and one part of sharp, fine sand well mixed together. Water the plants once thoroughly, then withhold water until the soil shows signs of dryness. Place the pots outside in a shady position on some coal ashes or

boards, the latter are to keep worms out of the pots. A shaded sash and frame is a good place for pelargoniums after re-potting, until they are taken in-doors. Re-pot the plants into pots one or two sizes larger in December. Use richer soil and less sand for potting them in at this time. The tips of the growth taken from the pelargoniums now will strike readily in sand in pots. The cuttings of these should have about five or six joints, unless the growth is hard, when shorter cuttings may be used.

Geraniums and Coleus. Cuttings of these should be taken now so as to get the plants established before winter sets in. Five or six cuttings put in sand in a 4-in. pot, and the pot plunged in the ground out side where the hot sun does not strike it, will suit geranium cuttings very well. Keep the sand moist, but not soddened with water.

Hibiscus incanus.

Pansies. If these are wanted for early spring flowering the seed should be sown now. Sow in a shallow box in fairly light soil. Place the box in a shaded place out of doors. When the plants are large enough to handle, plant them out in light, rich well drained soil in a shaded frame facing the south. A sash should be placed over them in very severe weather in winter, or the plants should have a light protection of brush and leaves from December to March, instead of the sash.

Petunias and Verbenas. If you have a choice variety of these you wish to take up to save over winter, cut the plants well back now. As soon as young growth commences, take them up carefully when the soil is moist, and pot them into some good potting soil. Place the pots in the shade or in a frame with a shaded sash if you can. Water sparingly for a time after the first watering.

SEPTEMBER.

Tender Plants.

All tender greenhouse and window plants that are required for winter decorative purposes or for beautifying the garden next season will have to be closely watched if they are still out of doors, so as to prevent unpleasant and damaging surprises by early frost. Stock plants or cuttings of coleus, heliotrope, achyranthes, salvias, and ageratum should be at once secured, if not already attended to, as these plants are susceptible to cold, chilly weather and are easily damaged by the slightest frost. Petunias, verbenas and geraniums, being of a hardier nature, may perhaps be safe until about the end of the month, but it is always well to be on the safe side and secure a stock of cuttings or plants before they are damaged by frost. Plant growth that has been frozen only very slightly is often difficult to propagate, even if the growth does not appear to have been damaged. Begonias, cactus, calla lilies, agaves and all plants of a

similar tender nature should be taken indoors when chilly, cold weather prevails. Palms, cordylines, oleanders, hydrangeas and even aspidistras may perhaps be left outside until towards the end of the month, at least in the day time. Fresh air and a fair amount of sunshine out of doors is much better for plants than the close, dry atmosphere of a dwelling house, or the super-heated temperature of a greenhouse at this season of the year, as long as the plants are safe from frost. The temporary protection of a sash and frame, or even the protection afforded by a verandah, or some slight covering placed over plants for a few nights, will often extend their period of outdoor life for several weeks at this season of the year, as it is seldom that early frosts prolong their visits beyond one or two nights.

Chrysanthemums. Although these plants are almost hardy, they must not be exposed to frost, or even to continued cold, wet weather, if good flowering results are to be obtained. Where only one or two are grown in pots for the window they can be lifted under cover for the night and set out of doors again in the morning. If the plants are put into the greenhouse, or even into frames, they must be given plenty of air and water, especially on warm, sunny days. Syringing, or sprinkling the foliage early in the day on hot days, will also benefit them materially. Disbudding will also soon have to be attended to with chrysanthemums. This is done by picking off with the thumb and finger all the lower buds as soon as they are about the size of small peas, leaving only one, or perhaps two of the top or terminal buds at the top of each branch or stem. By taking off these lateral buds, fewer but very much larger flowers are obtained than if all the buds were left to mature. As soon as the buds are formed on the plants liquid manure should be given them about once a week until the flowers are fully developed. Tobacco water, or fumigating with tobacco, are the most effectual remedies for the attacks of black or green fly on chrysanthemums. The black fly is oftentimes very persistent in its attacks, and close watch will have to be kept to prevent its appearance. As tobacco stems or the raw leaf of tobacco is sometimes difficult to obtain, a good substitute can be found by using a cheap cigar for making tobacco water or for fumigating plants with. By pouring about a quart of boiling water on a cigar after it has been unrolled sufficient tobacco water can be obtained to sprinkle a number of plants with. The solution must be allowed to cool before using. If any of the tobacco water is left over it can be kept a long time in a bottle tightly corked. Start with the tobacco solution before the plants are badly infested, as, if the aphis or fly once gets into the flowers, they cannot be eradicated without injuring the blossoms.

Roman Hyacinths. If the beautiful white sweet scented spikes of these early flowering hyacinths are wanted for Christmas time the bulbs should be secured and potted as early as it is possible to get them. By planting two or three bulbs in a four or five inch pot early in September and plunging the pot outside in ashes or sand—or even sandy soil—until the bulbs have made good root, which will be in three or four weeks, and then placing the pot in the window or greenhouse, these useful winter flowering bulbs can be had in flower even before Christmas if required. Plant the bulbs about half an inch under the surface of the soil so that the tops of the bulbs are well covered, water them well once and then plunge or bury the pot in an upright position until the bulbs are well rooted and you will be rewarded by a nice pot of sweet-scented flowers for your trouble. The soil in the pot should never be allowed to get quite dry whilst the plant is growing and when in flower. The pink and blue varieties of the Roman Hyacinths are very pretty, but not as early or as easily grown. By potting a few of these bulbs every two or three weeks until November, or even later, a succession of their beautiful blooms may be had until quite late in the spring. These later planted bulbs must, however, be covered with ashes or soil

in a cool cellar or shed, or in a box or frame out of doors where they can be covered and protected from severe frosts whilst making roots as before mentioned.

Cannas. As soon as the first frosts have touched the foliage of cannas the stocks should be cut off about six or eight inches above the ground. The roots should then be dug up entire with a little earth adhering to them and placed in a dry shed or barn for a week or two where frost cannot reach them. Before severe frosts they should be placed in a fairly dry, warm cellar, or laid under the benches in a greenhouse, where there is very little moisture to drip on them. A temperature of about 40° or 45° suits them very well when dormant in winter.

Dahlias These should be treated much in the same way as recommended for cannas, with the exception that the dahlia roots will keep well in a slightly lower temperature. Packing the roots in dry sand in a cool, dry cellar is probably the best method of wintering dahlia roots. The sand will prevent the tubers from becoming too dry, as this latter condition is almost as dangerous to dahlia roots in winter as an excess of heat and moisture. Dry the dahlia roots fairly well before stowing them away finally for the winter.

NOVEMBER.

Flower Garden.

If the weather is sufficiently open and no hard frosts prevail, this will be found the most suitable time for making new walks, flower beds or borders, as the winter rains and snow will assist greatly in settling the soil down before spring operations commence. Some planting of the hardier varieties of border plants can also be done to advantage. German Iris, Pæonies, Hemerocallis or Lemon lily, Dielytras or Bleeding Heart, as well as Lily of the Valley, are varieties that succeed well if planted late in the autumn. If left until spring, they are often overlooked and forgotten until it is too late for them to take root and give flowering results the same season. It may be advisable, however, to give these late planted varieties a mulching of leaves or long strawy manure later on, before very severe weather sets in. The Iris would probably be better without being covered up or mulched, as mulching is liable to damage and smother the growth. Fibrous rooted varieties of hardy border plants, such as Gaillardias, Phlox paniculata, Coreopsis, Rudbeckias, etc., succeed better transplanted in early spring.

Bulbs.—Most varieties of spring flowering bulbs, such as Tulips, Crocuses, Snowdrops, Scillas, Chionodoxas, as well as the Daffodil Narcissus, require very little, if any, covering during winter, excepting in very cold localities, or when the bulbs were planted very late in the season. A light mulching of long strawy manure four or five inches deep spread over the ground where the bulbs are planted, or three or four inches of leaves with a light covering of long grass or manure, or even pine boughs or brush to keep the leaves in place, make a splendid protection for bulbs in winter.

Roses.—Budded plants of even the hardier varieties of out-door roses are better if given some extra covering during winter. Banking the soil up in a conical form about a foot in height around the plant will afford great protection to out-door roses in winter. A mulching of strawy manure or leaves in addition to this would also be beneficial. In localities where the temperature is often for a long period below zero, some extra protection even to this would be advisable. Long straw, an inch or two in thickness, bound around the tops, would be a benefit where extreme cold prevails, and where, perhaps, the snow fall is light or uncertain. The rush matting used for covering tea chests, wrapped several times around the plant, makes a splendid winter covering for roses or any tender plants, as it, to a great extent, excludes moisture and still allows a circulation of

air to the plant sufficient to prevent rot and mildew,—the latter often occurring when plants are covered up too closely so as to admit no air at all to the plant.

Roses on their own roots are hardier than budded or grafted plants. Even these would benefit by some protection around about the base of the stem and over the roots, even if the growth was not altogether covered. It is best in all cases, however, to leave the mulching or covering of plants until late in the season, when severe weather is likely to set in, so as to allow the growth of the plant to harden off in a natural way fully exposed to the air.

A very essential point in protecting plants in the manner described is to so arrange the covering, whatever it is, so that it excludes as much moisture from the growth as possible. An old flour or sugar barrel minus the lid, turned bottom up over a tender rose or shrub, is a good protection. Holes should be bored around the sides to admit air, but the top of the barrel, when turned up, should be water tight and intact. Some straw or leaves placed or tied around the plant before it is covered with the barrel would be beneficial.

Window Plants.—The advent of colder weather means increased fire heat, the latter also meaning an increased aridity or dryness of the atmosphere. The latter condition will probably induce a visit from insect pests, unless precautions are taken to prevent their appearance. Green fly and red spider are most to be feared, especially the latter, as their appearance is not as easily detected as that of the aphis or green fly. Copious sprinkling and syringing with cold water is the best preventive for the attacks of the so-called red spider, Salvias, Fuchsias, Roses and Carnations are first favorites with this little pest. When first attacked, the leaves of these plants present a whitish, dusty-looking appearance, especially on the underneath side, and the leaves will soon commence dropping unless the plants are regularly and thoroughly sprinkled or syringed once or twice every day. Tobacco water, as recommended in the September number is the best remedy for green fly, although tobacco leaf or stems, or even a cigar thoroughly dried and rubbed into a fine powder and sprinkled on the plants infested with green fly will generally rid the plant of them. The latter application is best made after the plants have been recently sprinkled or syringed, as the tobacco dust adheres better when the foliage of the plant is moist.

Freesias. Pots of these that are well started should have the full benefit of the sun and sufficient water to keep the soil moist, but not soddened. Freesias do not like liquid manure, and do not require it if the soil they are in is only of a fair average fertility as generally used for pot plants.

Rex Begonias. Plants of these that have, perhaps, been resplendent with their beautifully marked foliage, will generally show rapid signs of decay towards winter. This is quite natural in these plants at this season of the year and is indicative that the plants require a period of partial rest, and it is best to allow them this period of partial rest when the leaves present the appearance mentioned. It is useless to deluge the plants with water at the roots, as is often done when the plants show signs of decay. By withholding water gradually from the roots and barely keeping the soil moist, the fleshy rhizomes and stems, and perhaps some of the leaves, may be kept in fair condition until spring or early summer, when the plants can be re-potted, or, if that is not necessary, the plants will show signs of new growth as the warm summer weather approaches without re-potting. Rex Begonias, and in fact all summer flowering and foliage Begonias, require to be kept in a temperature not lower than 45° or 50° when resting in winter. A slightly lower temperature than the plants have been accustomed to, and only sufficient water to barely keep the soil in the pots moist, are the conditions that induce this partial resting period so essential to almost all perennial plant life at some season of the year. Rex Begonias should never have their leaves sprinkled with water in winter, as it tends to spot and rot the foliage.

Gloxinias, Tuberous Begonias, Fancy Caladiums and Achimenes. All of these should now be resting and the soil left quite dry until time to start them in the spring. I have found that leaving these in the pots undisturbed all the winter is better than taking the bulbs or tubers out of the soil and packing them in sand or charcoal. Where large quantities are grown, it might be necessary to knock them out of the pots to economize space, but where only a few are grown, it is very easy to stand the pots back in a dry place on a shelf, where no drop of water can reach them. A temperature of 55° will suit all but the Tuberous Begonias when dormant; these latter I have found to keep better in a temperature of about 40° to 45°.

Summer Flowers for Florists.

The commendable and increasing demand on the part of the flower-loving public during the last few years, for a greater display of taste in the more natural arrangement of flowers, necessitating their more lavish use in the make-up of designs and floral decorative work in general, makes it imperative on the part of florists, to consider well how they can best supply the wants of their customers in this respect.

Begonia Weltoniensis (Pink Flowering).

The grouping of palms and foliage plants, as well as the very general use of large quantities of fern fronds, asparagus, etc., for room decorative purposes, often requires the use of large quantities of flowering plants and cut flowers, to brighten up the density of these masses of green. Bright colored foliage plants, such as crotons, pandanus veitchii, etc., are admirable for this work, but they are not always available, and cannot be used in many positions, even when they are to be had.

Roses and carnations can of course usually be obtained, but these cannot always be had at prices that will warrant their use except for the finer points of florist's work. Out of door flowers can usually be had in summer, but with the failure or partial failure of the sweet pea and aster crop, even these during the hottest weather in summer are often very limited both in quality and quantity, and many kinds of out-door flowers are too common almost to allow of their being used satisfactorily.

It seems to me that the empty benches so commonly seen in many florists' establishments could be more profitably used than they are, to supply this demand for a better class of flowers than is often obtainable out of doors during the summer months.

Japan lilies, more especially *Lilium speciosum album, Lilium rubrum* and *Lilium auratum,* as well as other varieties of this class can be,and are grown in

large quantities, but these sometimes, like our, at one time, reliable and beautiful Easter lilies, have of recent years become more fickle and uncertain in their character, and are at the best too costly, except for the very best class of work.

Although it is impossible to attempt even to fill the place of the gorgeous beauty of roses and carnations, as grown at the present day by our florists, or the more chaste and delicate beauty of the lily, there are some plants that I have found most useful as accessories and auxiliaries to these indispensable florists' flowers mentioned. I have reference more particularly to begonias.

For many years past I have grown *Begonia Weltoniensis* and *Begonia MacBethii and Begonia Weltoniensis alba* in as large quantities as desired, and although these varieties have been known to most of us for over a quarter of a century, or at least two of them, they cannot, in my opinion, be surpassed by any of our newly introduced varieties, taking ease of culture, handling and keeping qualities, as well as profuseness in flowering habit into consideration. By wintering over a few old plants and starting them in April or May, and propagating as soon as the cuttings are ready, a fine batch of plants can be had early in August, that will furnish a good supply of bloom or pot plants, at a time when flowers and flowering pot plants are scarce. By drying the plants off gradually when they are through flowering, and putting them on a front shelf under the greenhouse benches where the drip does not bother them, or on a back shelf in the greenhouse, or even in a warm potting shed, these begonias will keep splendidly, and occupy no valuable winter space. I have found two-year-old plants profitable, as they can be grown on into 6 inch or 7 inch pots, but after the second season I have not found the keeping qualities of the plants as reliable as younger stock. The *Begonia Weltoniensis* is a splendid bedder, and succeeds well in almost any position in light soil. Fairly light soil should be used for pot plants of this begonia. Other newer varieties, such as *Begonia Vernon, Bruantii, Erfordii, Ingramii* and other summer flowering types of Begonia semperflorens, will not compare favorably, in my opinion, with the two varieties just mentioned, excepting perhaps that these latter can be easier raised from seed than the Weltoniensis begonias. The seed, however, should be sown early in the spring, about February, to secure early flowering plants the same season.

The new hybrid type of Gloire de Lorraine Begonia, although beautiful and floriferous at almost all seasons, can scarcely be considered as a summer begonia. Although several new types and varieties of Begonia semperflorens have recently been introduced, at present there is still room for an ideal summer flowering begonia for florists; a want that may possibly be filled, as begonias are very susceptible to cross-fertilization, a fact that many of our principal florists are taking advantage of, as is shown by the introduction of so many types and varieties of this beautiful and useful class of plants. But the ideal florist's begonia has yet to be raised, and like all other classes of beautiful plants to be found in the floral world, we shall never know when the highest possible point has been reached, so great and mysterious are the workings of nature, when assisted by art, as well as by the assistance of bees and other insects in hybridizing and crossing different varieties of flowers.

I have been pleased to learn during the last few days that the three varities of begonias mentioned, viz.; *Begonia Weltoniensis, Begonia Weltoniensis alba*, and *Begonia McBethii* are again coming into popular favor, and, in my opinion, no florist should be without them on his greenhouse benches in summer, as their many good qualities for decorative purposes in general still entitle them to a place in the front ranks of this numerous and useful class of plants. Many florists, who have dropped them from their lists, are again taking them up, ample evidence that they are still of service, and that there is nothing yet to surpass them for general usefulness amongst summer flowering begonias.

And now a word on outdoor flowering plants in summer, 1st—Annuals, the prettiest, most varied and unfortunately, I must add, in many cases the most fickle and uncertain class of plants grown.

Malope Grandiflora Rosea.

It is gratifying to know, however, that there has been, during the last few years, more especially on the part of seedsmen and seed growers, a greater effort made, not only to introduce new species, but to improve generally the various strains and types of these useful adjuncts to a florists' establishment.

Time will not permit me to but barely touch on the subject of annuals, as it is unnecessary for me to even mention the staple varieties of many of them, such as Asters, Sweet Peas, Mignonette, Nasturtiums, Stocks, Phlox Drummondi, Cosmos, as well as Antirrhinums, Petunias and Verbenas —the last three being now generally acknowledged for all practical purposes as annuals—as all of these are well known to all classes of flower lovers, as evidenced by the beautiful display now on exhibition in connection with this convention.

But there are a comparatively few new varieties and types that may, perhaps, not be as generally known and cultivated as those I have mentioned. Take first of all the annual chrysanthemum. The beautiful colors and markings, as well as ease of culture, good keeping qualities, etc, well entitle these to the notice of all florists. For table and room decorative work, more especially, these annual chrysanthemums will be found to be invaluable. By sowing the seed early in the season, their decided and pretty flowers can be had early in August and September in abundance.

Annual Chrysanthemum.

Another species of plants that will furnish material for the florists' use are the Malopes and Lavateras. These improved types of the Mallow class of plants will be found of great service for decorative purposes and for loose cut flowers, Malope grandiflora alba and Malope grandiflora rosea being the two varieties most useful to florists. *Lavatera rosea splendens*, *Lavatera alba splendens* and *Lavatera trimestrie* are good varieties, their large, showy, mallow-like flowers being often several inches in diameter; and for a convolvulus-shaped flower their keeping qualities are very good, as I have, by experimenting with them in this respect, kept their flowers and foliage quite fresh for three days under treatment similar to what they would receive as cut flowers for decorative work.

Another class of annuals coming into favor are the annual rudbeckias, the beautiful brown and dark crimson markings of the base of the petals of these flowers makes them more acceptable than they otherwise would be, taking into consideration the almost objectionable and overdone appearance of many flower gardens, by the too general use of masses and rows of yellow flowers, such as *Rudbeckia laciniata* (Golden Glow) and the deep-colored, heavy-looking sun-flowers. Several very much lighter shades of these annual Helianthus or Sunflower have recently been introduced, their soft lemon yellow and almost white flowers making them less oppressive and objectionable as florists' flowers than the deeper orange shades of the older varieties of sunflowers.

Cosmos.

There is one more annual I would like to mention, viz., *Argemone Grandiflora Alba*, or Mexican Poppy. Although the growth is coarse (3 ft.) the abundance of its pure white, petalled flowers will especially commend it to florists, as it gives an abundance of blossom during August if sown in the open border in April. This plant has a habit of closing its flowers when on the plant at night, and during dull weather, but when cut, it remains open constantly. Although the stamens in the centre of the flower are yellow, it is of such a soft shade and texture that this feature is not as objectionable as it is for florists' flowers. For short time work it ought to be of value to florists, as large white flowers are so scarce oftentimes before the Asters make their appearance.

Perennials.

I should like to have said a few words on perennials, but the time is so short and space will not permit except to say that the improvement in this class of plants are equally as noticeable as in that of annuals, and no general florist's establishment is complete without a collection of these useful and inexpensive class of plants. I have a few specimens of several of the varieties of plants that I have mentioned, amongst which will be found several varieties, such as *Helianthus cummerifolia, Helianthus decapulatus nanus,* that from their form and soft lemon yellow colors well recommend them to the notice of florists as useful summer flowering varieties.

Argemone Grandiflora Alba (Mexican Poppy).

In conclusion I would mention another class of plants that could be made of more service to florists in summer than they are at the present time, I have

reference to the Hardy Climbers, more particularly the Clematis. The beautiful colors and shades of those that are now offered, from the pure white of the Duchess of Edinburgh variety, *C. paniculata* and *C. Henryi*, to the deep lavender color of Standishii or to the intense purple of the more common Jackmanni, will allow of no excuse for florists planting around and about their establishments—as we often see done—the common varieties of Ampelopsis and Clematis, when other kinds such as those I have mentioned might occupy to advantage and profit the places of the commoner kinds, and give results that would benefit their owners as well beautify their surroundings where planted.

Foxgloves.

I cannot close this rather lengthy, but I trust not altogether uninteresting, paper without again saying that although it is impossible and undesirable to supplant the queenly Rose, and I can almost say the kingly Carnation, in the estimation of the flower-loving public, still there are demands on florists that will sometimes not permit of the very general use of these as florists' flowers, especially at this season of the year, which, I trust, will be an acceptable apology and excuse for these remarks from me on "Summer Flowers for Florists."

FERNS FOR THE HOUSE.

By Wm. Hunt O.A.C., Guelph.

The delicate and tender nature of many of the prettiest and most graceful growing varieties of this beautiful and interesting class of plants, prevents their being used very extensively for house decorative purposes. The dry, arid atmosphere of dwelling houses induced by artificial heating, more especially in winter, is particularly destructive to the delicate texture and formation of the fairy-like fronds of many varieties of ferns.

Ferns thrive best in a moist, humid atmosphere, and although these conditions cannot be given them to the same extent in a dwelling house as in a conservatory or greenhouse, or even where ferns are found growing amidst their natural surroundings, still much pleasure and satisfaction can be obtained by selecting suitable varieties, and by modifying as much as possible the unnatural conditions

Nephrolepis Bostoniensis.

Aspidium Coriaceum.

that surround all plant life in a dwelling house. In fact many varieties can be kept fresh and bright looking, grown as house or window plants, much longer than many varieties of foliage plants commonly used for house decorative purposes.

It would be a waste of time and energy to endeavor to grow the delicate Adiantum and similar tender species of ferns under ordinary conditions in a dwelling, or even in a window, the finely formed lobes of their tender fronds being particularly susceptible to the dry atmosphere, if even they succeed in making any progress at all in the way of growth.

Probably amongst the almost innumerable species and varieties of ferns known to floriculturists, there are none better adapted for house or window culture than the many types of the Pteris fern,

sometimes called feather ferns from, the close resemblance many of these ferns have to the formation of a large feather.

Pteris Argyrea.

The long whip like, half-drooping fronds of Pteris serrulata, and the crested varieties of this Pteris, such as Pteris cristata and Pteris wimsetti, with the tips of their hard glossy green fronds more or less covered with the moss-like formation that give them the common name of crested ferns, are perhaps amongst the easiest grown and most enduring types of the Pteris, especially when grown as house or window plants.

Pteris cretica or Cretan Pteris is another variety that succeeds well in a dwelling house and is quite as easily grown as any variety of Pteris, in fact many prefer it to *Pteris serrulata* or the crested varieties, as being less liable to attacks of fern thrip and red spider, the two latter being the greatest insect foes of fern life.

Another variety, *Pteris hastata*, or Spear fern, specially commends itself to the indoor fern grower, not only from the fact that it is quite as easy of culture and as capable of resisting insect attacks as the other varieties mentioned, but the pleasing variation in its habit of growth makes it particularly acceptable either as a pot plant, or in the make up of a fern pan or fern dish.

The variegated type of *Pteris cretica*, viz.: *P. cretica alba lineata*, that takes its specific name (*alba lineata*) from the broad line of white that runs through the centre of each segment of its otherwise green fronds, is another variety that shows up splendidly amongst the plainer types of Pteris. In fact, in a well grown specimen, the white markings referred to often predominate sufficiently to make a plant of this variety quite a conspicuous object amongst a collection of ferns. The fronds of this fern are quite hard when matured, making it quite an easy task to sponge them occasionally to assist their growth, as well as to prevent attacks of insect pests.

Pteris Cretica.

All of the varieties of Pteris mentioned are of a comparatively dwarf habit the tough leathery texture, as well as the glossy surface of their fronds making them specially suited for house or window culture.

Pteris longifolia succeeds well in a house, and retains its freshness for a long time, its stronger growing habit however making it more suitable for large collections of ferns, or for use in large jardinieres than for ordinary house or window culture.

The beautiful *Pteris argyrea* (Silver Pteris) is unfortunately of a very delicate nature and does not as a rule succeed well in a dwelling house or window. As a greenhouse or conservatory fern it cannot be excelled in beauty, either in form or color, the broad rich silver markings of its large graceful fronds make it an object of attraction to all fern lovers. It is seldom, however, that a perfectly grown specimen of this fern is seen, as it requires exceptionally good culture to produce a good specimen.

Pteris Serrulata.

The *Nephrolepis* (Sword fern) gives us several types very useful as house or window ferns. The popular Boston fern (*Nephrolepis Bostoniensis*) is perhaps the most graceful, as well as one of the easiest of culture amongst ferns, its long arching fronds making it particularly adopted for furnishing large jardinieres, mantles, etc. *Nephrolepis exaltata*, or the true Sword fern, is also a useful house or window plant but is not as robust as the Boston fern. The dwarfer growing types of this fern, *N. cordata* compacta, and *N. philipensis* are useful ferns, but not as enduring or lasting in a house as *N. Bostoniensis*.

Another pretty and useful fern for house culture and one that until recently has been little seen, either as a house or window plant, is the dwarf, dense growing *Aspidium coriaceum* or leather fern deservedly taking the latter name from the extremely tough texture of its fronds as compared with many ferns This characteristic enables this fern to resist the bad effects that a dry atmosphere produces on ferns for a much longer period than many others. Its dense, dwarf habit is also another feature that recommends it either for the window or greenhouse, or for house decoration I have known plants of this fern retain their freshness for a longer period than many house plants such as palms and cordylines, without any extra care being bestowed on them.

Pteris Wimsetti.

The graceful-growing *Asplenium bulbiferum* cannot be omitted from the list of ferns suitable for a window or for house decoration, but it succumbs sooner to drouth and a dry atmosphere than some of the others I have mentioned. The long spear-like, hard fronds of *Asplenium marinum* (another distinct type of Asplenium) makes a most enduring and pretty fern for the house or window and is very easy to grow.

Amongst our native ferns that are especially suitable for indoor culture is the dwarf growing Polypody. This fern is almost evergreen in character and differs but slightly, either in form or habit, from the English Polypody (*Polypodium vulgare*) both of which are most enduring ferns as house or window plants. I have used specimens of both the Canadian and English Polypody for house decorative plants for several years past, the plants having in almost every case retained their, fresh bright appearance for two or three months without any more care or attention than is usually bestowed on the best house plants, viz: Aspidistras, Cordylines, palms, etc., a fact that certainly placed them high in my estimation as house plants. It is easy enough to secure a plentiful supply of the native Polypody, as it grows freely in almost every part of Canada, more especially amongst rocks and stones. Used solely as an occupant of the fern pan or as a pot plant, or mixed in with other kinds of ferns, these varieties of the Polypody are a valuable addition to the list of ferns suitable for house or window culture.

Another stronger and coarser growing fern, useful for house decoration or for the greenhouse, is the *Aspidum falcatum*, or as it is sometimes catalogued *Cyrtomium falcatum*, another iron-clad fern capable of resisting for a longer period than most ferns the atmospheric condition unsuitable to plants, usually found in a dwelling house.

Many other varieties of ferns could be mentioned as being suitable for house or window culture, but those given will be found sufficient to make a variety to supply quite a large window or for house decorative purposes.

A word or two perhaps on the culture and care of ferns may perhaps be acceptable.

There are very few ferns but delight most of all in soil of a light, porous nature. A compost should be made of one-half well rotted, clean, leaf-mould, the other half to be made up in equal parts of sharp, fine sand and loamy potting soil, the latter being enriched with a small quantity of dry pulverized cow manure. Mix this compost well together before using.

From the fact that ferns like plenty of moisture at the roots and around about them, the mistake is often made of not giving the pots they are to grow in a plentiful supply of drainage. This latter feature is very necessary when potting ferns or filling fern pans, as ferns will not live, to say nothing of thriving, in a sodded soil soured by stagnant water, especially when placed in a window or dwelling house. Use fully an inch of broken pots in all except perhaps very small pots, when the quantity of drainage can be reduced in proportion to the size of the pot.

Water ferns thoroughly at the roots when they require water, never allowing the soil to become anything approaching a dust dry condition; in fact with good drainage the soil should always be kept moist but not soddened.

When potting or re-potting ferns do not be too liberal as to the size of the pot; using a pot too large in proportion to the quantity of roots is detrimental to almost all kinds of plants, especially to house or window plants where the surroundings are not of a nature to induce quick root action so as to necessitate an abundance of room for the roots.

The fronds of most of the ferns I have mentioned can be easily washed with a small piece of soft sponge or some similar material, moistened with clean water. Syringing the growth with water from a fine atomizer spray will also be beneficial, or the growth of the plants may be dipped in a pail of water once or twice a week. This can be done by turning the plant upside down and allowing the fronds only to remain under water for a minute or so. By adopting these means before insects attack the growth, the destructive visits of the fern thrip and red spider can often be prevented, and the plants kept fresh and healthy looking.

The insect pests that are most likely to prove troublesome are fern thrip and red spider; the green fly often makes its appearance, especially on the young fronds. Shaking or brushing off the green fly is probably the safest way to dispose of green fly; if tobacco water is used it must be made very weak. The presence of thrip and red spider will be first seen by the whitish appearance the fronds present, especially near the centre rib of each lobe or frond. Weak tobacco water applied to the growth, especially on the underneath side, is the best remedy for thrip. The fern thrip is a very minute insect and cannot be discerned with the naked eye. A magnifying glass will, however, reveal its presence, when it will be seen burrowed snugly between the upper and lower layers of film that constitute the frond. Nothing is better for destroying thrip on ferns than frequent applications of tobacco water. Frequent syringing and sprinkling the growth of ferns with clean water is one of the best preventives of the attacks of the almost invisible but destructive red spider, one of the worst pests of indoor plant life.

Ferns have during recent years become so popular and necessary as accessories to floral decorations, that a word or two on their culture and care may perhaps be interesting to readers of the *Journal.*

ROSE PESTS.

By Wm. Hunt, O.A.C., Guelph.

With the advent of June blossoms, and the increasing heat of the sun, insect pests are sure to make their appearance. The old adage, "that an ounce of prevention is better than a pound of cure" is one that flower lovers will do well to bear in mind, and apply practically its teaching at this season of the year.

Much of the success to be attained during the summer season, both in the flower and fruit garden, depends very largely on prompt and vigorous action in preventing the development and increase of the many kinds of insect pests that prove so troublesome and destructive in our gardens. Too often the application of remedies and preventive measures for the extermination of insect pests, etc., is left until the plants have become so badly infested that they are hopelessly spoiled for floral or decorative purposes for the greater part of the season.

How often do we see rose bushes with the foliage and buds partly eaten and destroyed by the rose-worm or slug, long before the buds have had time to develop even the faintest tinge of the gorgeous colors of their beautiful petals, when an early and timely application of a little dry hellebore powder, sprinkled over the bushes before the flower buds developed, would have prevented the disfiguration of the plants as well as the loss of the roses. I have found it a wise course to always give rose bushes a sprinkle of hellebore powder as soon as the foliage has partially developed, before the flower buds are showing very prominently. By doing this and repeating the operation about once a week, until the flower buds com mence to open out into flower, the foliage, as well as the flower buds can be saved from disfiguration and partial ruin. The best time to apply the hellebore is early in the morning, whilst the foliage is damp with dew.

Take again the rose-thrip, that is so troublesome to rose-growers from the time the rose buds appear until early autumn. This insidious little white fly, or

midge, that secrets itself on the under side of the leaves, is oftentimes not detected until the foliage has become bleached and whitened by its destructive attacks. Its presence, however, can usually be detected if a close inspection of the foliage is made soon after the first leaves appear on the bushes. At this time the insects are so minute that it requires careful search before they can be seen. This is the proper time, however, to commence the application of insecticides, as if left until later, when hot, dry weather prevails, it is almost impossible to eradicate them from the bushes.

An application of tobacco in some form or other is the best and safest preventive of the development and increase of the rose-thrip. I have found that an application of dry powdered tobacco leaf, or dust, sprinkled once or twice on the bushes as soon as growth commences in early spring, and the operation repeated once a week until the flower buds are developing, has proved very successful in preventing the appearance of these troublesome pests of the rose grower.

A rather strong solution of tobacco water, made by pouring boiling water on tobacco, especially the raw leaves or stems, is a good preventive for the rose thrip. This solution should also be applied early in the season and at intervals as before recommended. There are several preparations specially prepared as insecticides that are very useful to the rose grower. Most of these preparations are largely composed of the essence of tobacco and are perhaps easier to obtain than raw tobacco. Nicoticide and Sulpho-Tobacco soap may be mentioned as amongst some of the best preparations of the kind. It should be remembered however that one application early in the season does more good than perhaps three or four will do later on, when the insects have become well established and numerous. A weak solution, made by dissolving about a teaspoonful of whale oil soap in two quarts of water, will prove of great service in preventing the the ravages of the rose thrip. The solution should be applied with a syringe or whisk to the underneath part of the foliage as much as possible.

Another enemy to the successful culture of the rose, is the red spider. Climbing roses are more liable to attacks from this little pest than are bush roses.

The red spider delights in a dry arid atmosphere, and roses that are trained near to, or perhaps close to, a wall or fence, offer splendid inducements for its attacks. These pests are also very minute and oftentimes hard to locate until they have done considerable mischief. The first intimation of their presence is the unhealthy, whitish appearance of the leaves, and finally the constant dropping of the dried, half-devoured leaves; unless they are stopped before they have reached this stage. Constant syringing and sprinkling with cold water is the best preventive of the appearance of red spider, as they cannot exist in a damp atmosphere. It is almost impossible to prevent the attacks of these little pests in climbing roses planted close against a house or wall having a south aspect. Those of our readers who have roses planted in such a position will do well to syringe or sprinkle their bushes with water well up to the time of flowering, and for the greater part of the summer after the flowering period, if they would have good healthy rose plants. An open, airy position suits roses the best. If planted against a wall or fence an east or northeast aspect is by far the best for their successful culture. The aphis or small green fly is also troublesome to rose growers. Constant syringing, or an application of tobacco water, usually rids the bushes very effectually of these less destructive insects than thrip, red spider, or the rose slug.

Those having rose bushes or similar plants that are liable to attacks from insect pests will find by using the different insecticides early in the season that much time and labor can be saved, and much better results obtained from their plants than by leaving the application of remedies until the insects have obtained a strong hold on the plants.

NOTES ON CONIFERS.

By W. T. Macoun, Central Experimental Farm, Ottawa.

PINES.

When the ornamental grounds are large no trees are better adapted for giving character to a landscape and adding to the appearance of the buildings than the pines. They are stately and graceful, typical of strength, yet swaying and bending their branches with every breeze that blows. They are always green, and when the species are judiciously mixed or intermingled with other evergreens, the effect in winter is very fine. They afford considerable protection also, and partly on this account they are more suited for a northern exposure than anywhere else, giving a home an air of greater comfort. Pines are more difficult to transplant than many other trees, and the careless manner in which a maple or even an arbor vitae may be handled should not be taken as an indication that all trees will survive this harsh treatment. Pines have few fibres on their roots, and what there are, are easily destroyed. For this reason the roots should be kept well protected until planted.

Group of Evergreens in Arboretum, C. E. F., Ottawa.

Pines are very varied in their form and the color of their leaves, some being also much more graceful than others. Our native White Pine (*Pinus Strobus*) is one of the best and most graceful of them all. If this were a tree from some foreign country it would probably be more planted for ornamental purposes than it is at present. The Austrian Pine beside it appears stiff and formal. The leaves, or needles as they are sometimes called, are of a lively green shade, which helps to make it one of the best appearing pines in winter. The white pine succeeds admirably in almost any kind of soil, unless it be very wet, but seems to thrive best in good sandy loam. It is a rapid grower, averaging about two feet a year. Young trees ten inches high, planted in 1889, at the Central Experimental Farm, are now twenty feet in height. If good lawn specimens are desired, the trees should be planted when small, and if given plenty of room and cared for they will branch close to the ground and make beautiful trees.

Scotch Pine (*Pinus Sylvestris*). The Scotch Pine is planted more in Canada as an ornamental tree than the white pine. It is not as graceful a tree as the latter, nor its equal in any way, but it is a fine tree. It transplants easier,

perhaps, than any other species of pine, and this may be one reason why it is so popular. The leaves are darker than those of the white pine, being of a bluish green color, which makes a fine contrast with those of the other species. It is a very rapid grower, and appears to succeed better on low land than the white pine. It will thrive well, however, in a great variety of soils, but it is best to plant it in a well-drained soil. Trees planted in 1888, when eighteen inches high, are now nineteen feet in height.

Red Pine *(Pinus resinosa).*

Austrian Pine (*Pinus Austriaca*). Next to the Scotch Pine, the Austrian is probably planted more than any other pine. It is a rather stiff appearing tree, but very symmetrical, and makes a fine lawn specimen, being compact, and if good trees are planted, branching readily from near the ground. The leaves are dark green in color and very stiff. It is a slower growing tree than either the White or Scotch pines. Trees planted in 1889 when eighteen inches high are now sixteen feet in height.

Pinus Resinosa (Red Pine). The Red Pine is another native which has been used very little as an ornamental tree. At a distance, when young, it might be mistaken for an Austrian Pine, but on closer inspection the leaves will be found to be less rigid and softer to the touch. As the tree develops it becomes more graceful than the Austrian Pine, and is preferable in many ways.

Pinus Ponderosa (Bull Pine). This is a native of British Columbia, and also occurs in the Rocky Mountains in the United States. Very few specimens of this fine native tree have been planted for ornamental purposes in Canada, but where it can be grown successfully it should not be omitted. It is one of the most handsome species. The long glaucous green leaves, sometimes twisted into peculiar forms, and its upright branches give it a majestic appearance, and make it a very noticeable and attractive object. It is a rapid grower when once established, a specimen planted in the Arboretum in 1890 when fifteen inches high, being now fourteen feet eight inches in height. It is one of the most difficult pines to transplant, as there are very few fibres on the roots. Great

Bull Pine *(Pinus ponderosa).*

care should be taken to not allow the roots to become dry. The trees should not be more than eighteen inches high when planted, after which they should be well looked after.

Dwarf Mountain Pine (*Pinus montana Mughus*). On account of its dwarf, compact and symmetrical habit of growth, and its generally attractive appearance, this is a very desirable pine. It is a native of the mountains of Central Europe, but succeeds admirably in this country. The foliage is very similar to that of the Scotch Pine in some respects. It is a low-growing tree, never probably attaining a height of more than ten to fifteen feet. Some specimens are dwarfer than others. This is a very desirable tree.

Pyramidal Arbor Vitae.

Swiss Stone Pine (*Pinus Cembra*). This pine is a native of Central Europe and Northern Russia. It is pyramidal in form, with foliage somewhat resembling that of the White Pine, but while the latter is a loose-growing tree, the Stone Pine is very compact, and is one of the slowest growing trees on the Experimental

Farm. A specimen planted in the Arboretum in 1889 when nine inches high, is now only two feet four inches in height.

Other pines which have been tested at the Central Experimental Farm and have proved hardy so far, are *Pinus contorta* and variety *Murrayana*, natives of the Rocky Mountains and coast ranges; *P. densiflora* and *P. Thunbergii*, natives of Japan, and *P. Penke*, native of Macedonia.

Alcock's Spruce.

The pines are all interesting, and most of them very ornamental. They should be planted in greater variety than they are at present.

Arbor vitae.

Among evergreens there are few as satisfactory as the different varieties of American Arbor vitæ. At the Central Experimental Farm there are now fifty-one distinct forms growing, which vary much in foliage and habit of growth from the dwarf and compact "Little Gem," which is only a few inches high, to the pyramidal Arbor vitæ which rises straight and full in striking contrast to it. The American Arbor vitæ adapt themselves to a great variety of soils, and it is only on the heaviest clay and lightest sandy soils that they fail to make satisfactory growth. This adaptability to so many different situations is one of the reasons they are so valuable for ornamental planting. Another important reason why they are so desirable is that they are all perfectly hardy, as the ordinary form grows in the coldest parts of Ontario and Quebec. Owing to the dwarf, or semi-dwarf, habit of most of the varieties, they are very useful for small grounds where there is not room to grow anything which will reach a great size. Some of the varieties are so distinct in shape, such as *compacta*, *globosa*, *pyramidalis* and *Hovcii*, that visitors to the Experimental Farm are often led to believe that they have been pruned to their several shapes until informed to the contrary.

Out of the large collection the following are selected as being among the best as regards form and color of foliage:

Douglas' Golden Arbor vitæ (*Thuya occidentalis aurea Douglasii*: For those who are fond of yellow-foliaged evergreens, this is a very desirable one. It is of a fine, upright form, with bright golden leaves which retain their yellow

color well in the winter, making this tree very attractive at that time of the year. Contrasted with darker kinds it makes a good effect.

Compact Arbor vitæ (*Thuya occidentalis compacta*): This is a compact, dwarf variety with bright green foliage and is very pleasing to the eye. There is a variety, Parson, which is particularly good.

Ellwanger's Arbor vitæ (*Thuya occidentalis Ellwangeriana*): Although this variety does not grow very tall, specimens from twelve to fourteen years old being about four feet high, it is a vigorous growing sort and spreads out well. It is a compact variety and has slender leaves and branches which give it a less stiff appearance than some other varieties.

Hovey's Arbor vitae (*Thuya occidentalis Hovzii*): This is one of the finest and most attractive varieties. The leaves are bright green and the branches flat and parallel, giving the shrub a very remarkable but pleasing appearance. It does not grow very tall, specimens from twelve to fourteen years of age being only between four and five feet high.

Group of Conifers at C. E. F., Ottawa.

Pyramidal Arbor vitae (*Thuya occidentalis pyramidalis*).—The pyramidal Arbor vitae is one of the most distinct in form. It is a compact and very upright grower, being quite columnar in form, which makes it a very conspicuous object wherever planted.

Siberian Arbor vitae (*Thuya occidentalis wareana Sibirica*:—The Siberian Arbor vitae is one of the best known varieties. It is of compact habit, and while not so dwarf as some others, it does not grow very tall. The leaves have a blunt appearance, which distinguishes it from most varieties, and their deep bluish green color is also quite distinct.

Thuya occidentalis Columbia:—Of those varieties of the American Arbor vitae which have variegated foliage this is one of the best. The tips of the leaves, which are rather blunt, are whiter than most of the other variegated forms, and the contrast between the lighter parts and the green is, therefore, more marked. This is a very beautiful variety.

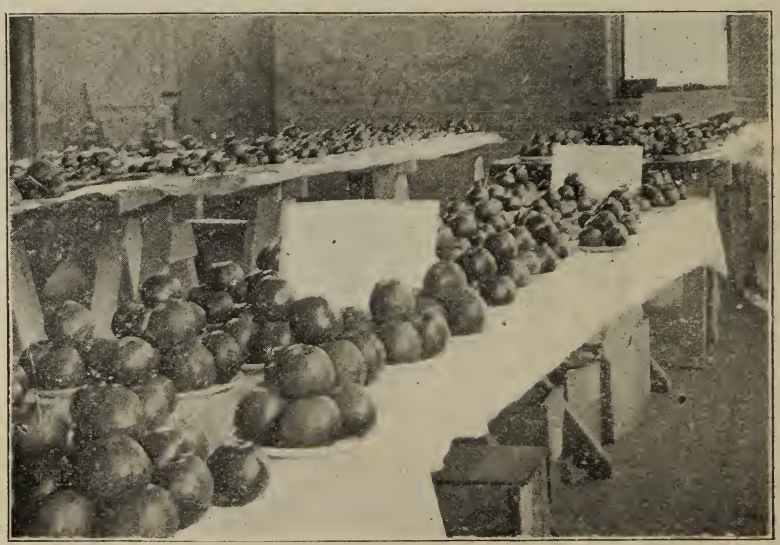
Spruce.

There are a good many species of spruce, and of the Norway spruce especially there are a great many varieties, but there are few of them which are better than the ordinary forms. The Norway spruce (*Picea excelsa*) is one of the best evergreens that will grow in this country. It is hardy, of rapid growth and good form, and possesses more good points than any of the other species.

The Rocky Mountain Blue Spruce (*Picea pungens*) is a very handsome tree. It lacks the graceful form of the Norway, but if a good specimen of the glaucous form is procured there will be nothing found to equal the beauty of the steely blue foliage. This tree is a slow grower and it takes some time before it reaches a great height. The beautiful specimens growing at the Central Experimental Farm are the wonder and admiration of all visitors. This species varies much from green to steely blue, and in ordering this tree the blue variety should be asked for.

Among the newer spruces there are none of the hardier species which equal Alcock's spruces (*Picea Alcockiana*) in beauty. It is a native of Japan and there attains a height of from forty to sixty feet. It is quite distinct from other species. The upper surface of the leaves is dark green, and the lower surface is bluish, silvery-green, and the contrast gives the tree a very attractive appearance. The cut of this spruce, which was produced from an excellent photo taken by Mr. F. F. Shutt, gives some idea of the character of it.

The native White Spruce (*Picea alba*) is not to be ignored. When given plenty of room where it can develop symmetrically it makes a handsome tree. The White spruce varies much in the color of the foliage, and by a careful selection specimens may be obtained which almost equal the Blue spruce in beauty of coloring. If one cannot afford to buy trees of other species one can get much satisfaction from growing a White spruce. The trees should be planted when quite young to get the best results, and they should be branched almost to the ground. If larger trees are planted they are liable to be scraggy or will become so



Fruit Exhibit at Annual Meeting. British Columbia Apples in the foreground.

Fruit Exhibit at the Annual Meeting. General view of appl tables.

Fruit Exhibit at Annual Meeting. Showing apples and peaches (bottled), grown on the grounds of the Lake Huron Experiment Station, Walkerton, Ont.

Fruit Exhibit at Annual Meeting. Showing a large assortment of grapes from the Wentworth Fruit Experiment Station at Winona, Ont. Apples from the St. Lawrence Valley and Bay of Quinte districts.

HOW TO BUILD A ROCKERY.

By F. B. Greening, of the Hamilton Horticultural Society.

Why many fail to attain success with their rockeries is because a few simple but necessary rules are neglected in their construction. It must be remembered particularly that the pockets should be made sufficiently large and deep for the roots to penetrate in search of nutriment and moisture. Many rockeries are deficient in this respect, and the plants are stunted for want of proper food, and succumb to the first protracted dry spell. The Hamilton City Improvement Society, in order to encourage the building of rockeries, is offering this season a series of prizes, and all citizens can compete. In order to assist any who may be making themselves a rockery the following suggestions are given.

After deciding upon the most desirable site, the ground should be excavated of the depth of about eight or ten inches and filled in with broken bricks, stones, or rough material for drainage. On this place a layer of decayed vegetable matter and rough mould, then finish off with a foot or two, according to the height required, of the best mould you can get mixed with well rotted manure. The soil should be thoroughly well firmed to avoid undue sinking when the earth settles. Now fix your rocks, starting at the outside of the mound, forming pockets not less than 12 inches across, most of them considerably larger. The rocks should be partially buried in the soil and pushed well in, then put some cement at the joints to keep the rocks in their place, and it is as well to wash each rock, or dip it in a pail of water, to ensure there being no dirt that would prevent the cement adhering. After completing the lower series of pockets gradually build up towards the top, one row of pockets at a time and in irregular and diversified shapes, trying to avoid too formal outlines. This is important if a natural effect is to be attained. Fill up the pockets with fine loam, sand, and black earth, well mixed together. The rockery in this way can be built up three or four feet high, if necessary, and you will have a series of beds wherein you can grow your flowers or ferns to perfection.

The choice of material in Hamilton is fortunately large; suitable waterworn stones can be collected along the face of the mountain and in the ravines. In England, where rockery building has become almost an art, instead of natural stone they are now using clinkers or slag, which can be procured from founderies or smelting works. The pieces of slag should be as large and irregular in shape as possible. These can be used as they are, or a better effect can be produced by covering the slag with a thin solution of cement and sprinkling with sand, making a very pleasing effect. Pieces of marble, shells, glass, etc., should on no account be used, such materials being utterly out of character with the beautiful foliage of the plants. The whole aim should be for the arrangement to be as natural as possible.

In furnishing the rockery with plants, it is necessary when making your selections to consider the aspect. If it is shaded and comparatively sunless, you must not try to grow any but plants that thrive in such situations, and for such rockeries it is recommended that ferns should be largely used. There are comparatively few people who appreciate the vast variety of native ferns to be gathered within an easy driving distance of Hamilton. There are enthusiastic collectors in the city who have upwards of thirty distinct varieties of native ferns transplanted to their gardens from the neighboring woods and ravines. In addition to the ferns, there are many native wild flowers suited for the shady rockery, such as columbines, anemones, hapatica, arbutus, gentian, and many others. Some of the cultivated plants recommended for shaded places are the foxglove, larkspur, German and Japan iris, lily of the valley, Canterbury bell

ribbon grass, etc.; also a variety of bulbs may be planted for spring flowering, such as crocus, daffodil, and tulip, which need not be disturbed from season to to season.

For rockeries with a sunny exposure, all the glorious wealth of garden plants may be used and a perfect blaze of color can be relied upon all summer with very little attention. The rock pockets keep the roots of the plants cool and moist, and the sunshine will bring out to the full nature's wealth of color in all its brightest and loveliest forms. Oriental poppies, perennial phlox, campanula, peonies, gaillardia, dicentra, ornamental grasses, alyssum, funkia, etc., also many climbing vines may be planted and allowed to run over the whole, making an exceedingly pretty effect. Climbing nasturtiums should be planted, particularly, also the lathyrus (everlasting pea).

There are many shady situations where rockeries can be placed to advantage on lawns where the grass cannot be made to grow, or such gardens as are not large enough to have a satisfactory lawn should be made into rock gardens as described. There are also many odd nooks and corners that could be utilized that now are harboring places for waste paper and rubbish.

At Messrs. Upton's factory on Ida street is to be seen a form of rockery that should be universally adopted by householders with corner lots, it being built across the lawn as a barrier to prevent the public making a short cut, and it has been a source of much pleasure to passers by and residents in that neighborhood. Why cannot more of our enterprising manufacturers spend a little time in beautifying the surroundings of their factories? Besides being appreciated by the public, it is an inspiration and example to their workmen to better their own house surroundings.

LAWNS, HOW TO CARE FOR THEM.

By A. Alexander, of the Hamilton City Improvement Society.

Nothing is more beautiful around our homes and along our streets than a well-kept lawn. Crisp lawns, all dim with early dew, or smooth in evening warmth of barred sunshine, are alike redolent of pleasure to the beholder's eyes. As John Ruskin says, when writing of a blade of grass, "Made as it seems only to be trodden on to-day and to-morrow to be cast into the oven, and a little pale, hollow stalk leading down to the dull brown fibres of roots. And yet, think of it well, and judge whether of all the gorgeous flowers that beam in summer air, and of all strong and goodly trees, pleasant to the eye or good for food, there be any by man so deeply loved, by God so highly graced, as that narrow point of feeble green."

Where the soil has been properly prepared by rather deep digging and enriched with thoroughly rotted stable manure, or an artificial fertilizer, such as ground bone and muriate of potash, there will be no trouble in having a good lawn, for the roots of the grass must be able to reach down and find moisture and food. The artificial fertilizer referred to is made up of five parts of ground bone to one of the muriate of potash, and five pounds of this mixture to be used for every square rod of ground. This mixture to be worked into the soil before seeding or sodding.

A top dressing of the muriate of potash alone, at the rate of one half pound to the square rod two or three times during the season, will be of great benefit, especially if sown before a shower. Hard-wood ashes, unleached, are of great

benefit sown on the lawn in spring. Last year I could see the beneficial effect of this in two weeks after being applied. The muriate of potash and ground bone are worth about five cents per pound, and less in large quantities.

In making new lawns or renewing them it is not absolutely necessary to use sod. Sowing a mixture of lawn grass as sold in the seed stores in April will be ready for the mower in July, and next year will be as good as if sodded, and at half the price. The covering of lawns with rank stable manure in the fall is to be avoided; it is very unsightly, and tends to produce a rank, unhealthy growth. A top dressing of thoroughly decayed manure or vegetable humus applied early in the spring, and broken or levelled in with the back of rake, when nothing better can be got is good. It is injurious to a lawn to have the sprinkler going when not absolutely necessary It tends to produce a weak, unnatural growth, and washes all the food on which the grass feeds away below the roots, impoverishing the upper soil.

I am often asked if I leave the grass on the lawn after mowing. I answer, No. If the mower is not provided with "catcher," the grass should be raked off at once with a grass rake or swept off with a besom.

The question of how to get rid of weeds in the lawn is a very troublesome one. There is nothing we can use to destroy the weeds that will not destroy the grass also. Dandelions can be kept down by cutting them below the ground with a sharp knife. Wherever there is a healthy growth of grass there will be no trouble with weeds, for there will be no room for them. In the shade of trees or fences it will be observed that the grass is weak and the weeds strong. Sometimes chickweed, ground ivy, self-heal and a variety of speedwell infest a lawn in patches, a sharp steel rake may get rid of these to some extent, but when they get a hold and become unsightly the best plan is to skin the whole patch, stir up and enrich the soil and sow some clean grass seed. The using of stable manure for top dressing, as referred to above, is responsible for many of the noxious weeds which mar our lawns.

Once a week is often enough to mow the lawn. Mossy places in a lawn indicate sourness or poorness of the soil. Treat them as for the weeds above mentioned; top dress with fine rich compost.

Frequent use of a heavy roller over the lawn is of great benefit, especially when the lawn is soft, and as soon as the frost is out of the ground and throughout the season.

You roll it as I advise, and it is stronger the next day. You mow it as I advise, weekly; and it multiplies its shoots as if it were grateful. Let us then care for our lawns and deal generously with them, and thus add another charm to our city's adornment.

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NINTH ANNUAL REPORT

OF THE

FRUIT EXPERIMENT STATIONS

OF

ONTARIO,

UNDER THE JOINT CONTROL OF THE

ONTARIO AGRICULTURAL COLLEGE, GUELPH

AND THE

FRUIT GROWERS' ASSOCIATION OF ONTARIO

1902.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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NINTH ANNUAL REPORT

OF THE

ONTARIO FRUIT EXPERIMENT STATIONS

1902.

To the Honorable John Dryden, Minister of Agriculture:

Sir,—In presenting to you the Ninth Annual Report of the Fruit Experiment Stations of Ontario, we desire to call your attention to a number of new fruits reported upon for the first time in Canada, to the alphabetical arrangement of matter, and to the revised copy of the Fruit Catalogue, in the yearly revision of which we invite the aid of fruit growers in every section of the Province.

We have the honor to be, Sir,

Your obedient servants,

Jas. Mills, Chairman.
Linus Woolverton, Secretary.

BOARD OF CONTROL, 1903.

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The Chairman, the Official Inspector, and the Secretary of the Ontario Fruit Growers' Association.

THE ONTARIO FRUIT STATIONS.

	Name.	*Specialty.*	*Experimenter.*
1.	Southwestern	Peaches.....	W. W. HILBORN, Leamington.
2.	.....	.....	
3.	Wentworth.	Grapes.....	MURRAY PETTIT, Winona.
4.	Burlington.....	Blackberries and Currants	A. W. PEART, Freeman.
5.	Lake Huron.....	Raspberries.....	A. E. SHERRINGTON, Walkerton.
6.	Georgian Bay.....	Plums	J. G. MITCHELL, Clarksburg.
7.	Simcoe	Hardy Apples and Hardy Cherries .	G. C. CASTON, Craighurst.
8.	East Central.....	Pears and Commercial Apples	R. L. HUGGARD, Whitby.
9.	Bay of Quinte....	Apples.....	W. H. DEMPSEY, Trenton.
10.	St. Lawrence.....	Hardy Plums and Hardy Pears	HAROLD JONES, Maitland.
11.	Strawberry Station	.....	E. B. STEVENSON, Jordan Station.
12.	Gooseberry Station	.....	STANLEY SPILLETT, Nantyr.
13.	Maplehurst	General collection of all kinds of fruits for descriptive work for "Fruits of Ontario"	L. WOOLVERTON, Secretary.
14.	Algoma.....	Hardy Fruits.....	C. YOUNG, Richard's Landing.
15.	Wabigoon	Hardy Fruits.....	A. E. ANNIS, Dryden.

FRUITS OF ONTARIO.

Described and Illustrated by Mr. L Woolverton, Secretary of the Ontario Fruit Experiment Station.

Fruit growing has become so important an industry in the Province of Ontario, that it deserves every encouragement at the hands of the Department of Agriculture. The Canadian farmer who contemplates growing fruit asks for information on two points in particular, viz., (1) What fruits shall I plant, and (2) How shall I cultivate them ? The latter of these questions it is the province of the Ontario Fruit Growers' Association to answer through the Canadian Horticulturist and the Annual Report, while the former question is one that can be solved only by years of patient experimental work by our fruit experiment stations.

Of equal importance is some means of identifying all varieties now grown in our Province, and of knowing with some degree of exactness the size, color, general appearance and real value of these varieties aside from the catalogues of the nurserymen. To meet this latter need, the Secretary, with the advice and approval of the Board of Control, has begun the work of illustrating and describing the fruits of Ontario ; and in this work he desires to acknowledge the valuable aid of the various fruit experimenters. The illustrations are all new and original, having been engraved from photographs made the exact size of the fruit samples, except where otherwise specified, and in this way there will in time be made accessible to the Ontario fruit growers a complete guide to all the fruits grown in the Province. Such a work necessarily must be slow and tedious, but it is all important that it should be characterized by scientific accuracy, and the writer invites notes or criticism from pomologists generally.

STARK.

SECTION.

The Stark has been tested in a commercial way in Ontario by our experimenter near Trenton, Mr. W. H. Dempsey, who considers it a good winter apple for export, being about as profitable as Ben Davis, and somewhat better in quality; its dull red color is a serious fault.

ORIGIN: Ohio.

TREE: A stout vigorous grower, very productive each alternate year; foliage, large, dark green, somewhat subject to fungus.

FRUIT: Large, $3\frac{1}{2}$x$3\frac{1}{2}$ inches; form, roundish, slightly one-sided, somewhat oblong conical; skin, covered with shades and splashes of light and dark red on a greenish yellow ground, thickly sprinkled with brown dots; stalk, one-half inch long, stout, in a small cavity of medium depth; calyx, large, half-closed, in a large, shallow, plaited basin; flesh, yellowish white; texture, a little coarse, firm and moderately juicy; flavor, mild, sub-acid, good.

SEASON: January to May.

QUALITY: Dessert, poor; cooking, good.

VALUE: Home market, fair; foreign market, good.

STARK.

BLACKBERRIES.

AGAWAM.

A profitable variety, and a favorite for the table.

ORIGIN : Found growing wild by John Perkins, Ipswich, Mass., about 1870.

PLANT : Hardy, vigorous and productive, resistive of drouth.

BERRY : Oblong, medium size $\frac{7}{8}$ by $\frac{3}{4}$, black, sweet, tender and of good flavor.

SEASON : Mid-summer ; in 1900 it ripened at our Burlington station July 25 to August 10.

ADAPTATION : Succeeds in nearly all fruit sections. G. C. Caston. of our Simcoe station, names it as one of the best in his district, and says the plants at his station are hardy, healthy and productive.

AGAWAM.

MINNEWASKI.

MINNEWASKI.

Introduced with great flourish, but it has proved disappointing, except in the place of origin, because tender and unproductive.

ORIGIN : By A. J. Caywood, of Marlboro, N. Y.

PLANT : A stout, vigorous, upright grower, but unproductive and tender.

BERRY : Large, oblong, ($\frac{7}{8}$x$\frac{3}{4}$ at Burlington station in 1900), dull in color, and of fair quality.

SEASON : July 20 to August 10, (Burlington station, 1900).

SNYDER.

SNYDER.

A popular variety in the commercial fruit garden, because of its productiveness; very reliable in the colder sections, but not very desirable for the table because of its inferior quality.

ORIGIN: On farm of Henry Snyder near Laporte, Indiana, about the year 1851.

PLANT: A vigorous, stout, upright grower, hardy and very productive.

BERRY: Medium size, ($\frac{7}{8}$x$\frac{3}{4}$ at Burlington in 1900), roundish, firm and carries well.

SEASON: July 18 to August 5, (at Burlington in 1900).

CHERRIES.

CALIFORNIA ADVANCE.

A fine Duke cherry, so similar in both season, and in character to the Late Duke, that we are inclined to think the two identical. Introduced by the Stark Nurseries of Louisiana, U.S.

LATE DUKE, (ANGLAISE TARDIVE.)

The most desirable of cooking cherries, because of its mild agreeable acid; and probably the most profitable of the Dukes, because (1) of its productiveness, and (2) of its season, which is between the Early Richmond and Montmorency. This and May Duke, which precedes it about two weeks, cover the early part of the season for cooking purposes; while Montmorency Kentish) and English Morello extend the season of cooking cherries to the 1st of August.

TREE: Habit, upright; very vigorous and very productive; Duke.

FRUIT: Large of its class, $\frac{3}{4}$x$\frac{3}{4}$ of an inch; form, roundish, slightly flattened; color, partly covered with bright red, but rich, dark red when fully ripe; stalk, $1\frac{1}{2}$ inches long, inserted in a shallow cavity; suture, traceable; flesh, creamy white, tender and juicy; flavor, very mild, agreeable acid.

SEASON: July 1 to 30.

QUALITY: Good for dessert; best for cooking.

California Advance.

Late Duke.

6 CAMPBELL'S EARLY.

This grape is claimed to be an improved Concord, and being in season with Moore's Early should be a most valuable commercial variety. We have still to study the vigor of the vine and its productiveness, not yet being satisfied that it is in these respects equal to the Concord.

ORIGIN : Ohio, by G. H. Campbell ; the product of different crosses from Hartford, Concord, and Moore's Early, through Muscat Hamburg. Introduced in 1896.

VINE : Vigorous, healthy and productive.

BUNCH : Large shouldered.

BERRY : Large, sometimes one inch in diameter ; skin, black, with thin blue bloom, tough ; flavor, rich and sweet without foxiness ; flesh, meaty, sweet, tender ; seeds, small, separate easily from the pulp ; hangs to vine well.

QUALITY : Fine for dessert.

VALUE : First-class for market.

SEASON : Nearly as early as Champion.

ADAPTATION : Recommended for general trial.

CAMPBELL'S EARLY.

DIAMOND.

(*Moore's Diamond.*)

A grape that is growing in popularity, and which succeeds in sections farther north than the Niagara.

ORIGIN : Brighton, N. Y. in 1873, by Mr. Jacob Moore, from seed of Concord, fertilized with Iona ; just one year after the Niagara was originated at Lockport.

VINE : Vigorous and productive, though not equalling the Niagara ; foliage much like that of one of its parents, the Concord.

BUNCH : Large, $5\frac{1}{2}$ x $3\frac{1}{2}$ inches ; compact and shouldered.

BERRY : About $\frac{3}{4}$ of an inch in diameter and adheres firmly to the stem ; color greenish white, yellowing slightly at maturity ; pulp, tender ; flavor, juicy, sweet and good.

QUALITY : Dessert, very good, superior to the Concord ; the Michigan station gives it 8, the Concord 6 and the Delaware (the highest) 10.

SEASON : About one week in advance of the Concord.

ADAPTATION: Reported as very desirable at the Simcoe station ; worthy of trial generally.

DIAMOND.

PEACHES.

ST. JOHN.

(Yellow St. John.)

ST. JOHN.

The earliest really good peach for either home use or market. Its season is the end of August, just before the Early Crawford ; and its fair size, its yellow flesh, attractive skin and good quality, make it one of the most satisfactory peaches for all purposes.

ORIGIN : North America.

TREE : Vigorous and productive.

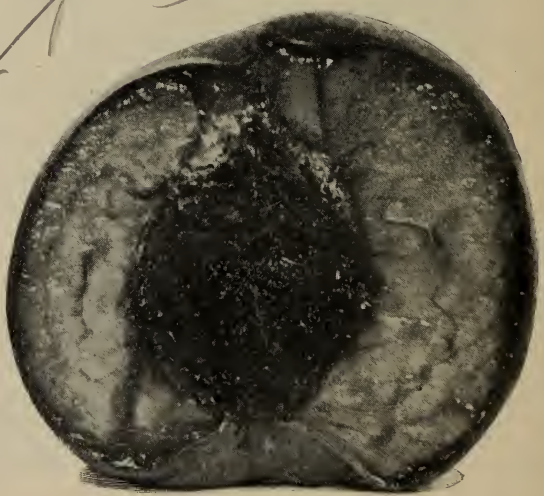
FRUIT : Round, large, $2\frac{1}{2} \times 2\frac{1}{2}$ inches ; skin, yellow, with dark red cheek ; suture, traceable on one side, sometimes by a red line ; apex, a tiny point in a rather deep depression ; freestone.

FLESH : Color, yellow, tinted red at the stone ; texture, tender and juicy ; flavor, sweet, rich and agreeable.

SEASON : August 20th to September 1st.

QUALITY : Dessert and cooking, very good.

VALUE : Market, first-class, the best of its season.



SECTION.

PEARS.

EASTER BEURRE.

Among the desirable pears to grow for export we must not overlook the Easter Beurre, which, though green and unattractive in appearance at time of harvesting, keeps well through the winter, is an excellent shipper and is very good in quality. A warm climate and favorable soil seems to be necessary to its best development, and accordingly we find it planted for commercial purposes in the Californian pear orchards. On deep, rich, sandy loam, in the southern parts of our Province, it succeeds well, either as a dwarf, or as a standard tree.

Although some writers have claimed that this pear originated in France, because some old trees were found near Laval, yet the majority agree that the variety originated in Belgium, at the old University town of Louvain. Van Mons, in his Album de Pomologie in 1847, says, "This variety was found in the ancient gardens of the Capucins, at Louvain, where the original tree still stood in the year 1825, under the name of Pastorale de Louvain."

In the old countries, much confusion has existed regarding the names of pears, and subsequently much difficulty exists in the identification of varieties ; this pear, for example, is given no less than twenty-four different names in Leroy's Dictionnaire de Pomologie, as, for example, Doyenne de Printemps, Canning, Beurre d'Hiver, etc., the last being adopted by LeRoy ; while Hogg, of England, and Downing, of America, both adopt the name so well known to us, Easter Beurre.

Tree : Fairly vigorous, upright and productive, and may be grown either as a dwarf or as a standard tree, if as a standard, it needs good, rich soil and a warm climate for the best success. In Great Britain it does not seem to succeed as well as in Canada, for Hogg says it frequently happens that this delicious pear is of an indifferent and insipid flavor, which is caused by the unfavorable soil ; and Blackmore, of Teddington, says, "It cracks in spots and is seldom very good." Our experience with it, as grown on a dwarf tree, is favorable.

Fruit : Above the medium size, irregular obovate ; skin, pale green at harvesting time yellowing somewhat toward maturity, with numerous russet dots, russet patches around the stem and calyx, and often a brownish check ; stem about one inch long, stout, swollen at the base, set in a narrow, deep cavity ; calyx small, closed, set in a much plaited basin of moderate depth.

Flesh : White, fine in texture, melting and juicy ; flavor, sweet, rich and agreeable.

Season : January to May, under ordinary conditions.

Quality : Dessert, good.

Value : Export, good.

Adaptation : Southern parts of the province.

HOOSIC.

A remarkably large and excellent pear, as tested at Maplehurst grown as a dwarf, and it promises to be an excellent commercial variety.

Origin : Seedling from Hacon's Incomparable, by Asahel Foote, of Williamstown, Mass.

Tree : On quince stock, healthy, vigorous and productive.

Fruit : Size, large to very large, $3\frac{1}{2}$ x $3\frac{1}{4}$ inches ; form, obtuse pyriform, somewhat one-sided ; skin, yellow, with light red in sun, and with russet dots ; stem, $1\frac{1}{4}$ inches long, stout, curved, set in a small, irregular cavity ; calyx, small, open, set in a broad, uneven basin.

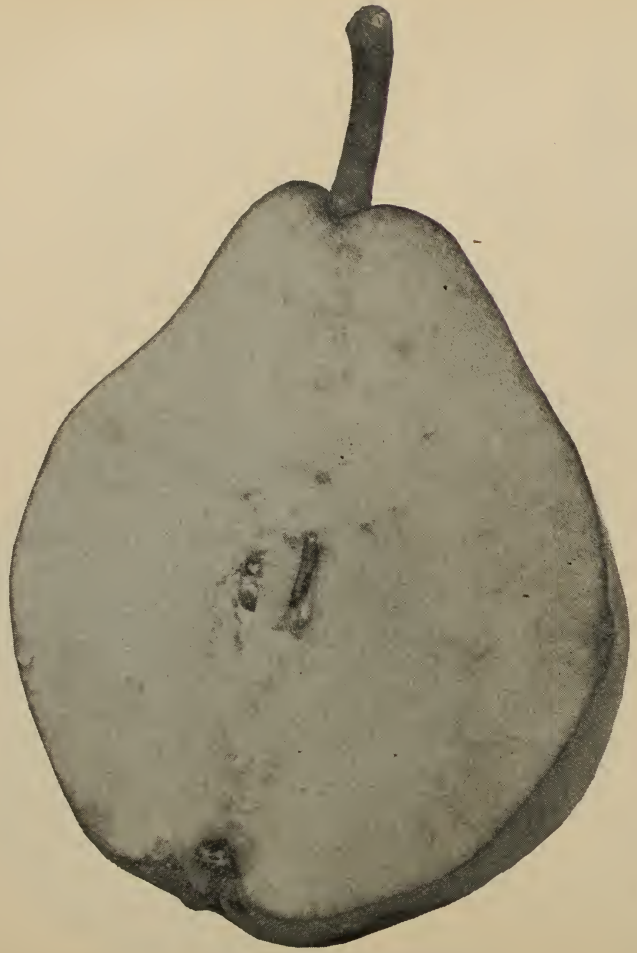
Flesh : White, tender, fine and moderately juicy ; flavor, rich, perfumed.

Season : Last half of September.

Quality : 1st class for all purposes.

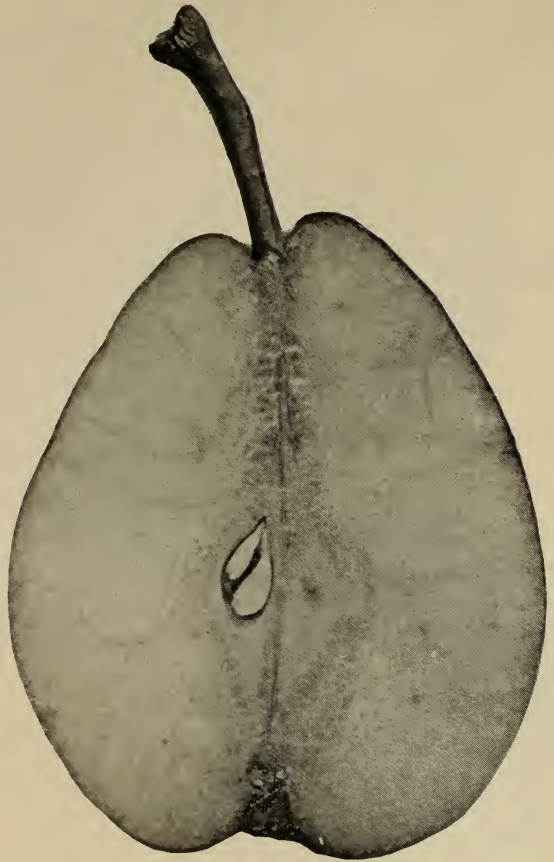
Value : 1st class for market.

Grown at Maplehurst, as a dwarf, this pear has given the greatest satisfaction ; and, only that its season is rather short, it would be commended as an export variety.



Section of Easter Beurre.

Easter Beurre.



Section of Hoosic.

Hoosic.

PITMASTON.

PITMASTON.

(*Pitmaston Duchess d'Angouleme.*)

A very promising variety, succeeding well as a dwarf ; its large size, good shipping character, fine quality, and regular form, seem to make it very valuable for export. The fruit is too large to be grown as a standard.

ORIGIN : Raised by John William, of Pitmaston, England ; a cross between Duchess and Glout Morceau.

TREE: A very vigorous grower, and quite productive.

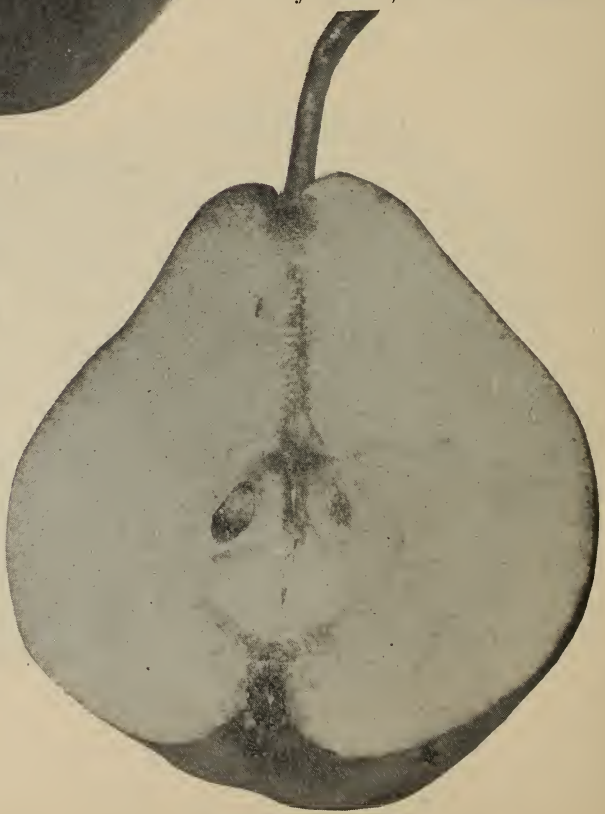
FRUIT : Very large, 4 X $3\frac{1}{4}$, oblong, obovate, obtuse pyriform ; skin, pale yellow, with light russet in cavity; stem, stout, $1\frac{1}{2}$ to $1\frac{3}{8}$ inches long, set in a small cavity; calyx, prominent, half open, set in a very shallow, shouldered basin.

FLESH : Color, creamy white ; texture, very fine, melting and juicy ; flavor, very pleasant, aromatic, sometimes a little puckery.

SEASON : September and October.

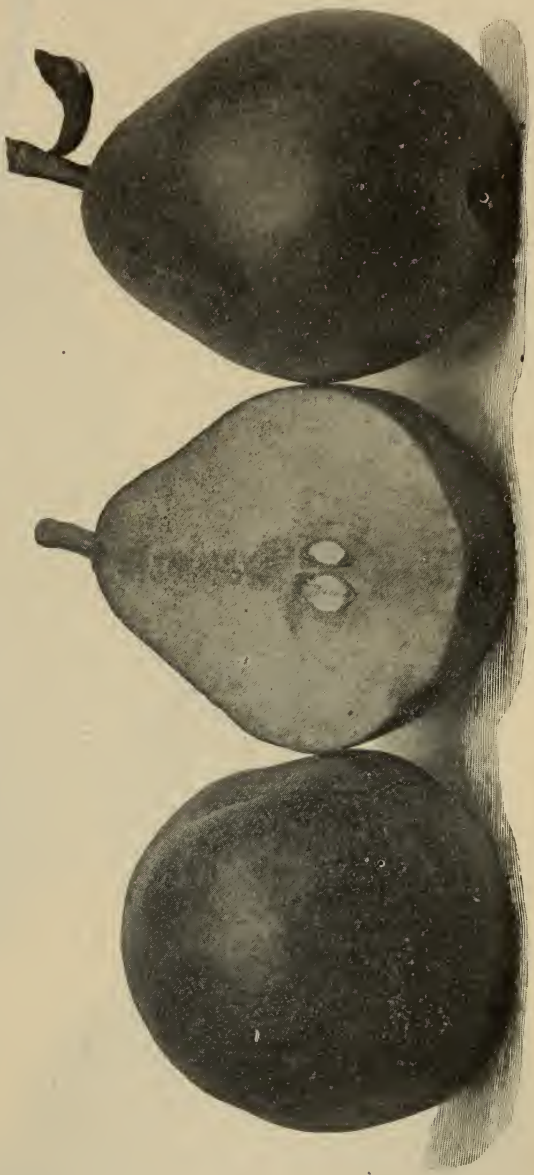
QUALITY : Good, not quite equal to that of Duchess.

VALUE : First class for market.



SECTION OF PITMASTON.

THE SECKEL PEAR.



SECKEL.

The finest dessert pear in cultivation, and one that should never be omitted from the garden, when planting pears for home use. Downing calls it "The richest and most exquisitely flavored variety known." At Maplehurst it has been grown both as a dwarf and as a standard ; in the former case with the most satisfactory results, but in the latter, smaller, less highly flavored and less attractive in appearance.

Its small size rules it out of the commercial orchard, unless one can cultivate a very special demand among a certain class of consumers who will appreciate its high quality.

ORIGIN : On the farm of Mr. Seckel, of Philadelphia, near the Delaware river, where in 1884, the original tree was still standing, aged one hundred years and having reached the height of thirty feet. The Seckel was introduced into England, into the garden of the Horticultural Society, in 1819.

TREE : Healthy, hardy, and productive ; forms a compact symmetrical head ; wood, olive brown in color, stout and short jointed ; succeeds best as a dwarf.

FRUIT : Size, small, two inches by one and three-quarters ; form, obovate, regular and even ; color, dull brownish green, yellowing as it ripens with a deep brownish red cheek ; stem, half an inch in length, in a very small cavity ; calyx, small, open, in a shallow basin.

FLESH : White, very fine grained, melting and juicy ; flavor, honey-sweet, rich, spicy with delicate aroma.

QUALITY : Dessert, best ; cooking, good.

SEASON : September to October.

VALUE : 1st class for a special market ; but second class where not known, on account of its small size.

TRIUMPH.

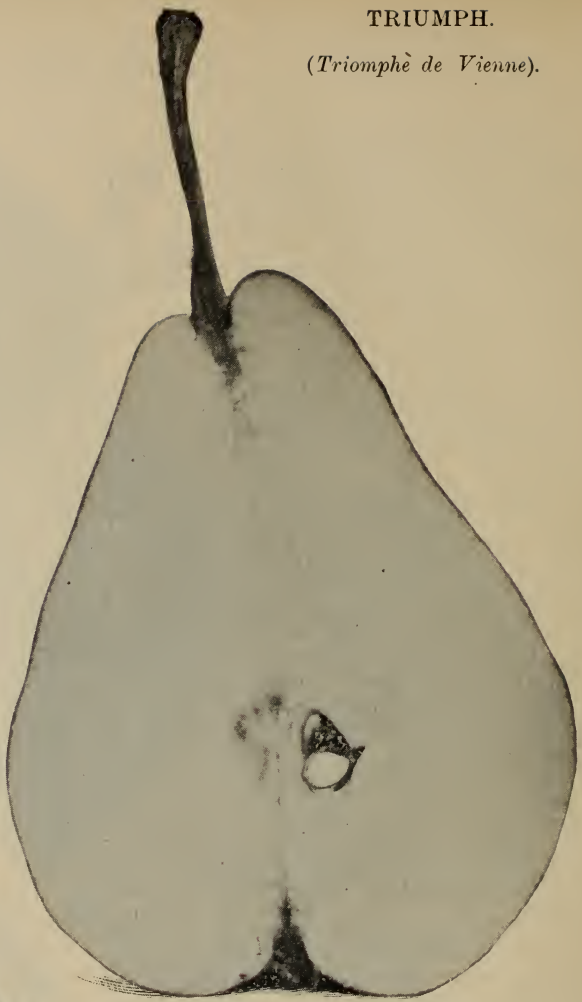
(*Triomphè de Vienne*).

A very fine, large, showy pear, a trifle later than Bartlett, larger in size, but not equal to it in quality ; promising as a commercial variety.

ORIGIN : France ?

TREE : A thrifty, upright grower, productive.

FRUIT : Large, 4 inches by $2\frac{3}{4}$; form, obovate, pyriform, somewhat uneven and irregular ; skin, greenish yellow, with patches of russet ; stem, $1\frac{1}{4}$ inches long, set in a shallow, uneven, often one-sided cavity ; calyx, open, in a broad, irregular, russeted basin.



SECTION OF TRIUMPH.

TRIUMPH.

FLESH : Creamy white, very juicy ; flavor, rich, sweet and excellent.

SEASON : September 15th to 30th.

QUALITY : Dessert very good ; cooking very good.

VALUE : Market, home or foreign, 1st class.

PLUMS.

ABUNDANCE.

One of the best of the Japan plums for the home garden. It is early in season, being ripe about the middle of August, and maturing quite unevenly. To get its best flavor it should be picked while still firm, and ripened indoors like a Bartlett pear ; it will color beautifully and become very juicy, and the flavor will be sweet and rich.

ORIGIN : One of Luther Burbank's importations from Japan in 1884.

TREE : Vigorous ; a six year old tree, at our Lake Huron fruit station, bore six 12-quart baskets of fruit in 1901 ; class, Japanese.

FRUIT : Size $1\frac{3}{4}$ x 2 inches ; form, roundish, narrowing towards the apex ; color, bright red on a yellowish ground with numerous red dots ; stalk, strong, $\frac{3}{4}$ of an inch long, inserted in a narrow, deep cavity ; suture, shallow, distinct ; apex pointed ; pit, oval ; a partial cling.

FLESH : Texture, tender, juicy ; flavor, sweet and delicious.

QUALITY : Dessert, very good ; cooking, very good.

VALUE : Home market, good ; distant market, very good.

SEASON ; August 10th to 20th.

ADAPTATION : The fruit sections of Ontario.

ABUNDANCE.

BURBANK.

The Burbank is one of the best of the Japan plums for the commercial orchard, on account of its beauty, its greatest productiveness, and its excellent shipping quality.

ORIGIN : It was in 1885 that Mr. Luther Burbank of Santa Rosa, California, imported some plum trees from Japan and, when they fruited, he selected this as one of the best and most worthy of propagation. In 1891 he sent samples to the Department of Agriculture at Washington and Mr. H. E. Van Deman, Pomologist of the Department, named it Burbank, after the introducer.

This plum has been before us for ten years and notwithstanding the great number of Japanese varieties now sold by nurserymen, none seems to hold a higher place for commercial purposes, than the Burbank.

Compared with the Domestica class, the Japanese are inferior in quality, but, when fully ripened, are fairly good eating. Like the Kieffer pear, the Burbank plum is making its reputation rather on quantity than on quality.

TREE : Hardy ; a very vigorous, wayward grower, making a very badly shaped tree, unless severely headed back and kept within bounds ; an early and most abundant bearer ; the fruit needs thinning to secure good size.

FRUIT : One and a half to two inches in diameter ; form, when properly thinned, nearly round, but slightly conical ; skin, orange yellow ground, shaded with red, and almost purple on the side exposed to the sun ; skin, very smooth, with a slight bloom, peels easily when ripe ; suture, traceable ; apex, a small point ; stem half to five-eighths of an inch long, stout ; cavity deep abrupt, with leather-crack marks.

FLESH : Color, amber ; texture, juicy and tender when fully ripe ; flavor sweet, fairly agreeable ; stone, medium, pointed, cling.

QUALITY : Good for cooking ; fair for dessert.

VALUE : First-rate for market.

SEASON : End of August.

ADAPTATION : General.

BURBANK.

BRADSHAW. (DOMESTIC).

(Niagara, Blue Imperial).

Considered by many one of our most valuable European varieties whether for home use or market, because of its fine quality, its large size and beautiful appearance.

TREE : Erect, vigorous, very productive ; class, domestic.

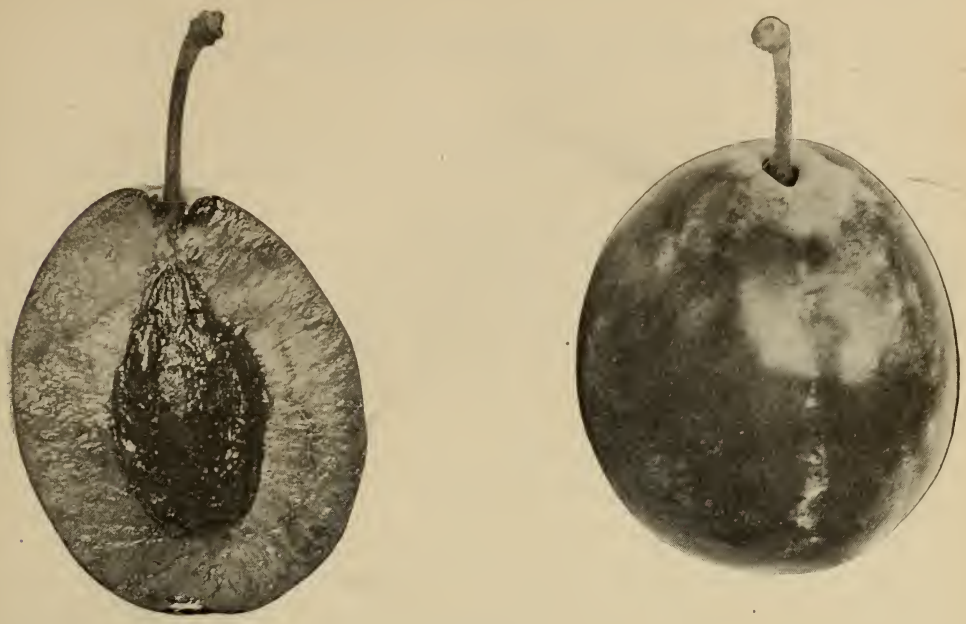
FRUIT : Size, large, $2\frac{1}{4}$ x $1\frac{7}{8}$ inches ; stalk, one inch long, slightly curved ; color, reddish-purple, with blue bloom ; apex, round, slightly depressed ; suture, on one side, broad and shallow.

FLESH : Color, yellowish ; texture, juicy, tender ; flavor, rich and sweet ; pit, long, thin oval, partial cling.

QUALITY : Dessert, very good ; cooking, very good.

VALUE : Home market, first-class.

SEASON : August 15th to 30th.



BRADSHAW.

RED JUNE. (*Red Nagate of Thomas*).

The earliest good plum grown, and one of the most profitable of the Japanese varieties.

ORIGIN : Japan.

TREE : Hardy and vigorous, forming a symmetrical top ; an early and fairly abundant bearer ; class, Japanese.

FRUIT : Form, roundish conical ; size, medium, $1\frac{3}{4}$ x $1\frac{3}{4}$ inches ; suture, distinct ; color, dark red, with light bluish bloom ; cling.

FLESH : Color, yellow ; texture, juicy, moderately firm ; flavor, agreeable.

QUALITY : Good.

VALUE : Very good for market.

SEASON : Middle to end of July, (about 1st of August at Georgian Bay station.)

RED JUNE.

YELLOW EGG.

(White Magnum Bonum).

A profitable commercial variety, on account of its large size and fine appearance, but susceptible to the plum rot and inclined to drop before maturity. Good for canning purposes.

ORIGIN : Europe.

TREE : vigorous, spreading, and very productive.

FRUIT : Size, large to very large, average 2½ by 2 inches ; form, egg shaped with distinct suture on one side ; skin, thick, adherent to flesh ; color, yellow with whitish bloom ; stalk, nearly an inch long, inserted in a small cavity, with a fold about its base ; pit, long, pointed, cling.

FLESH : Yellow ; texture, firm, juicy, coarse ; flavor, subacid, becoming sweet when very ripe, but ordinary.

QUALITY : dessert, poor ; cooking, good.

VALUE : Home market, very good.

SEASON : End of August.

ADAPTATION : Quite general.

YELLOW EGG.

STRAWBERRIES UNDER EXPERIMENT.*

CHALLENGE.

CHALLENGE.

Little grown as yet, but promising.

ORIGIN : By J. R. Peck, Breckenridge, Mo., about 1894.

PLANT : Healthy ; a strong grower ; makes runners freely ; blossom, perfect.

BERRY : Large, sometimes cleft at the end ; color, glossy red, quite dark when fully ripe, somewhat resembling old Parker Earle.

QUALITY : Good.

EMPEROR.

ORIGIN : By John Little, of Granton, Ont.

PLANT : Large, vigorous, healthy ; quite productive ; blossom, perfect.

BERRY : Very large, conical, sometimes ribbed ; color, dark red ; flesh, reddish pink almost to the centre ; texture, firm.

QUALITY : Good.

SEASON : Medium to late.

EMPRESS.

EMPEROR.

EMPRESS.

Very like the Emperor and from the same source, originated by the late John Little ; both resemble the Woolverton in fruit. The plant is very healthy, strong, productive and a vigorous grower. The fruit is bright red and attractive, and of good quality ; season, medium to late ; blossom, perfect.

*From Notes taken at Jordan, Ont., by our strawberry expert, Mr. E. B. Stevenson.

GANDY.

GANDY.

The Gandy originated from the Jersey Queen, fertilized by pollen from Glendale; it is one of the best late varieties.

PLANT: Healthy, strong and fairly vigorous; long runners; makes a good row; free from rust, but rather a shy bearer.

FRUIT: Large and fine, conical in shape, firm, a good shipper; fine dark scarlet in color and a fine looking berry.

FLESH: Pink, firm and fine quality.

ADAPTATION: Does well in most soils, is grown mainly for its lateness.

HALES 11.59 P.M. (*Midnight.*)

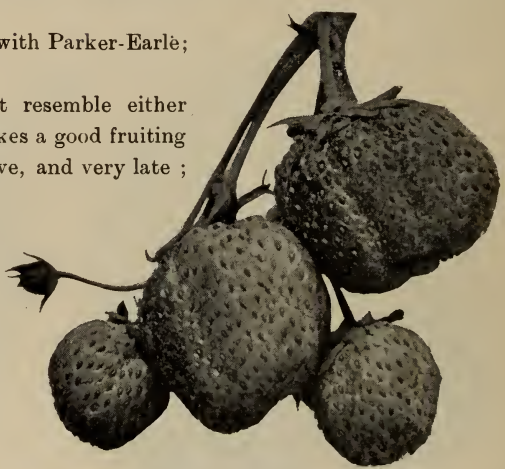
ORIGIN: Seed from Haverland crossed with Parker-Earle; introduced by J. H. Hale, of Connecticut.

PLANT: Strong and healthy, does not resemble either parent; makes plants only sparingly, but makes a good fruiting row; the runners are strong, fairly productive, and very late; blossom, perfect.

FRUIT: The berry is medium in size, flat and conical; color, light, almost white on under side; texture firm; flavor, fine.

FLESH: Pinkish, meaty, good eating.

ADAPTATION: This is a new one, has not been tried over any large area as yet.



HALES 11.59 P.M.

HERO.

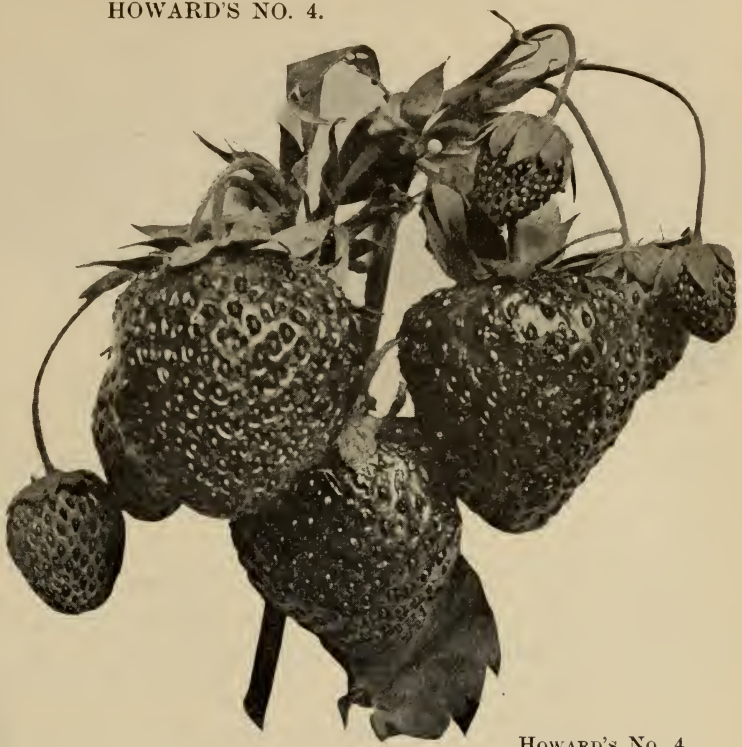
HERO.

A very promising variety introduced in 1900. The plant is strong, healthy in the main, a good grower, productive and makes runners freely. Foliage, very dark green. The fruit is a good size and of good quality. It is considered a good one; season early to medium; blossom, perfect.

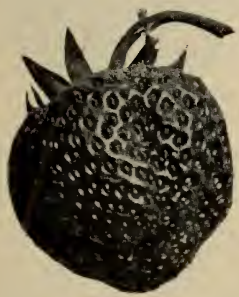
HOWARD'S NO. 4.

A seedling originated by Mr. A. B. Howard, of Massachusetts.

The plant is a strong, healthy, good grower, very productive, and of great promise; the berry is large, conical, very regular, bright dark scarlet, very large, and of great beauty. The quality is very good. It has been fruited only once; not yet introduced.



HOWARD'S NO. 4.



KLONDIKE.

KLONDIKE.

Originated in Massachusetts. It is a good, very late variety. The plant is moderate in size, healthy, good grower, making plenty of runners that root easily. The fruit is large, roundish conical, sometimes ribbed, dark red and somewhat glossy; flesh, red, fair quality, medium in firmness. It is quite productive, much more so than Gandy or Hunn; about the same season but not as handsome as the Gandy. It is worthy of trial by those who want a late berry; blossom, perfect.

LATEST.

Originated from seed of Jewell and Belmont by S. H. Wallace, of Massachusetts. The plant is strong, robust, and easy of propagation; it is healthy and free from rust. The fruit resembles the Belmont, conical, sometimes cock's combed; berry, large, dark red, yellow, seeds embedded; flesh, white and firm good quality and productive; the berries lie in heaps around each plant. Season, late as the Gandy, and more productive; a good late variety. This is the first season it has been fruited; it was introduced in 1901, and it has a future before it, especially for those who follow the hill system of cultivation; blossom, imperfect.

LATEST.

McKinley.

McKINLEY.

McKinley is a large healthy plant, fresh looking, a good grower and quite productive. The fruit is large, conical, sometimes with uneven surface, dark red when fully ripe ; fine looking, fairly firm and of good quality. Blossoms perfect.

MILLER.

Originated by D. J. Miller, of Central Ohio. The plant is large, strong and vigorous ; as large as Bubach, and makes plants very freely ; not the slightest trace of rust.

Plant : Quite productive.

Fruit ; Large, dark, glossy red.

Flesh : Light in color, fruit stems strong and hold the fruit up well among the foliage ; quality good ; texture, quite firm for so large a berry.

Season : Medium to late.

Miller.

MONITOR.

The Monitor originated from a chance seed in the orchard of L. T. Russell, Missouri, on ground where formerly Crescent and Capt Jack grew. It has some of the qualities of both parents, the productiveness of the Crescent and the vigorous foliage of Capt. Jack.

Monitor.

Plant : Vigorous and healthy ; foliage, very dark green, glossy. The plant is small and makes almost too many runners; stands dry weather well and is very productive ; blossom, perfect.

Fruit : The berry is large, roundish in form, and bright scarlet. The vigor of the plant seems to be such that it is able to mature and ripen its immense crop, there being no small berries.

Flesh : Firm and good flavor ; pinkish inside.

Season : Early to late.

Adaptation : It seems to do well wherever it has been tried, and taken altogether the Monitor is one of the best that has been introduced for some time ; highly recommended to all growers.

NETTIE.

NEW YORK.

NETTIE.

ORIGIN: One of Black's pedigree seedlings; it is a strong competitor of Hunn for extreme lateness; fruit was picked in the middle of July in 1902.

PLANT: Of medium size; quite healthy and a good runner, making plants freely; fairly productive; blossom imperfect.

FRUIT: Large, ribbed, rough, of quite light color; seeds, dark; flavor, sour, but good; texture, fairly firm.

FLESH: Light colored, almost white.

ADAPTATION: Does fairly well in most places, though we have some unfavorable reports. It seems to need better flavor and greater firmness.

NEW YORK.

A good variety, and very promising.

ORIGIN: In New York State, from seed of Bubach and Jessie; captured a prize of $100 offered by W. F. Allen for any new variety that would produce as large in size and as good quality as Glen Mary.

PLANT: Large, strong, healthy and productive; no rust, makes a fine row; blossom, perfect.

BERRY: Large, conical; a good red, turning to crimson, and colors well.

SEASON: Medium.

ROBBIE.

ORIGIN: One of J. H. Black's pedigree seedlings, from New Jersey.

PLANT: Good grower, perhaps not as large as the Nettie or Joe, but healthy and free from disease: fairly productive; blossom, perfect.

FRUIT: Good size, conical in shape, light red, good flavor, quite pleasant though peculiar to the taste.

FLESH: Salmon colored.

ADAPTATION; Has done fairly well wherever heard from.

ROBBIE.

FRUIT EXPERIMENT STATIONS.

REPORT OF THE INSPECTOR.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

I have the honor of presenting herewith my ninth annual report of the work of the Fruit Experiment Stations.

The original plan for the establishment of these Stations was unique, and that it has been worked out so successfully must be a matter of gratification to all who had the work in charge. There have been a few drawbacks, such as the loss of most of the trees at the Southwestern Station through the severe winter of 1899, and the removal of Mr. Burrill, the experimenter at the Niagara Station, to British Columbia, but, apart from this, the work on the whole has made great progress. It is doubtful if so much could be accomplished in any other way with so small an annual expenditure.

The extensive variety tests which are being made at these Stations are of inestimable value to the people of the Province, and, in my mind, the most important problem for us now to consider is : How can we bring the results of these tests more prominently before intending planters in every part of the country ? The annual report from the stations gives much of this information to those who read, and is valuable at all times for reference ; the annual display of fruits from the various Stations, made at the Industrial Exhibition, Toronto, has been a great object lesson, and has helped to bring before the public, in a practical way, the nature of the work being done; but, in our opinion, the results of the tests at the Stations might be brought more prominently before the people throughout the country generally by making use of the opportunity afforded by the county and township fairs. Prize-lists for each fair, revised and improved in accordance with the results obtained at the various Experiment Stations, would have the desired result of bringing out a display of the varieties best suited to the section, and would be looked upon as reliable guides to planters.

Last winter we prepared for the Fall Fairs Association a model prize-list, which might be taken as a guide in preparing such lists adapted to the various sections where the fairs were held. This list will be sent to the secretary of every fall fair in the Province, and I trust will be useful in still further applying the results of the Station tests.

The whole session, which is to be given to the work of the Fruit Experiment Stations at the next meeting of the Ontario Fruit Growers' Association, should also help to bring before the public some of the valuable results already obtained at the Stations.

In speaking of the work of the stations in this report, I have mentioned each in the order in which it was visited, and these visits were arranged, as far as possible, to enable me to see to the best advantage the fruits being specially tested at each station.

The Lake Huron Station. Experimenter, A. E. Sherrington, Walkerton.

Visited July 24th. At the time of my visit Mr. Sherrington was busy harvesting his bush fruits—raspberries, currants, and gooseberries—of which he had an abundant crop of good quality.

The trees in his young experimental plum orchard were again heavily loaded this year, notwithstanding they yielded a heavy crop last year. A number of Japan varieties have been doing particularly well at this station. Abundance and Burbank trees, six years planted, produced nine or ten baskets of fruit each last year, and the trees are thrifty and healthy this year, and again have some ripe fruit upon them. The Satsuma, another Japan variety having a blood-red flesh, was very heavily loaded this year. Mr. Sherrington says this variety has been in great demand for canning purposes.

There are a number of varieties of cherries under test at this station. Three trees of Ostheim were still heavily loaded at the time of my visit, and were particularly fine. The cherry crop as a whole, however, was not up to the average this year. Most of it was taken by the birds, the robin and the Bohemian waxwing being the chief offenders. The protection of this crop from these birds is becoming a serious problem with cherry growers, and Mr. Sherrington, like many others, was compelled to resort to the shot-gun as being more effective than Mr. Powell's plan of growing an extra crop for the special use of the birds.

The experimental apple and pear trees planted a few years ago have made good progress, and some are beginning to bear.

The apple crop in the older orchard was particularly promising, the fruit being exceptionally clear of codling moths, although the apple scab had made its appearance in spite of repeated sprayings of the Bordeaux mixture. From his orchard of five acres, Mr. Sherrington sold last year 200 barrels, which netted him about $500.

Experimental plum orchard at John Mitchell's, Clarksburg. Trees four years planted. Intercropped with sugar beets.

Mr. Sherrington's place is a good example of "a little farm well tilled." He has only ten acres, but from this little plot he netted last year nearly $800. Such profits, of course, mean careful attention to details, both in growing and marketing, and Mr. Sherrington succeeded in developing a good market for nearly all his products right at home.

Mr. Sherrington is also a reliable and careful experimenter, and his annual reports are of much value to the growers of his section

THE GEORGIAN BAY STATION. EXPERIMENTER, JOHN MITCHELL, CLARKSBURG.

Visited August 4th. Prof. Lochhead, of the Ontario Agricultural College, accompanied me to this station this year, and in our opinion the sight in Mr. Mitchell's experimental plum orchard was well worth seeing.

The young orchard, where the trees do not yet require all the space, was being inter-cropped with sugar beets, but the older orchard, where the trees require all the space, was under clean cultivation, and was just ready for seeding down to the fall cover crop.

All trees have been carefully pruned and sprayed, and most of them were bearing a good crop. The fruit promised to be above the average in quality, due in part to the favorable season, but more to the good care given, and also to the fact that the trees were not overloaded.

Mr. Mitchell has now over 170 varieties of plums under test, and here, as well as at the Lake Huron Station, one of the most interesting features of the work has been the success of the Japan varieties. When these were first introduced, a few years ago, it was supposed that they would be too tender for any except the southern portions of the Province; but at every station where they have been tried, not even excepting the Algoma station, they have proven hardy and productive. Of the many varieties of this class under test, Mr. Mitchell has found the Red June, Chabot, Burbank, and Abundance among the best.

Experimental plum orchard at John Mitchell's, Clarksburg, showing clean cultivation, ready for cover crop. Trees eight years planted.

The American, or native plum, of which there are now a large number of varieties under cultivation, Mr. Mitchell considers are hardly worthy of a place in the orchards in this section, when the European and Japan varieties suited so well, and as fast as these varieties are tried and found want-

ing, he is top-grafting them with the best European sorts. This tends to show how doctors differ, for by some growers the best of the Americana plums are much preferred to the best of the Japanese or even European varieties.

In the bearing apple orchard, there was promise of a good crop of fruit of most varieties, although there had been a great deal of late falling of the small fruit, due to the unusual, cool, wet weather.

In the apple orchard the same clean, level cultivation had been given as was given to the plum orchards, and the ground had just lately been seeded to crimson clover.

Another interesting feature of the station has been the test with eight varieties of peaches. There are three trees of each variety, and all of them looked thrifty, and were well loaded. From these same trees Mr. Mitchell sold last year about 30 baskets of fruit.

The results attained at this station during the past five years have well repaid for the small outlay put upon it, and the careful report sent in each year by Mr. Mitchell is of untold value to plum growers all over the country.

The Simcoe Station. Experimenter, G. C. Caston, Craighurst.

Visited August 6th. There had been continued rain in this section almost all summer, and the small-fruit crop, although much later in ripening, was excellent. At the time of my visit, the Cuthbert raspberries were at their best, and, notwithstanding the fact that it freezes back more or less severely every winter, this variety has proved to be the best of its kind for this section.

One of the surprising results of the work at this station has been the fine crops of blackberries that have been produced year after year. Blackberries, as a rule, have been thought too tender for any but the most favored fruit-growing districts, but Agawam and Eldorado have proved quite hardy here, and both were carrying a fine crop of fruit.

Mr. G. C. Caston's Duchess apple trees, 15 years planted, propped to support their loads.

The cherries this year had not done so well as last, and Mr. Caston is having a hard fight to keep them free from the black knot, which comes in from neighboring trees. Many of the trees were badly defoliated by a blight, which might have been prevented by spraying with the Bordeaux mixture, but thorough spraying was almost impossible this year because of the excessive rains.

Plums were a light crop at this station. Several apricot trees were well loaded, but the curculios, which were unusually abundant, had destroyed most of the fruit.

One of the finest sights at Mr. Caston's this year was the great crop of Duchess apples. Every tree was so loaded that propping was necessary, and the fruit was of the finest quality. This is certainly one of the most valuable varieties for northern sections, where it ranks as an autumn rather than a summer variety.

On the winter varieties of apples there had been a good show of fruit early in the season, but, on account of the cold, wet weather, it had been falling steadily all through June and July, until but a light crop was left.

This station is situated too far inland to be influenced by the waters of Lake Simcoe or the Georgian Bay; hence, whatever proves hardy here would likely be so over a large part of the Province. The reports of tests here during the past nine years have given valuable information regarding the hardiest and best varieties of apples, pears, plums, cherries and small fruits for this and similarly situated sections.

Among the Cuthbert raspberries at G. C. Caston's, Craighurst.

THE SOUTHWESTERN STATION. EXPERIMENTER, W. W. HILBORN, LEAMINGTON.

Visited August 28th. All of this southwestern peninsula suffered terribly by the "freeze" of February, 1899. Thousands of peach and other tender fruit trees, in orchards ranging from 10 to 100 acres in extent, were at that time destroyed. Peach-growing then received a blow from which it has not yet fully recovered. Quite naturally, some growers became discouraged, and

did not replant, but most of them, however, have been replanting steadily ever since, and some of the early planted of these are now coming into bearing.

In orchards where a few trees survived the freezing, the spaces were filled in with young trees ; but this has made the orchards very uneven in appearance, especially as the old trees here and there have been dying out since, necessitating replanting. This has been the case in Mr. Hilborn's experimental orchard, which, naturally, has been very discouraging to him, after having had such a fine orchard and large collection of varieties in bearing to report upon.

View of Mr. Hilborn's peach orchard. Trees 16 months from date of planting.

On another farm near the lake shore, his brother, Mr. J. L. Hilborn, has twenty acres of young peach trees planted since the freezing, which are just coming into bearing, and make one of the finest orchards to be seen in the section.

Many of the young peach trees planted in this section during the last few years have made very unsatisfactory growth, and whole orchards have proved to be an entire failure. It was at first supposed that the trees were being injured by the fumigation to which they were subjected before they left the nursery, but it has since been found out that the trouble was due to root aphids, which, evidently, were not destroyed by the fumigation. Mr.

Mr. J. L. Hilborn's 20 acre peach orchard. Two year old trees.

Hilborn has found that the best way to rid the roots of these insects is to dip the roots of the young trees, before they are planted, in strong tobacco water. The tobacco water is made by steeping tobacco stems in water in the proportion of 3-4 of a pound of stems to one gallon of water. Trees treated with this decoction have made excellent growth, while untreated trees adjoining them have proved an entire failure.

The peach crop in the Essex peninsula this year was excellent, and Mr. Hilborn had fruiting quite a number of varieties upon which he will be able to report.

Plums were a light crop, probably on account of the heavy crop last year. The Japan varieties are proving of great value here as well as elsewhere, and they appear to be much less susceptible to the shot-hole fungus than the European varieties.

THE BURLINGTON STATION. EXPERIMENTER, A. W. PEART, BURLINGTON.

Visited August 28th. The Burlington district has long been known as an important fruit section, and in no other section that I know have the growers worked together so unitedly for their common interests. This co-operation, among the growers, has helped to win for this section high awards at all the recent large expositions, such as were held at Chicago, Paris, Glasgow, and Buffalo, as well as the first prize for ten years in succession at the Toronto Industrial, for district exhibition.

The growers of this section were also the pioneers in the use of the bushel and half-bushel box instead of the barrel for the shipment of apples and pears to the Old Country, and by the continued use of these boxes for the shipment of good fruit they have succeeded in establishing a good demand for their fruit in the British market.

Mr. Peart, our experimenter, has not confined his attention to any special line of fruits, but he has an extensive collection of both the large and small fruits.

Wordens in the vineyard of A. W. Peart, Burlington.

At the time of my visit he was busy picking and packing his Blenheim and Ribston apples for the Montreal and European markets, all of the fruit being packed in the bushel boxes.

The apple crop in this section was not above the average this year, but the quality of most kinds was good. The scions of about thirty varieties

of apples which were grafted on bearing trees a year ago last spring, have made good growth, and some of them began fruiting this year.

Pears were a light crop, this being their off year.

Plums, also, were a light crop because of the heavy one last year.

Grapes, blackberries, and currants all bore heavily, and will be fully reported upon in Mr. Peart's annual report.

Mr. Peart is a thorough cultivator and a careful experimenter, and the reliability of his reports make them of much value to the growers of that section.

The Wentworth Station. Experimenter, M. Pettit, Winona.

Visited September 6th. My visit to Mr. Pettit's this year was timed so that I might help him gather his samples of grapes for the Toronto Exhibition, and thus have an opportunity of carefully going over with him the many varieties in his experimental vineyards, but, owing to the unusually cold and backward season the grapes this year were very late in ripening, and at the time of my visit very few, except Champion, were showing signs of taking on color.

Grape rows half a mile long in Murray Pettit's vineyard, Winona.

The grape crop, besides being so late in ripening, was hardly up to the average at Winona this year.

As mentioned in my last report, there are but few among the many varieties of grapes being tested in the new experimental vineyard that are worthy of further cultivation. Many of them are not only worthless, as far as the fruit is concerned, but the vines are also so unthrifty looking that they would not be worth grafting upon. Mr. Pettit intends to replace the unthrifty ones as soon as possible with new vines of the best sorts, and graft the thrifty ones with some of the old standard kinds, such as Agawam, Lindley, and Wilder.

The experimental plum trees planted out shortly after the station was established, have been fruiting for the past two or three years, but the crop this year was rather light upon most varieties.

Mr. Pettit and I went carefully over all the trees, and as far as possible verified the names of varieties, many of them having come wrongly named.

Mr. Pettit has a large orchard of pears, and the crop this year of Giffard, Bartlett, Duchess, and Flemish Beauty was exceptionally fine. The Keiffer pear orchard at this station, planted nine years ago, is a model one. The trees are uniformly thrifty and have been fruiting heavily for several years. Last year from this orchard of 1,500 trees Mr. Pettit shipped three car-loads of fine fruit.

How the Ontario apple yields at Trenton. A six year old tree at W. H. Dempsey's, Trenton.

Most of Mr. Pettit's orchards and vineyards are on heavy red clayey soil, which requires careful management to get the best results; but the crops raised on it show that, with good management, it excels the light soils for productiveness. The plan Mr. Pettit adopts is to give clean, thorough cultivation during the early part of the season, and follow this after July with a cover crop of rape and rye. The rape is sown in the alternate rows as soon as cultivation ceases, and the rye is not sown till the fruit is harvested, and therefore does not interfere at all with the harvesting. The next year the rape is sown in the rows where the rye was grown the year before, so that he has an alternation of cover crops.

The Grimsby Station. Experimenter, L. Woolverton, Grimsby.

Visited July 5th and Sept. 6th. A meeting of the Board of Control was held at Mr. Woolverton's place on July 5th, at which time his experimental cherry orchard was showing an abundance of fruit The trees in this young

orchard are all now nicely in bearing, and the collection of varieties is a most interesting one. In the July number of the Canadian Horticulturist, as well as in his annual reports, Mr. Woolverton has already given valuable notes on the varieties which he has found most satisfactory.

Upon my return to the Grimsby section in September, I again visited Mr. Woolverton, and found all hands busy putting up a car load of Bartlett pears for the Glasgow market. The Pettit fruit grader was being used for grading the fruit into the various sizes. Each pear was wrapped in tissue paper, and it was all being carefully packed with excelsior in small crates, something similar to those used in the shipment of the California pears.

Mr. Woolverton deserves great credit for the persistent effort he has made for several years past to establish a demand in the old country markets for the more tender class of fruits, with which our large markets are so often glutted, and the successful shipments made this year warrant us in believing that before long we will have in the old country an unlimited market for all of our well-grown and carefully packed fruits.

THE EAST CENTRAL STATION. EXPERIMENTER, R. L. HUGGARD, WHITBY.

Visited September 24th. The trees in the old bearing orchard at this station have been rather too closely planted, and are now becoming much crowded. There was a fair crop of fruit this year, but it had become badly spotted with apple scab. The past season has been a difficult one in which to do thorough spraying, because of the excessive rains.

The trees in the young orchard, planted five or six years ago, have been well cared for, and have made good growth. Quite a number of them were fruiting this year, and Mr. Huggard has taken note of this and will speak of them particularly in his annual report this year.

THE ST. LAWRENCE STATION. EXPERIMENTER, HAROLD JONES, MAITLAND.

Visited October 4th. This is the first year I have had the opportunity of visiting this section of the country late enough in the season to see the Fameuse and Scarlet Pippins in their full color. These beautiful apples seem to reach perfection in Mr. Jones' orchard. One of his bearing orchards of about five acres is made up mostly of these two varieties, and the regularity of the crop in this orchard is something remarkable. The crop this year was as usual about 700 barrels. The regularity of crop may be accounted for to some extent, however, by the careful attention given in the way of cultivation, pruning and spraying.

In the young experimental orchard, most of the trees have made good growth, but the varieties too tender for this section are plainly beginning to show themselves.

One of the new promising apples in this young orchard is the Milwaukee. The trees are thrifty and begin bearing early, and the fruit is of good size and fair quality.

Among the pears under test, there are a few which have made good growth and have begun bearing, but the majority of them appear to be too tender for this section. The same might be said of many of the European plums, but those of native origin stand out prominently for their extreme hardiness and vigor. Several varieties of them bore heavily this year, and will be noted in Mr. Jones' report.

Within the past two years, Mr. Jones has planted out several acres more of apple trees, mostly of the McMahon White, which he considers one of the hardiest and healthiest for a stock upon which to graft the more saleable kinds.

THE BAY OF QUINTE STATION. EXPERIMENTER, W. H. DEMPSEY, TRENTON.

Visited October 7th. This station is in the centre of one of the finest apple-growing sections in the Province. For the last two years, it has been my good fortune to arrive here just in time to attend the Wooler Township Fair, and I think I can safely say that I have never seen finer samples of apples shown anywhere than are at that little Township Fair.

Mr. Dempsey's orchard is a remarkable one in several particulars,—first because of its size; second, because of the great number of varieties it contains; and third, because of the regularity of the crop. Last year, when apples were a failure in most parts of the country, Mr. Dempsey had about 1,800 barrels. This year his crop will probably be about 2,500 barrels. There are about 300 varieties of apples in bearing, many of these being grown simply as top grafts for testing. The varieties making up the greater part of the crop, however, are : Ontario, Northern Spy, Ben Davis, King, and Fameuse.

The fruit is put in barrels as picked, and is hauled at once to the fruit-house, where it is repacked, and shipped during the fall and winter, when it can be sold to the best advantage. Mr. Dempsey's skill, not only in growing, but in handling and marketing his crop, has made him one of the most successful apple growers in the country .

The trees in the young experimental orchard have made good growth, and most of them are just coming into bearing. Among them are an interesting lot of new varieties. These will be described and reported upon in Mr. Dempsey's report.

Mr. Dempsey has very kindly furnished me for the past two seasons with samples of nearly a hundred varieties of apples for study and class use at the College, for which I am greatly indebted. Careful descriptive notes have been taken of all of these, which will be useful in verifying varieties.

STATIONS NOT VISITED.

On account of the difficulty of getting away from the College during the month of June, when we have excursions visiting us every day, and also because of extra work in looking after our own small-fruit tests at that time, I was unable to get to see Mr. Stevenson's strawberry plantation at Jordan, but I had the pleasure of comparing notes with him in our plantations at Guelph.

The "Pioneer Farm" at Dryden also was not visited this year, but as most of the new stock was sent there only a couple of years ago, it could not have got more than nicely started by this time.

REPORT OF VISITS OF INSPECTION MADE BY MR. A. M. SMITH OF ST. CATHARINES.

In accordance with your wish, I visited in the first week of August the stations at St. Joseph's Island and Craighurst; and also the station started by myself on the farm of W. F. Clark, Powassan, and would report as follows:

ALGOMA STATION.

The station at St. Joseph's Island I found in a very satisfactory condition, and nearly all the varieties of fruit planted growing fairly well, with the exception of a few killed by mice during the past winter, and two or three

cherry trees which had failed to leaf out for some unaccountable reason, though others of same variety near them were doing well. Several varieties of plums, to my surprise were well loaded with fruit, among them Lombard and Burbank; also several cherry trees. Grapes came nearest to failure of any fruit tried here. Mr. Young is a thorough and painstaking cultivator and will doubtless give you a full report of this station.

Simcoe Station.

At this station, which is in charge of Mr. G. C. Caston, of Craighurst, I met Prof. Hutt, who had gone over the grounds before I arrived, and who will doubtless report on them. I found the trees well cared for here and everything arranged in a systematic manner. The many varieties—especially of pears—were in fruiting, which I did not expect to find so far north. The most serious trouble I saw was some kind of a fungus which had destroyed the leaves on several varieties of cherries, leaving the fruit hanging on the tree, immature and worthless.

I also visited the grounds of Mr. Stephens, our Director at Orillia, and saw several varieties of seedling gooseberries which were very fine, and I think would be well worthy of cultivation. He has sent specimens to our "New Fruits" Committee.

Powassan Station.

In regard to the station at Powassan I suppose it will be well to give you a little history of it. While visiting there in 1898, I learned that repeated attempts had been made to grow fruit there without success, as nearly every thing planted was killed by the severe winters, and the people had become discouraged and seemed to think that fruit could not be grown. I told my friend, W. F. Clark, with whom I was stopping, and who owns a large farm there, that I believed I could send him varieties that would succeed, and as I was then engaged in the nursery business I thought it might prove a good advertisement if a success. I told him I would furnish him a lot of trees if he would plant and test them, and report his success with them, which he consented to do. Accordingly in spring of 1899 I sent him a lot, and again in 1900; there were about 100 trees in all, consisting of from two to five of the following varieties :

Apples. Duchess, Princess Louise, Wolf River, Scott's Winter, Mann, Golden Russet, Yellow Transparent, Longfield, Gideon, Wealthy, and several varieties crab.

Pears. Bessemianka, Clapp's Favorite, Idaho, Goodale.

Cherries. Reine Hortense, Riga No. 18, Ostheim, Baba, Early Richmond, Montmorency.

Plums. Wolf, de Soto, Stoddard, Hawkeye, Moore's Artic, Willard, besides gooseberries and currants, etc.

I found the trees had been fairly well cared for, being planted in a garden plot, but only about one-third of them were living and not all of these gave promise of success. None of them had yet borne fruit, except a few of the crab apples. Most of the cherries were thrifty and healthy. The following is a list of the surviving trees :

Apples. 4 Crab apples, Whitney No. 20 and Hyslop, 4 Duchess, 3 Yellow Transparent, 3 Scott's Winter, 1 Gideon, 2 Mann.

Cherries. 4 Riga No. 18, 2 Ostheim, 2 Richmond, 3 Montmorenci, 2 Reine Hortense.

Plums. 2 Moore's Artic, 1 Willard, 2 Wolf, 1 de Soto.

Pears. 1 Bessemianka, 1 Goodale.

In view of the partial success of this experiment, I think it would be well for the Government or Board to take it up, and continue it, as there is a large district here subject to the same climatic influences in which there is little or no fruit at present grown.

Mr. Clark says that if the Board will see fit to furnish the trees, he will replant those that have died out of this plot next spring, and if they want to enlarge he will prepare a new field which he is clearing next summer in what I consider a very favorable locality, and plant there under your direction. I will relinquish all the claim I have for the good of the country, believing it would be a great boon to that section of the country to test and find some fruits that would grow there. All of which is respectfully submitted.

REPORT ON TENDER FRUITS.

By L. Woolverton, Grimsby.

In the pursuance of an extended study of the adaptation of our fruits to various sections of Ontario, we are surprised to find how many fruits, hitherto considered too tender, may be successfully grown in certain favored sections; and this discovery may help to advance the interests of our fruit growers. On the other hand we are disappointed when we find that some most desirable fruits cannot be cultivated with any certainty, and hence must be finally discarded. The publication of this information should prevent the useless waste of money in the farther planting of such varieties. The following fruits are presented in order of ripening.

Apricots. Among the unprofitable fruits in Ontario we are inclined to place the apricot, which is so successfully grown in England and also in California.

About twelve years ago I planted one dozen Russian apricots, upon the commendation of the nurserymen. During all these years I have sought vainly for ripe fruit, but have been disappointed. The bloom opened so early in spring that it was sure to be touched with frost and drop either in bloom, or while the fruit was still small and green.

In 1895 I planted eleven named varieties, viz:—Harris, Shense, Nicholas, Gibb, Red Masculine, Kaisha, Alexander, Skobeloff, Montgamet, Early Golden, and Peach. I took the best of care of them, and two years ago had two or three samples of Early Golden, but otherwise the trees have yielded no fruit, and many of them are now in a dying condition. Another special weakness of the apricot is its liability to the curculio, which causes the young fruit to drop before maturity.

Nuts.

Cobnuts. About ten years ago, I procured a quart of Kentish Cobnuts from Pelee Island, hoping we might grow them profitably in the Niagara District. The trees have grown most vigorously, but most persistently fail to produce any nuts, with this exception that two years ago I had a single specimen. From my experience with them so far, I am inclined to condemn them as unprofitable.

English Walnuts. For many years there grew not far from my house, a large seedling tree of this nut, but though the tree lived to quite an age, it seldom bore a crop of fruit, and seemed to be almost as tender as a peach. But a friend near by has a tree which seems to have exceptional hardiness, and deserves careful study. At the age of eight years it bore its first crop of nuts, and has increased in productiveness ever since, until now at the age of

fifteen years a crop has just been harvested of about six bushels, and sold for about fifteen dollars. We have planted six pounds of nuts, and hope for some good results.

Peaches.

It is now about forty years since the first commercial peach orchard of any consequence was planted in Ontario. It was five acres in extent, and was planted on the grounds of your Secretary.

Among the varieties planted, the earliest was Early Purple, a variety little planted nowadays, but at that time the earliest to ripen, and very agreeable in flavor. It was too tender for distant shipment, and very often a large part of the crop was wasted because it softened too quickly to be handled for market. It ripened about the 2nd of August, and was followed by the

Early Crawford, which term "early" is a misnomer, for we have varieties now which ripen more than a month in advance of this variety. This variety is somewhat tender in bud, and does not produce a full crop as often as some other varieties; yet after fifty years of trial the beauty of the fruit, its large size and excellent quality retain for it the first place as a market peach. No variety is so much called for in our markets, and no variety more remunerative to the grower who gives it proper care. It needs very rich soil, close pruning and most careful handling to get the best results.

Old Mixon Free. Following the Early Crawford was another very excellent variety, but one that also is a little tender, the Old Mixon Free, a medium sized, white fleshed peach, of delicious quality. This peach succeeds well in all peach sections, and why it is so little grown at the present time, I cannot understand. Certainly it should have a place in the home garden.

Smock. The Smock is another variety that has now had forty years testing at Maplehurst, and still holds its place among the best commercial varieties. It is yellow in flesh, and about the last peach to ripen, being usually ready for market during the first week in October. It is not very juicy, and therefore an excellent shipper, and highly esteemed for drying.

Other Kinds. There are quite a number of other varieties that were thoroughly tested in this old orchard, which are now little grown, such as Stump the World, The Sweetwater, Royal George, Early York, Morris White, Barnard, Crawford's late, Jacques' Rareripe, Old Mixon Cling, etc., which have not proved of sufficient value for general planting.

Newer Varieties.

For some years it has been the tendency to seek for very early ripening varieties, and among them we have tested a good many which are not worth recommending, as for example, Amsden's June, Early Louise, Early Canada, Hyne's Surprise, etc. Among those which have so far given good promise, we report upon the following :

Sneed. A variety originating in Tennessee, from seed of Chinese Cling. Its great value is its earliness, the first ripe being picked on the 20th of July in 1902. Like most of the early peaches, it is a clingstone, and only of fair quality, but in my opinion it is a little better than Alexander. The flesh is white, and the size of the fruit medium, averaging about two inches in diameter.

Greensboro. In my opinion the Greensboro is the best very early peach grown in Canada, for the table. It is larger and finer looking than the old Early Purple, of which its white tender juicy flesh and sweet flavor reminds me. The size averages about 2 1-4 inches. It does not seem to be subject to rot, and the tree is very productive. Last summer my trees were breaking

down with their load of fruit. The chief fault is its tender flesh which makes it difficult to handle, as in the case of the Early Rivers. It begins to ripen about August 1st.

Triumph. Though a prolific bearer, yellowish in flesh and freer from rot than its parent, the Alexander, the Triumph does not equal the claims of its introducers. The tree is subject to blight which spreads rapidly and affects the fruit itself just previous to maturity, and its thick furry skin is not attractive to buyers. If not thinned, the fruit is inclined to be small in size. Its season is early in August.

Alexander. Perhaps no early peach has been more widely planted than the Alexander, and the last year or two has proved that this is a great mistake; for our markets have been glutted with the fruit until it has become almost unsalable. One serious fault is its great susceptibility to rot, and another that it puts on an attractive outside, which disappoints the buyer when he finds the flesh too firm to be good eating. This peach has been much overplanted in Ontario.

Hale's Early. The Hale's Early is another peach with the same fault as the Alexander; the flesh is too firm for eating, or to be cut up for the table, and it often rots just as it matures. Previous to the introduction of the Alexander it was the chief early variety, but it cannot be recommended for general planting. Season 15th to 30th of August.

Early Rivers. The Rivers is a fine white fleshed peach of good size, and agreeable flavor, which ripens about the middle of August. It is widely planted for market purposes in Ontario, but is less popular than it was, because of its tender flesh. When well thinned it can be grown to a fine size and color, but it must be handled with great care, for the slightest bruise turns black and spoils its sale.

Yellow St. John. In the Yellow St. John we have the earliest, really first-class peach grown in Ontario, and one which so far has not been over planted. It is a good sized peach, averaging about 2 1-2 inches in diameter; it has a yellow skin and a fine red cheek; the stone is free, and the flesh yellow, melting, juicy and agreeable. It is desirable for all purposes, and its season is just over as that of the Early Crawford begins. Last season at Maplehurst its season was from August 25th to September 5th.

Elberta. There is perhaps no peach of recent introduction which possesses so much merit as the Elberta. Its season is the last of September, when it has no rival in yellow fleshed peaches, and, if well grown, it is large and attractive in appearance. Though not of highest quality for dessert, it is a good all round variety. One great point in its favor is its shipping quality, in which respect it is not surpassed by any peach we have grown. The trees at Maplehurst have proved themselves vigorous and productive.

Steven's Rareripe. In the Steven's Rareripe we have another peach which is almost the equal of the Elberta for shipping purposes. It is large in size, averaging nearly three inches in diameter, while in flesh it is tender, juicy and of good quality. Its season is the first week in October, just a trifle in advance of Smock. We tried exporting this peach both in 1901 and in 1902 to Great Britain, with the most encouraging results. Half bushel boxes sold from 4 shillings to 6 shillings each.

Early Michigan. The Early Michigan is in our opinion more desirable than Hale's Surprise, Alexander or Waterloo, being less of a cling, and more tender in flesh. It ripened in the Niagara District about the middle of August, in 1902.

Other Kinds. We have under test about one hundred varieties and among them several that should be named as very desirable for general planting, as for example, Fitzgerald, Engol, Champion, Longhurst, Salway, Crosby,

Reeves, Millionaire, Kalamazoo, Garfield, etc., etc., upon which we will reserve our report for another season.

Tender Cherries.

While the Kentish and Morello cherries are hardy, and may be grown in almost any fruit section in Ontario, the Hearts are much more tender, and many of them cannot be successfully grown outside the peach belt.

Even in the Niagara District Heart cherries are occasionally nipped in the bud by severe winters. Still, wherever the peach succeeds we would recommend the planting of the following varieties which we have tested and proved profitable in the Niagara district :

Governor Wood. The best early dessert cherry, light yellow in color and richly shaded with light and dark red. The flavor is sweet and delicious and it is in season about the middle of June.

Knight's Early Black. The earliest fine black Oxheart coming in about the beginning of July. The tree is a regular and even bearer, and the fruit is very little disturbed by bird, and not subject to rot.

Black Tartarian. The best main crop black Heart cherry. The fruit is very large, tender in flesh, and delicious in flavor. Its fault is that it ripens rather unevenly and is very subject to ravages by birds. In dry seasons I find it very susceptible to rot. Season, the end of June.

Napoleon Bigarreau. This is the largest of the sweet cherries, and is one of the most profitable for market. The tree is enormously productive, and if the fruit could hang till ripe and fully colored it would be the best market cherry on our list. This, however, it cannot always do, for in wet seasons no cherry is more susceptible to rot, and sometimes nearly the whole crop of Napoleons is destroyed by it.

Yellow Spanish. In this cherry we have one of a little higher quality than Napoleon; the flesh is yellowish, and the skin yellowish white, with a bright red cheek. The tree grows to an enormous size, and sets a prodigious quantity of fruit, the most of which blight and drops before ripening, consequently this variety may be called unproductive. Season about the middle of July.

Mezel. One of the finest of the black cherries, in season about the middle of July. It is a firm fleshed cherry, of the Bigarreau class, and not a Heart, though at first sight it might be mistaken for Black Tartarian. The fruit is very large, almost black, and first class in value for any purpose.

Elkhorn. The most profitable late black cherry we have tried at Maplehurst. Its season is the last half of July. The fruit is nearly black, quite firm and an excellent shipper. In wet seasons we have found it subject to rot, in dry seasons we have harvested immense crops off trees of this variety.

Windsor. A variety of Canadian origin, and on clay soil very productive of fine large, dark cherries ; but with us, on sandy loam, much subject to rot, and too much inclined to make wood rather than fruit. Its season is about the same as Elkhorn.

Plums.

The European Plums. For excellence of quality no class of plums can be compared to the European or Domestica class. For hundreds of years these plums have grown and been improved under special cultivation and selection by the gardeners of Europe and Asia, and where these succeed as they do in the southern parts of this Province, there is no reason why they should not be planted freely for commercial purposes. For convenience sake they have been divided into several sub-classes, as for example: (1) The Gages, roundish plums, green or yellow in color, with green flesh, including Reine

Claude, Green and Imperial Gage, Washington and General Hand; (2) the prunes, oval plums, blue purple in color and rather firm, greenish yellow flesh, including the German Prunes and Prune d'Agen; (3) the blue plums with large oval fruit, dark blue in color, with firm yellow flesh, including such varieties as Kingston, Quackenbos, Shipper and Arctic; and (4) the Red plums, of which the fruit is obovate, purplish, with thin skin and soft, juicy flesh as Bradshaw, Victoria, Pond, Duane, and Lombard.

Of course the above distinctions are more or less arbitrary, for, in these days of cross breeding, classes are being more and more obliterated, and individuality alone seems to remain for study. For the home garden a large assortment of these plums is most interesting and desirable : for the commercial orchard it is best to make the list as limited as possible and to plant only three or four of the very best varieties. The time to decide upon what varieties are most profitable for one to grow is in plum season, when the fruit is being harvested and sold.

Too Many Varieties Grown. It is an old saying that you should not put all your eggs in one basket, for an accident might cause the loss of all, and no doubt this applies to plums as well as to eggs; and yet the more common mistake is the planting of too many varieties. Not knowing anything about them, the young planter is guided almost entirely by the agent or by the nurseryman's catalogue, from which it would seem desirable to plant the whole of the list, for all of them are lauded most highly. Just here the work of our fruit stations comes in, to determine the varieties best suited to each section for home use and for markets, and the reports from the experimenters will prove more valuable each year.

Picking and Marketing. Plums need to be handled a little on the green side, especially the "Red Plums", such as Bradshaw, which quickly becomes too ripe to ship, and indeed they cannot well be sent to very distant markets. The Prunes are much better shippers, and this class of plums is being forwarded by the steamer from Collingwood for distribution to towns on the north shore of Lake Huron, and points farther west.

Plums in Ontario have usually been packed in a basket containing eleven quarts, but since new sizes have been introduced this basket will be discarded for the one holding twelve imperial quarts, which is rather large for plums. A very suitable standard sized basket for choice plums is the 6 2-3 quarts basket, which also holds about nine pounds, and will soon become a favorite basket for all kinds of choice tender fruit for our markets.

GENERAL NOTES BY EXPERIMENTERS.

Burlington Fruit Station.

The following classes of fruits are under cultivation here : Currants, 22 varieties ; blackberries, 22 ; pears, 44 ; plums, 50 ; grapes, 28 ; raspberries, 25 ; peaches, 10 ; apples, 69 ; cherries, 8 ; quinces, 1 ; mulberry, 1 ; in all, 280.

The general crop was large. The season, however, was very wet, which, while it induced large-sized fruit and a heavy growth of wood, also furnished conditions that were favorable to the development of an unusual amount of fungus on many varieties of apples, as well as on some varieties of pears. The new wood of vines and trees seemed to be fairly well matured to go into winter.

Apples were an exceptionally heavy crop, probably one-third more than in 1900, Greenings, Snows Holland Pippins, Baldwins, Spitzenbergs, and

the Northern Spy were materially injured by the scab, the three former suffering the most. Golden Russet, Ribston, and Blenheim Pippin, Pewaukee, Gravenstein, Mann, Duchess and Astrachan were practically clean; while the King, Cranberry, Wagener, and Roxbury Russet were more or less spotted. The scab appeared to be the worst on the heavier soils, on the north side of the tree and in the lower branches.

The codling moth did not make much of a showing, partly owing, probably, to the superabundance of fruit, and partly to the free use of Burlap bands. Of the 450 barrels picked, we shipped 250, partly in boxes and partly in barrels to Glasgow and Liverpool, exporting even the tender Astrachan successfully to the latter market. The remaining 200 barrels were divided up between Toronto, Montreal and the local evaporater. The 39 varieties of Southern apples, top-grafted on Roxbury Russets last year, are living, with the exception of five sorts—Ingram, Paynes' Gatekeeper, Wythe, Kentucky Red Streak, and Keeper. Wandering Spy bore two or three apples 2 1-4 to 2 1-2 inches, small to medium, greenish white. Vandevere Pippin had one specimen, small, 2 1-4-inch, reddish. Some of the grafts are three and four feet long. The seven varieties of Southern apple trees are living, save a few of the Collins' Red. They have made very strong growth.

Pears were a fair crop. The Duchess spotted considerably, but the other varieties, barring the Flemish Beauty, were up to the mark. The Anjou, and Louise Bonne were exceptionally fine. As usual, we exported our pears in boxes to Glasgow, Manchester, and Liverpool, successfully sending Clapp's Favorite in cold storage to Liverpool. Up to date the varieties exported are: Bartlett, Clapp's Favorite, Anjou, Duchess, and Kieffer. These are also the leading commercial varieties in this district.

Plums were a light crop; 1,000 trees gave only about 400 (12-quart) baskets this year, as against 1,600 in 1901. There was considerable rot in the Lombard, Yellow Egg, and Reine Claude. The Bradshaw, Niagara, Quackenbos, and Satsuma (Japan) were of fine form and quality.

Peaches were a very heavy crop of fine quality. The leading varieties are the Champion, Crosby, Elberta, Early and Late Crawfords, Smock, and Tyhurst.

Cherries were a fair crop of excellent quality. Early Richmond, Montmorency, English Morello, May Duke, and Windsor are the leading varieties grown.

Grapes were a fine crop of good quality. All varieties ripened well except those that lost their leaves prematurely—the Wilder and Agawam. Delawares were exceptionally heavy. There was practically no mildew, not 10 pounds of a crop of 10 tons being rejected on that account. Pocklington, Eldorado, and Lady suffered somewhat from rot. I think that the Worden and Delaware are the most profitable grapes grown here.

Currants and Blackberries were a good crop of fine quality. (See notes.) Raspberries gave a satisfactory yield. Marlboro and Wilder lead for early reds, with Cuthbert and Loudon for later. Smith's Giant, Kansas, and Older rank first in the blacks, Columbia in the purple, and Golden Queen in yellow. The following raspberries may, I think, be eliminated from commercial plantations: All Summer, fruits from July to October (too long); it may be of interest to the amateur, but useless to the commercial grower; Japan Wineberry being scarlet-red, small, and acid; bush tender and unproductive; a novelty in its foliage, oriental and all that, but of no use here; Progress, black not productive enough; Redfield, purple, not a good cropper; Thompson, red, too shy a bearer. Received and planted last year a few Harris raspberries, three dwarf Alexander apples, two dwarf McIntosh apples, and three standard Bismarck apple trees. All are growing well.

I used the insecticide soap for the cherry aphis, but saw no beneficial results.

For the past three years we have exported a few boxes each year to the Old Country of the "Honor Bright" tomato. They are a medium-sized handsome, solid, late tomato, ripening in distinctively pronounced stages. I cut them off (leaving about one-half inch of stem adhering) when in the whitish-yellow stage. As a rule they reach Glasgow in good condition, netting here from 40 to 50 cents per box, which, although a fair price, is scarcely enough for the extra trouble. I do not know of any more promising export tomato.

A. W. PEART.

MAPLEHURST FRUIT STATION.

Probably the largest general collection of varieties of fruits to be seen anywhere in Canada, outside the Dominion Experimental Farms, is to be found on the grounds of the Secretary, Mr. L. Woolverton. There are now over eight hundred varieties planted, covering 5 1-4 acres, the object being to give him an opportunity to study the habits of growth and the bearing qualities of each tree, together with the characteristics and fruiting season of each fruit. While the cherry is a specialty at Maplehurst, there is a complete collection of peaches, pears, plums, grapes, apples, apricots, and small fruits; thus there are afforded endless opportunities of taking notes for use in preparing the matter for the work called the "Fruits of Ontario," in which are to be included all the principal varieties worthy of cultivation in this Province.

THE CHERRY HARVEST.

The cherry harvest is now becoming important in some sections of the Province. In that portion bordering on the south shore of Lake Ontario, and the north shore of Lake Erie, and, indeed, nearly all the east shore of Lake Huron, the more tender varieties of the sweet cherry class seem worthy of a place in a commercial way, but, even in these sections, a frost at the end of May or beginning of June is often fatal to the crop.

The earliest cherry of this class grown at Maplehurst is the Early Purple, which occasionally gives a full crop at highest prices, though a cherry of only medium size and ordinary quality. Some old trees have made a good record for productiveness, and made the owner a fine return, but as a rule the birds take a good share of the crop, and, if gathered before ripe enough to please the appetite of the birds, they are but "skin and bones," and not colored enough to deserve the name Purple. In England it is customary to protect valuable cherry trees from the birds by means of large nets, which are spread over the trees; a good suggestion for us if we want to succeed with certain varieties of Oxhearts.

This netting is sold very reasonably, as we note in a recent issue of the Journal of Holticulture several advertisements, such as the following:

Garden Netting. Small mesh, keeps out the smallest birds, oiled and dressed; will not rot if left out in all weathers; 105 yards by one yard wide, 72 cents; by two yards wide, $1.44; by three yards wide, $2.16, and so on to any width. G. H., Netting works, Rye.

Edge of Maryland says:

"For protecting cherries from the birds, I bought a lot of damaged mosquito netting, and sewed it into pieces six yards square. This I put over an Early Richmond tree and drew it together at the bottom. The sun shines through, but the birds are kept out. It stays on only a few days while the cherries are ripening, and is then taken off and laid away for another year."

In our commercial orchards, however, we find it best to plant those which are not subject to the attack of birds, as, for example, the Biggarreau class, which have a flesh too firm for their beaks. Without attempting to make reference to the other varieties of sweet cherries, we commend two of our latest market kinds, the Elkhorn and Windsor. This latter has been introduced with a great flourish, and since it is of Canadian origin, we hope it may prove the best of its class. We have planted a few hundred trees, being so well pleased with the first samples borne in our experimental plot ; but a few years' experience may be needed to determine whether it or the Elkhorn is the more valuable for the main crop. The latter has been grown for forty years at Maplehurst, and often bears a prodigious crop of fine dark fruit. Both ripen about the middle of July, when other varieties are out of the market, and consequently bring a good price. Both are subject to rot in wet seasons, but possibly we can control this by treatment with copper sulphate.

The English Morello is the best latest sour cherry. It is a famous cropper, dark in color, and will hang long after it is ripe. In the Western States it has been sold under the name of Wragg, and no doubt some nurserymen have been making money out of fruit-growers by selling this old variety under a new name. We have them both side by side in our experimental plot, and can see no difference whatever.

Of cooking cherries none can compare with Dukes, a class of semi-sour, red cherries, that cannot be excelled for sauce and pies. The May Duke is a familiar example of this class, which is frequently ready for use the latter part of June. Among the others of the class we have the Olivet, a sparse bearer, and most excellent in quality, and the Late Duke, which considerably prolongs the season, though otherwise very similar to the well-known May Duke.

The Board of Control of our fruit stations met at Maplehurst on the 5th of July. The new varieties of Duke cherries were of especial interest to the chairman, Dr. James Mills. There were five varieties noted down as suitable to keep up a succession for the market, and carrying immense loads of fruit for their age, viz., in order of ripening : May Duke, Royal Duke, California Advance, Late Duke and Louis Philippe, the first of which is over long before the latter begins ripening. These Dukes are a class of cherries which are a mean between the sweet and the sour cherries, and most desirable for all household uses. The peculiar upright habit and the close and continuous clustering of the fruit upon the underside of the long upright branches, at once distinguish the trees from those of other classes. One special variety of this class, the Reine Hortense, was especially admired because of its immense size and excellent flavor, but it is not as productive as the others.

The Cherry Aphis.

This insect has been most troublesome in our cherry orchard, and during the past season we determined to try a very fine spray of crude petroleum. We secured the finest possible nozzle, and on the 1st May, just before the buds opened, we applied the crude petroleum in the form of a fine mist. On the 2nd May we followed this with an application of Bordeaux, but we found this would not stick on the trees, owing to the oil.

On the 1st of June we examined the trees, and could find no aphis, except upon an occasional young leaf, and we could detect no injury from the application of crude petroleum.

On the 10th of June a few aphidae appeared on the end of the twigs, but not in sufficient numbers to damage the crop.

Thinning Fruit

Experiments in thinning fruit, conducted at Maplehurst for some years, go to prove that with peaches especially the time and labor is a well-spent investment. We have found the size of our Alexander peaches upon overloaded trees so much increased that the total number of baskets harvested from a tree which had been thinned to nearly one-half was quite equal to that from its mate, left unthinned. Besides this, the color was better on the thinned fruit. There was less inclination to rot, and the quality was considerably improved. As a consequence, the cash value of the crop was largely increased.

Our own experience in this matter was quite well supported by that of our neighbor, Mr. John Brennan. Walking through his Alexander orchard on the 28th of June, we found the ground literally covered with young fruit. "People," said Mr. Brennar, "are calling me a fool to waste my fruit like this, but I have learned by experience that thinning pays."

"What portion do you take off?"

"Well, from those overloaded Alexanders, fully one-half. Here is a tree from which I took 1,700 peaches on the 26th of June. The tree could never carry that quantity to perfection. Why, 100 peaches, well grown, would fill a twelve-quart basket, and that tree was carrying enough peaches to fill over 30 twelve-quart baskets, while eight or ten baskets is all it could possibly mature to any size."

Effect on Plums. Experiments made at the Wisconsin Experiment Station seem to prove that equally good results may be had from thinning plums, as we have had with peaches. About four-fifths of the fruit was removed from a portion of a tree of Gale Seedling plums, leaving the fruit about two inches apart on the branches, while the other branches are left untouched.

Effect on Apples. While the results in the case of apples may not be so clear as with peaches and plums, still the effect on the tree is no unimportant factor, for when our orchard trees overbear, as they did in 1896, it takes three or four years for them to fully recover their vitality. Indeed, if one may judge from evidences, it is only this year of 1902, six years after that enormous exhausting crop, that our apple trees have recovered their wonted vigor.

The Massachusetts Station has reported on results of thinning apples as follows:

A tree each of Gravenstein and Tetofsky apples was thinned on July 1st, and a similar tree of each variety left unthinned as a check. In case of the Gravenstein, the yield on the thinned and unthinned trees respectively was: first quality fruit, 9 bushels and 2 1-2 bushels; second quality fruit, 1 bushel and 2 1 2 bushels; windfalls, 9 1-2 bushels and 10 1-2 bushels. In the case of Tetofsky, the thinned trees gave 1 bushel of windfalls, and the unthinned trees 3 bushels; of second quality fruit, the yield was one-half bushel from each tree, and of first quality fruit the thinned tree yielded 2 bushels and the unthinned tree none at all. Allowing 60 cents per bushel for firsts and 25 cents per bushel for seconds, the market value of the thinned Gravenstein apples was over twice as much as that of the unthinned, and of the thinned Tetofsky apples eleven times as much as that of the unthinned. It cost 48 cents to thin the Gravenstein and 25 cents to thin the Tetofsky. The net gain due to thinning was 85 cents for the Tetofsky and $1.85 for the Gravenstein. It is thought that the results would have been more pronounced if the thinning had been done two weeks earlier. The large percentage of windfalls in case of the Tetofsky was believed to be largely

due to the fact that the apples have very short stems, and are borne in clusters of from three to eight fruits each, so that as they grow they become very much crowded. With trees having this characteristic, therefore, thinning is especially valuable.

L. WOOLVERTON.

EAST CENTRAL STATION.

Our fruit crop was not all that we could have wished for as to quality, yet the quantity in some measure made up. We began spraying on March 28th, as I firmly believe in early spraying. We used whale oil soap and Bordeaux mixture, dissolving soap with warm water and then adding the Bordeaux, making a fine emulsion. This was the only satisfactory spraying we did all through, for although we sprayed four or five times afterwards, the rains invariably came on and washed a large percentage off before it had time to do its work, and, in consequence, a large percentage of our fruit was spotted more than ever before.

About one hundred of our young pears and plums were imported, and, fearing the various kinds of scales and insects, I concluded to try the crude oil treatment. I am not sure whether that was the cause of the injury, but some twelve of our finest plum trees, that have been fruiting for several years, never showed a leaf this spring. The winter of 1901 and 1902 was the mildest we have had for the past twenty-five years, the thermometer not going below 12 1-2 below zero ; we frequently have it 20 degrees and more without injury to the trees.

In my report I have confined myself to those varieties sent me by the Board of Control, several of which are worthless here for market, which I have marked for the inspector, and which I think ought to be top-grafted next spring. Our cultivation consisted first, in pruning in March; second, in spraying frequently, and, third, in working the land till the fruit interfered by bending the branches. All the trees are in fine condition of growth, as you will see by the report. The quantity of fruit gathered has also been taken down at the time of gathering, so as to get at the exact data of the different varieties. The varieties not reported on did not fruit, but all made satisfactory growth. The two hundred trees planted on our farm were grown in clover sod, which was plowed and made to enrich the land, the clover being dragged under with a chain. The trees have done remarkably well. The varieties that were most affected with scab were : Fameuse, about 70 per cent.; Chenango, about 90 per cent.; Spy, 25 per cent.; Baldwin, 15 per cent.; Canada Red, 40 per cent.; while King, Minkler, and Haas were from 10 to 20 per cent. affected. Boston Star, Gideon, Wealthy, Ribston, and Western Beauty were clean and large.

Bartletts were not as good either in quantity or quality as formerly, while Duchess, Anjou, and Lawrence were better than usual. The currants sent me were magnificent, viz., London Market, Prince Albert, and Victoria Black ; some of our Empress were badly mildewed on account of wet weather, and did not ripen well. Strawberries were an immense crop, and lasted late in the season. This is the first time we have had a good crop of peaches ; they were fine and large, the varieties being Fitzgerald and Longhurst.

Berries of all kinds were good in quality and quantity.

In the beginning of the season the price of apples ran from $1.50 down to 90 cents, but at present the latter figure is about the top, as buyers are over-stocked and apple barrels have gone up to $35 per hundred. Another season we will box all our best fruit for the English market.

I would suggest that those varieties which have proved almost worthless as commercial fruit should be re-grafted with some valuable kinds of winter fruit.

R. L. HUGGARD.

Georgian Bay Fruit Station.

This has been a season of most peculiar extremes, alternate cold and wet predominating, which in some ways retarded vegetation, and in other ways encouraged a luxuriant growth. But it has not been without its object lessons ; for instance, in the development of fungous diseases, and as regards cultivation. This season I have noticed, and so have many others, that fruit on apple trees growing in grain or grass has been cleaner and better colored than the fruit in the well-cultivated orchard, which clearly shows that in a year like this it is quite possible to conserve too much moisture. It would, therefore, seem better in a spring of much cold and wet to commence cultivation somewhat later than usual, especially in apple orchards.

There are now in test at this station 170 varieties of plums. Many of them are now in bearing, which enabled us to place on exhibition at Toronto 120 different kinds. Among this large list there are, to be sure, many varieties which are very indifferent in quality and productiveness, but it is of equal importance to know the poor ones as the good. The best of the old, well-tried Europeans are as yet the most profitable.

We have just gathered the finest crop of plums we ever grew. The orchard received thorough and clean cultivation during the early summer, and was carefully sprayed with Bordeaux and Paris green, three ounces to the 50-gallon barrel. Although this has been one of the worst seasons for shot-hole fungus, and while most trees in the neighboring orchards have lost their leaves weeks ago, some of them as bare as winter, our trees are still healthy and green, only a very few showing the slightest bareness, and that only on the tips of the young wood. The orchards are now green with a beautiful covering of red and crimson clover, which will be plowed under next spring, and the cultivation will again go on as above.

The Japan Plums. The Japan plums are mostly very strong growers and good bearers, but their quality is rather against them, as compared with our best European varieties, and I cannot advise planting them very extensively. Many of them have a pronounced acrid or almond flavor, becoming almost bitter in such varieties as Willard, Ogon, Berckman's Hatankio, etc.

The American or native plums are all too small in size, indifferent in quality, and unattractive in appearance to be of any value in the commercial orchards of Ontario. They are usually, however, very strong growers, and make good stocks to work better varieties on. Some of our best plums are grown as top grafts on these varieties.

What to Plant. I am often asked to recommend varieties for planting. Climatic conditions and locations are so varied that this is difficult only in a general way. Some like dark plums ; others want light ones. The tendency of the market now seems to favor the light-colored varieties, believing them to be sweeter. For my own planting I would use the following, to cover the whole season in the order named : Red June (a Japan), Washington, Bradshaw, Burbank, Quackenbos or Glass, Prune d'Agen, Arch Duke, Diamond, Yellow Egg, Pond's Seedling, Coe's Golden Drop, and Reine Claude. This list is sufficiently large, and pretty well covers the whole season ; besides, fewer varieties give least trouble.

Peaches. This has been another good year for peaches here. It is only a few years since peaches were tried here to any extent, but we now feel confident that with careful selection they can be grown in sufficient quantity to at least meet the local demand. Such varieties as Red Canada, Triumph, Fitzgerald, Tyehurst, Bowslaugh's Late, Crosby, Champion, Wonderful, etc., have been bearing well, some trees bending and breaking with their loads of fruit.

Pears. Pears have only been about a good half crop, but of excellent quality. The following varieties are succeeding remarkably well: Beurre d'Anjou, Bartlett, Beurre Clairgeau, Belle Lucrative, Flemish Beauty, Duchess, Clapp's Favorite, Howell, Kieffer, etc. Quite a number of our young trees are beginning to fruit, but not in sufficient quantity to make any particular mention of them. I believe it will be only a few years when we shall be able to prove that pears can be grown here nearly as well as apples. I can well remember when it was thought useless to plant anything but Flemish Beauty, but, thanks first to the Fruit Growers' Association, and later to the experiment stations, that is all changed.

I have seen it claimed several times during the past year that it was no longer possible to grow clean Flemish Beauty pears. We sprayed our trees with Bordeaux, first, when buds were swelling; second, when blossoms began to burst; third, when fruit had set and petals had fallen. The fruit is as clean and handsome as could be desired.

Owing to the cold and wet spring grapes bloomed rather late, and unless we have a warm fall some of them may not ripen well. Champion, Moore's Diamond, Green Mountain, Niagara, and Brighton are maturing very well.

JOHN MITCHELL.

LAKE HURON STATION.

The season just passed has been a very trying one to the fruit grower, owing to the extremely wet, cold weather. The winter of 1901 and 1902 was a very mild one, the lowest degree of frost was only 10 degrees below zero. The spring opened up very early with summer-like weather, but cold weather set in the early part of May and continued so throughout the season. On May 10th and 11th we had twelve degrees of frost, but no damage was done except to some of the young growth of the raspberries, and on May 27th we had a cold rain, with some snow, still it did not seem to injure the bloom any.

Very little planting was done at this station in the experimental plots. Two varieties of apples, one variety of raspberry, and three varieties of plums were added to the large list now growing at this station.

One thing very disappointing to the experimenter after caring for a tree or plant, is that when it commences to bear fruit he often finds it is some old and worthless variety. This has happened at this station. I think the nurseryman who sends out trees incorrectly named ought to be prosecuted.

All classes of fungus were very prevalent, especially the black spot, and twig and fire blight.

Insects were not so troublesome as some years. There was a small green worm that bored in the apple from the outside in the later part of the season, which has never been noticed before.

New Fruits. Among the newer fruits that commenced to bear this season are three of the French pears planted two years ago:

Citron de Carmes, fruit rather small; quality not very good, tart; ripe August 1st.

Dr. Jules-Guyot, this one bloomed in July; fruit medium size, not tested yet for quality.

Dr. Jougre, fruit large; resembles Clairgeau; not ready at time of writing.

The apple crop this season was anything but satisfactory. They were very small and spotted, not more than one-third fit for market, especially the Spys.

The pear crop was very good. Fruit large and clean, and all sold at fair prices.

The plum crop was not so large as last season but was of better quality. The plum orchard at this station is continuing to grow vigorously, and is becoming a very profitable part of the farm.

The cherry crop was very light, not over one-third. The Black Knot is still prevalent, but the Lake Huron Fruit Growers' Association petitioned the Brant Township Council to appoint an inspector and it has been done. The cherry trees at this station continue to make a good growth and are doing well. But I cannot give any report as to the yield, as the birds took the entire crop with the exception of a few baskets. I have never seen the waxwing and the robin so numerous as the past season.

A. E. SHERRINGTON.

SIMCOE FRUIT STATION.

This has been a peculiar season, such as may occur perhaps only once in a lifetime. Never, in the history of this country, have we had such an excess of moisture, or such a cool summer; and this has had a peculiar effect on the fruit crop. The winter of 1901-2 was the mildest in point of temperature for thirty years; the lowest temperature recorded here being scarcely ten below zero. As a result of this all kinds of fruit buds came through the winter in fine condition, and there was an abundance of bloom. But cool weather, with alternate frosts and rain, spoiled the early blooming fruits such as plums and cherries; and frequent rains during the time of the apple bloom spoilt the prospects in most of the orchards in this district; more particularly in the winter apples. Early apples, such as Duchess and Astrachan, however, were a full crop. Some varieties of fall apples were a fair crop, while others were very poor. The peculiar thing about the winter apples was that there was no uniformity about the crop. They were what might be termed patchy, that is, some orchards have a full average crop and some above average; while others, in the same section, were almost barren.

In my own orchard the Duchess have a heavy crop, the fall apples were below average and the winter apples set a large crop; but continued to drop until last midsummer, when there was little left. The Spys, however, were a little better than the others. I attribute this to imperfect fertilization of the blossoms, the Spys blooming later during better weather probably making a difference in their favor. The orchards giving the best crops were almost invariably on high rolling land, and, no doubt, atmospheric drainage had a good deal to do with it. Small fruits, such as strawberries, raspberries, and blackberries were a record crop. The abundant moisture seemed to suit them, and we gathered berries continuously from June until well into September.

I have tested a great many varieties of strawberries, and my main crop consists of Crescent and Williams. The Crescent is the most profitable strawberry among upwards of a hundred varieties tested. I have tested many of the much lauded, fine looking varieties, and many of them certainly produced fine berries, of good quality, but when you picked them over about three times they were done. I want a berry that will give you fairly good pickings for two weeks, or more, and the Crescent will do this better than any other variety I have tested. It will pay better at 5 or 6 cents a box, than many of the others would do at 25.

I have been testing several varieties of Russian Apricots, viz.—Gibb, Nicholas, Alexander, and Purple Apricot. I might sum up my experience with them in this advice to intending planters : Don't plant them; to do so would be only time and money wasted.

Insect pests were in evidence but no worse than in other years. There were scarcely any of the tent caterpillars, and I think this pest will not be troublesome for some time again.

Curculio was very bad; I presume on account of the small crop of plums they were able to concentrate their efforts. Codling moths were plentiful.

I believe the bandaging of trees with burlap, if properly attended to throughout the season, would almost exterminate the moth.

Nothing in the experimental plots has failed since my last report. With the exception of the blight on the foliage of the cherries noted in this report, everything has continued to make a satisfactory growth, and apparently is doing well.

G. C. Caston.

South Western Fruit Station.

The past season has not been favorable to the fruit grower. The spring was cold and backward, May, June and July were unusually wet and cold and proved disastrous to many of our fruits. Apples suffered least. They were a large crop, much above the average both in quantity and quality. The buyers however, are not all living up to their agreement, and considerable loss will result from this cause. On account of the orchards yielding more good fruit than the buyers expected, and not being able to dispose of the surplus to advantage, a large quantity has been left on the hands of the grower.

Most varieties are unusually free from scab especially in orchards that were sprayed with Bordeaux mixture.

W. W. Hilborn.

Strawberry Station.

The past season was quite exceptional, in many respects different from any that we ever remember to have had, so that few varieties were left at their normal condition.

The spring was on the whole very cold and wet, some few quite warm days, but on the whole the season of fruiting was what may be called cold.

After the earlier varieties had begun to blossom, we had three or four quite severe frosts, one that froze ice 1-5 of an inch on pail standing on pump platform. These frosts destroyed not only a large part of the first blossoms, but many unopened buds, so severely that many of the strawberry growers in our section at once declared that the entire crop of strawberries was gone—killed by the frosts. Happily their surmises were not at all correct; for it was found that enough buds had been untouched to make one of the best crops we have had for some time, the cool showery weather prolonged the season until the middle of July. Some kinds were very much more injured than others. Nick Ohmer, Sampson, Wm. Belt, Marshall, Seaford, and Margaret were hurt seriously, while there were others, such as Klondike, Saunders, Hunn, Sample, Woolverton, and Empress injured only very slightly or not at all. There was a great deal of rain in June, on June 25th ground was thoroughly soaked; again on the 29th it rained all day and part of the 30th. This was just what the late varieties required. While the days were warm the nights were quite cool, ideal weather for producing the best strawberries. On July 2nd there was a good picking of Brandywine, Joe, Klondike, Hunn (last picking of Bismarck); good of Dew, Gandy, Emperor, Miller, Wm. Belt, Sample, Senator Dunlap; while opinions differ in many places on many of the varieties, Senator Dunlap seems to have done well wherever it has fruited. On July 4th there was a good picking of Joe, Nettie, 11.59 p.m. or Hales' Midnight, Hunn, Klondike, Sample, Gandy. This has been a season in which the medium and late varieties have beaten the early kinds, 10 to 1—an ideal season for late var-

ieties. I never saw them do nearly as well. There was a very large crop and good prices all through the season. Again I wish to repeat that the narrow system has come out ahead, and the "wide row" must go, although, perhaps, three-fourths of all the strawberries grown are grown on this plan. But progressive fruit growers are finding out that it is not the most profitable way. I will give you just one instance: A grower, a progressive one, prepared one acre of ground, well manured it with stable manure, well worked in, and got good plants set in rows three feet apart. The varieties were Williams and Clyde. Kept rows of plants narrow, about 18 inches, leaving a good path for the pickers. In fall gave a dressing of unleached hardwood ashes, and a slight covering of long, strawy manure. In the spring this was raked into the paths, which acted as a mulch, and kept the berries clean. The ground had been kept well cultivated, and clear of all weeds. The result: First season there were 600 crates picked from that one acre, or 14,600 boxes, and the grower lost fully 50 crates during the hot spell, when he could not get help to pick them, and that many were wasted. There were over 500 crates picked from that acre the past season, which was the second year of fruiting for that piece of ground. That acre of ground produced as much as the ordinary grower gets from three or four acres grown in the ordinary way. As I have said, the past was a good strawberry season, lasting from about June 10th, when the first berries began to be picked, such as Monitor, Honest Charlie, and the well-known Michel, Van Deman, Johnson, August Luther, and Bederwood, until the middle of July, when the last of Nettie, Hunn, Klondike, and Gandy were picked. It was a season of very fine berries; some of the finest I ever saw were grown this past season. Some boxes I picked of Hunn, Sample, Glen Mary, Brandywine, Saunders, Miller, New York, Uncle Jim, Corsican, Klondike, Bismarck, Bubach, Haverland, Monitor, Parson's Beauty, I never saw surpassed for size and beauty.

Notes on Season of Picking.

Season of Different Varieties. The season of some of the different varieties was as follows:

June 20th. A good picking of Carrie, Overholt's Special, Manwell, also of Kansas, a good cropper. (First picking of Hero.) Good picking of Bederwood, and third picking of August Luther, a good cropper; first picking of Uncle Jim, large and fine, also first picking of Glen Mary, very large berries; also first of Emperor, Empress and Parson's Beauty, fine berry; first of Marie and Gertrude.

June 23rd. Good picking Splendid, Leader, Glen Mary, Jucunda (imported), Irene, Annie Laurie, and Monitor, a splendid variety; good of McKinley, Klondike, Parson's Beauty, Clyde, August Luther, Michel. First picking of Joe, Senator Dunlap, Williams, Wm. Belt and Jersey Queen; good picking of Aroma, Manwell, Woolverton, Sample, Kansas, Saunders, Corsican, New York, and Uncle Jim. First picking of Triumph de Gand, and Star; good picking of Greenville, Cobden, Queen, Fountain, Bederwood, and Hero; Crescent, small and poor; good of Lovett, Tennessee Prolific, Pride of Cumberland, Marie and Gertrude; Saunders was better than Lovett or Williams. These last three resemble each other very much in the berry, but not in the plant. We are now in the thick of the season; all varieties are bearing except the very late ones, such as Nettie, 11.59 p.m., and Robbie. No berries yet ripe on these varieties; not ripe before July 1st.

I was particularly pleased with the showing Monitor made the past season, its first fruiting here. The berry is large, roundish, bright and attractive; the plant is thrifty and very productive. It comes amongst the early ones, and, I think, will prove profitable.

New ones placed in our trial plot for first time are as follows : Auto, Armstrong, Bush Cluster, Benjamin, Chellie, Dewey, Drought King, Echo, Epicure, Family Favorite, Granville, Great Ruby, Hawaii, Lady Garrison, Lester Lovett, Luxury, Lyon, Palmer's E., Success, Superior, Sutherland, Shephard, Saint Antoine de Padone, Mark Hanna, Mrs. Mark Hanna, Nichol's No. 6, New Globe, Repeater, Texas, Thompson's Nos. 500, 203, and 202, Uncle Sam, Vandevere, Virous, and Ryckman, and 13 of J. H. Black's pedigreed seedlings sent me by Mr. Black for trial, viz.: Joe, Reba, Nettie, Robbie, Stella, Almon, Carrie Silvers, Howard, Prof. Fisher, Mrs. Fisher, Hazel, Leon, and Ham. With one or two exceptions these have made a very good growth, and we will be able to report on them after fruiting next season.

Early and Extra Early Varieties. August Luther, Michel, Monitor, Van Deman, Johnson's Early, Excelsior, Smith's Lord Sheffield, Clyde, Staples, Bederwood, Marshall.

Mid Season to Late. Haverland, Splendid, Tennessee, Prolific, Honest Charlie, Kansas, Hero, Marie, Bismarck, Ruby, Glen Mary, Saunders, Williams, Lovett, Brandywine, Sample, Ruby, Bubach, Miller, Senator Dunlap, Nick Ohmer, Empress.

Late. Aroma, Uncle Jim, Klondike, Hunn, Gandy, Emperor Joe, Nettie, Robbie, Timbrell 18, Dew, Empress, 11.59 p.m. or Midnight, Rough Rider, etc. There is quite a difference of opinion on some of the above varieties, depending on the difference of the soil in which they are grown and the way they are treated.

E. B. Stevenson.

St. Lawrence Experiment Station.

The winter of 1901-02 was all that could be desired from a fruit grower's point of view. On November 12th we had a light fall of snow, followed about a week later by a second, which, remaining until well into March, kept the ground from freezing all winter. The winter temperatures were normal, with no very sudden changes from high to low. The only severe test the trees had was on the 10th of May. The trees were then almost in bloom, when the thermometer dropped a few degrees below freezing, with a high wind, which injured the centre blossom in many clusters on the apple, and did serious injury to all early blooming plums and cherries.

Field mice were very destructive in unprotected orchards during the winter. In some orchards of young trees more than half were completely ruined. My young orchards were successfully protected by wrapping with ordinary building paper for about 10 to 12 inches from the ground. Out of 700 trees wrapped only one was injured, and that was done above the paper. I cannot recommend tar paper, and wish to warn people against using it, for I have seen injury to the bark in many cases.

Fungi caused serious damage here, as elsewhere in the Province, but I found that from four to five sprayings gave me a crop with from 85 per cent. to 90 per cent. clean fruit. Most of the sprayings were made between showers, as it rained almost continually during the past summer, but by being careful to spray when the foliage was dry I obtained good results, even though it rained a short time after the spraying was done.

Insects were apparently few in number, but by close observation one found the smaller insects (really the ones that do the most damage) out in their usual numbers, but were later in hatching or moving from winter quarters. Bud moth gave me the most trouble, and I had also to fight an attack of Tussock moth. These insects appeared in large numbers, and began eating the young apples when about the size of cherries, and injured a lot of my fruit before I got them under control.

The black soap from France for treating the aphis I applied to a row of cherry and plum trees with markedly good results. The foliage on the treated trees retained a bright, glossy green, and the aphis was almost all destroyed. I find strong tobacco water and soap also a satisfactory treatment for aphis, and not injurious, like kerosene emulsion.

My plums and pears were kept under a treatment of clean cultivation until July 9th, when cultivation ceased, and I allowed a cover crop to grow. The ground was fertilized with a cover crop plowed under in the spring, and a light dressing of manure and muriate of potash applied.

A good many people from the surrounding neighborhood, and some from a distance visited my orchards to see for themselves what varieties to plant before placing their orders with the nurserymen.

HAROLD JONES.

WABIGOON STATION.

As stated in my report last spring, all our fruit suffered severely during the winter of 1901-02, the ground freezing to the depth of over six feet, and there being very little snow until January. The only trees that survived were one Ostheim cherry, one De Soto plum, one Transcendent crab, and two Whitney crab. The crabs only showed any vigor this season. I may state that I have eighteen trees grown from seed from Siberia now two years old. In the spring they were alive to the top bud. They are now about three feet high. If any of these prove of value, grafts can be made on hardy stocks of crab varieties. I think it useless to send any tender varieties to this climate.

Gooseberries have proved nearly a complete failure, as well as black raspberries.

Strawberries, owing to having been too heavily covered with strawy manure, rotted some plants. Those that survived gave a good yield of excellent fruit. This year we have covered them with chaff and straw. All the raspberry canes have been laid down and covered with straw. Next year I expect to have definite results to report, as the ground is now covered with eight inches of snow, which will assist very materially to protect the bushes and vines. From the short experience that has been obtained here, crabs (in the line of trees), red raspberries, strawberries and black currants are hardy enough to grow a profitable crop.

If I can furnish any further or fuller information along any line, I will be pleased to do so.

A. E. ANNIS.

WINONA FRUIT STATION.

Plums. There was not a heavy set of plums, but nearly enough for an average crop, had the rot not destroyed fully one-half or more of some varieties. Early spraying does not appear to be a remedy for the plum rot. Our orchards were sprayed thoroughly with seven pounds of copper sulphate, instead of four, to the barrel, with the expectation of destroying all fungus on the trees and on the ground under them. This was done the last week in April, both sides of the rows were very thoroughly covered. As soon as the plums had set they were again sprayed with five pounds to the barrel, and again in two weeks with four pounds. The weather being dry, and the foliage and fruit looking very healthy, spraying was discontinued. About the middle of July the weather became showery, raining nearly every day, which caused the rot to spread much worse that it has ever been known. The fungus continued to spread until the plums were picked. Red June, Reine Claude, and Monarch sold higher than any other varieties. Red June, on account of earliness ; Reine Claude and Monarch, both good quality, and ripening after the

rush of plums is over. Lincoln is a very fine, large, red, sweet plum of most excellent quality, and early, but the tree is a rather slow grower. With this year's experience I would strike Washington out of the list of plums to plant for profit. In one of our orchards we have a row of fifty-five trees of Washington ; the next row on one side is Bradshaw, on the other Lombard. The same number of trees of each were planted at the same time, the cultivation, spraying, and all treatment was the same, and the Bradshaw row yielded 335 baskets, the Lombard 264, and Washington only 15. The difference in other years has not been quite as great. Many of the plum trees sent to this station are not true to name, and, not being an expert in plums, I do not undertake to give descriptions of varieties.

Insects. Our experience with the San Jose scale this season goes to prove that it can be controlled, if not entirely eradicated. On the first inspection here four trees were found to be infested. These trees were fumigated with cyanide of potash, and all trees near them thoroughly sprayed with two and one half pounds of whale oil soap to the gallon.

On a subsequent inspection three more trees were found, adjoining the first. These and all trees near them were sprayed by Mr. Fisher with his petroleum emulsion. These trees have all been carefully examined, and no appearance of live scale has been found.

M. Pettit.

NOTES BY THE SECRETARY.

Our Exhibit at the Industrial.

The display of fruits from our fruit stations was exceedingly good this year. Each of our experimenters arranged his fruit in alphabetical order, for convenience of singling out any variety under consideration ; and the labels, being written out boldly with a shading pen by our assistant, were a most important feature.

The whole was superintended by Mr. W. M. Orr, of Fruitland, who has had long experience in exhibition work. The exhibit was held during the second week only of the Industrial, but we hope to be able to continue from the beginning to the end, as it is one of the most important exhibits in the fruit building, affording an opportunity to other exhibitors to compare notes with the experimenters, and to correct misnamed varieties in their exhibits.

Discarded Varieties.

One of the most important features of our fruit station work is the warning of our fruit growers against planting inferior varieties. Almost every nurseryman's catalogue is loaded up with a whole list of inferior kinds which he carries simply because they are still asked for ; and he will be greatly obliged to us if he can educate the grower to discard them. In our future exhibits we intend making a special table of such varieties, so that growers can see at a glance why we have discarded them. Another feature will be the showing up of varieties which are too much boomed. There are always unscrupulous dealers who want to trade upon varieties before their value is known, and we want to test all such fruits, and where they are not superior to varieties in cultivation we want to warn the growers against them.

Fine French Pears for Ontario.

We have noticed in our experimental plot several varieties of pears worthy of the attention of our fruit growers. One is Triomphe de Vienne, which is of about the same season as Bartlett, but larger in size ; and another

is the Hoosic, which is a trifle later, but is not only larger than the Bartlett, but has a fine red cheek, and is of excellent quality. Dr. Charles Saunders of Ottawa, was particularly taken with a beautiful dwarf tree of this variety at Maplehurst, which was bending down with its tremendous load, and took a photograph of it for the Exposition at St. Louis. Surely it would be a splendid export variety.

Japan Plums.

The Chabot plums (pronounced "shabbot") is coming to the front rank among the Japan varieties. It fruited this year for the first time at Maplehurst, and we first noted that the tree was fairly productive, and the fruit large and most attractive in color. Next we tested its flavor, and were surprised at its excellence ; it was tender, juicy and of a delicious flavor.

It was a little disappointing, however, to see this plum, as grown in the Beaver Valley, in the Georgian Bay district, and shown by Mr. John Mitchell, our experimenter there ; for in his exhibit it was much smaller, and apparently quite inferior. Conditions of moisture, richness and cultivation of soil must have much to do with these differences, and should be further investigated. "In my opinion," said Mr. Orr, of Fruitland, "the best three Japan plants are Red June, Burbank, and Satsuma. I do not know the Chabot, and, of course, it may displace one of these. Satsuma is blood red in flesh, and very desirable for canning purposes."

"In my opinion," said Mr. John Mitchell, our Clarksburg experimenter in plums, "the three best Japans are Red June, Chabot, and Burbank. I also think very highly of the Satsuma, and would place it fourth on my list, for it is productive, quite hardy, and a splendid preserving plum."

Fairly Good Reports of Fruit Exported to Glasgow.

When the fruit growers of Ontario have learned to produce only fruit of the best quality, and never to allow inferior samples upon a tree to reach maturity, they will have learned the secret of success in fruit growing. Then we can ship with confidence to any market and expect reasonable results.

Every week since August 1st, when Astrachans began to ripen, we have kept up steady and successive shipments of apples and pears, with varying success, but, on the whole, with encouraging results.

With the exception of one lot to Manchester and one to Liverpool, all these have gone to Glasgow, and a recent mail has brought us the following report by John Brown, inspector at Glasgow, an extract of which may be of interest :

(Marina Shipment.)

The 953 C's shipped by L. Woolverton consisted of Wilson C's of pears and apples, ½ C's pears, 40 lb. boxes apples, 2 C's plums, 3 large Wilson C's peaches. The pears were packed in the half C's in wood shavings with no paper on them ; the variety was principally Bartlett. These showed up very well, although some were very ripe The pears in the Wilson C's showed up well also, and the Duchess apples in Wilson C's were the best Duchess I have seen this season. The peaches were very wasty, and only about a third of each case was fit for use. These were put up in special cases with no ventilation whatever, which I think had something to do with the condition they arrived in. They are, in any case, a dangerous fruit to ship. The two cases Washington Plums were useless. The following are the prices :

Bartlett Pears in Wilson C's,	6s. 3d.	8s.
Duchess Apples do	5s.	6s.
Bartlett Pears, ½ C's	5s.	5s. 9d.
Apples, 40 lb. boxes	6s. 3d.	6s. 6d.

I have seen two of the largest buyers of the Bartlett pears, both of whom report : the pears they got went sleepy, and after three or four days were quite useless.

(*Lakonia Shipment.*)

L. Woolverton, Pears and Apples.—The pears were packed in half cases in Excelsior packing, without being packed separately in paper. This packing was (for pears) rather coarse; something of a finer and softer nature would, I think, be more suitable and less likely to bruise the fruit. I also advocate the wrapping of each pear separately in paper, the same as the Californian pears, using the same kind of paper. Some of the pears were packed in Wilson cases. There was no paper on these either, with the result that a good many were bruised. The half case is going to be the most popular package here, as it relatively contains more fruit and is less expensive than the Wilson case. The latter would only pay with fruit of exceptional quality. The apples were packed in special cases holding about 40 lbs. of fruit. They were in layers with a great deal of Excelsior packing between each layer. This, I think, is quite unnecessary, a layer of Excelsior being sufficient, as buyers naturally prefer a box full of apples rather than two-thirds and one-third packing. Woolverton also sent a sample Wilson case of peaches and a sample case tomatoes. The former showed up well, each peach being wrapped up separately in paper and mostly in good order; the latter were a failure, the tomatoes being soft and useless. The following are prices realized:

Bartlett Pears, ½ C's, 3s 9d., 7s. 8d. Some ripe others extra good.
Louise Bonne Pears, ½ C's, 2s. 6d., 4s .6d. Green and good.
Flemish Beauty, ½ C's, 3s., 3s. 6d. Green and hard.
Duchess, ½ C's, 4s. 3d. Very good.
Bartlett's, Wilson's C's, 3s. 6d., 5s. 3d. Wasty and irregular.
Apples, Wilson's C's, 3s. 9d., 7s. 3d. Kings made highest price.
Peaches, Wilson's C's, 6s. 3d.
Tomatoes, Wilson's C's, 2s., 2s. 9d.

APPLES.

Notes by G. C. Caston (Simcoe Fruit Station).

Some varieties fruited this year for the first time.

Shackleford. Planted in 1895; tree healthy, vigorous, spreading in habit of growth; fruit medium to large; skin dark green, splashed and streaked with dark red; calyx partly closed; stem short, set in a deep, narrow cavity; flesh coarse, acid, with no pronounced flavor; probably a fair cooker, and would keep until well on in winter.

Hamilton. Planted in 1897, bore for the first time a few specimens this year; tree a thrifty grower, spreading; fruit above medium size, roundish oblate; calyx large, partly closed, in a wide, uneven basin; stem short, set in a deep narrow cavity; skin yellow, waxy in appearance; flesh whitish, watery; water core, fairly good flavor; I doubt if it will be of value, though a clean, handsome-looking apple.

Sherwood's Favorite. This is an old variety, known as Chenango Strawberry, and sometimes called Sheep's Nose. I fruited it years ago from scions, which were sent me under the name of Stump. It is so well known that it is not necessary to describe it. Some esteem it highly as a dessert variety, and it certainly has considerable merit in that line. I would not advise anyone to plant it extensively. One tree in an orchard would be enough.

Banks. An apple grown from scions sent me under the name of Bank's Red Gravenstein, which has fruited this year. It is a handsome apple, above medium size, elongated and ribbed. Calyx closed in a shallow basin; stem very short, in a deep cavity; skin dark green, overspread with bright red; flesh white, with a slightly sweet, agreeable flavor. In my opinion when fully ripe this would scale up pretty high as a dessert apple. It is a clean, handsome, attractive-looking apple, and I think it will likely be well worthy of cultivation. It will evidently keep until midwinter at least.

Peerless. This is an apple described in former reports, but I am inclined to think it is one of the best varieties yet tested for its season. It came from Minnesota in 1895, where it originated. It is said to be a seedling of

Duchess of Oldenberg. It was introduced as a winter apple, but it cannot be classed as other than a late fall apple, though it would keep until Christmas, I think, fairly well. The tree is not a fast grower, but it is very healthy and hardy, and is inclined to an upward habit of growth. It began to bear the second year, and has borne every year since. At first the fruit was scarcely above medium size, and did not attract attention particularly ; but, as the tree grows older, the fruit improves in size and beauty, until now there is no variety on the whole list that I know of that is its equal in appearance. It is very uniform in size, averaging three inches in diameter ; in shape it resembles the King ; it is perfectly clean and free from scab. The skin is red, varying from bright scarlet to dark red; flesh white, crisp, juicy, with a brisk, spicy flavor. As a cooking apple this variety excels ; indeed, I think I am safe in saying that it has no equal as a cooker, and I believe this variety would rank very high in the British market, if transported in good condition. We are growing too many fall apples now in this country, and not enough of the standard commercial winter varieties, and I think we should be very careful about extending the list, unless they are possessed of special merit. But, unless I am greatly mistaken, we have a valuable new apple in the Peerless. I believe there is money in it.

Several varieties of Russians fruited this year were of such poor quality that they are not worth describing. It would be a waste of time. The best that can be said of these Russian, or most of them a least, is that, being hardy, they may succeed in cold sections of the country where better varieties fail, and would be better than no apple at all.

Gano. This variety, called by some Black Ben Davis, I still believe to be a decided improvement on the Ben Davis. It bears just as early, keeps just as long, and is superior to it as a cooking apple. We only use Ben Davis for cooking in late spring or early summer, when other varieties are gone. but we find Gano has just as long a season, and makes a far better sauce, as it develops quite a spicy flavor in cooking. I would plant it in preference to Ben Davis.

Ontario. For this section, this is one of the coming apples. It is doing well here, and, on account of its early bearing and good appearance, coupled with good quality, it is very desirable as a commercial market apple.

McIntosh Red. What a pity this variety is so subject to scab. It is almost impossible in a season like this to keep it clean. I consider it one of the very best dessert apples on the list. It will do best on high rolling land, with the trees well apart, well pruned and sprayed. Under these conditions it will do fairly well, but in general it is an unsatisfactory apple to grow in my district.

Shiawassee Beauty. This seedling of the Fameuse is doing well here. It bears well, and the fruit is clean. Trees planted in 1895 now bear about a bushel each. Fruit large, somewhat flattened ; skin green, overspread with dark red, quite handsome ; flesh white, juicy, with a distinct Fameuse flavor. This will be decidedly the most profitable of the Fameuse seedlings. I have Scarlet Pippin top grafted, but I don't think much of it.

Princess Louise is as bad as McIntosh Red for scab ; it is almost impossible to keep it clean.

Notes by W. H. Dempsey (Bay of Quinte Fruit Station).

Apples were about an average crop this year. The quality, however, was not up to the standard. The cold, wet weather early in the season made it very difficult to retain the Bordeaux mixture on the trees, and it was necessary to spray nearly every day. The trees in the experimental plot have made good

growth this season, have always been thoroughly cultivated, and a hoe crop of corn and potatoes planted between the rows of trees, but never closer to the tree than six feet. Many of the varieties have borne a few samples this year.

Trees planted in 1896 of Yates Red bore heavily, but were too small to be of any commercial value. Dudley's Winter fruited this year for the first and was fully ripe in October; it was very handsome on the tree.

One tree of Downing's Winter Maiden's Blush had three medium sized waxy yellow apples. Western Beauty bore about one bushel to the tree. It is very much like Wealthy, and ripens at the same time.

Peter had about a peck to the tree. It also is similar to Wealthy, and ripens at the same time.

Boiken had a bushel to the tree, and the fruit was very handsome on the tree. Walter Pease yielded a peck of dull striped apples which ripened in August. Barry gave twelve poor looking samples of apples of no value whatever. Starr produced six medium sized yellow apples which ripened in September, with no appearance of ever being of any value.

Sutton's Beauty has never formed any fruit buds yet. Gano, planted in 1898, had four handsome apples this year.

Bismarck fruits every year, though the tree is no larger than a currant bush. It is no doubt one of the earliest varieties to come into bearing; it is large and handsome but coarse, and only a cooker.

Windsor Chief. Top grafted 1895; strong grower; fruit $2\frac{3}{4}$ x $2\frac{1}{2}$ in., roundish conical; skin yellow, almost covered with bright red, darker on the side next the sun, with numerous large grey dots; calyx partially open, set in an even basin; stem $\frac{1}{2}$ in., medium, set in a broad cavity; flesh yellowish-white, coarse, crisp, mildly acid; fair quality; season March and April. Has only borne a few apples each year, until this year it bore a heavy crop, and they hung well to the tree till the last of October. It would no doubt be a profitable apple to grow if it would come into bearing earlier. It is of handsome appearance, very similar to Baldwin, and kept in good condition through April. In fact I had it till last of May.

Winter Fameuse. Top grafted 1896; of medium growth; fruit 2 x $2\frac{3}{4}$ in.; roundish, oblate; skin lemon yellow, nearly covered with streaks of red with splashes of darker red and numerous small, grey dots, not so bright in color as Fameuse; calyx closed, set in a moderately deep basin; stem $\frac{1}{2}$ to $\frac{3}{4}$ in. medium, set in a broad uneven cavity; flesh white, tender, juicy, good quality; core small; season January to March. The tree has not come into fruiting as early as the Fameuse, but I think it will fruit fully as well, though very uneven in size and much more subject to fungus. It will not take the place of the many good winter varieties we already have.

Coo's River Beauty (Oregon seedling). Top grafted in 1897; vigorous grower; foliage medium; fruit $2\frac{3}{4}$ x 3 in., roundish oblate; skin smooth, yellow, nearly covered with bright red with streaks and splashes of darker red, with a few prominent grey dots; calyx large, nearly closed, set in a moderately deep basin; stem $\frac{3}{4}$ in, medium, set in a broad, deep russetted cavity; core small; flesh white, crisp, firm and juicy; season November and December. The tree has borne medium crops each year for the last three years, and is quite subject to fungus both in fruit and foliage. A very handsome apple in the basket.

Palouse. Top grafted 1896; a medium grower; foliage medium: $2\frac{3}{4}$ x 3 in., oblong, conical: skin yellow, streaked and splashed with red; calyx partly open, set in an uneven basin; stem 1 inch, slender, set in a narrow, deep cavity; flesh yellowish, a little coarse, juicy, sub-acid; quality good; season October and November; quite subject to fungi; yields abundantly.

Notes by Harold Jones (St. Lawrence Fruit Station).

The following varieties fruited with me this year in the experimental plot: Ontario, Longfield, Chenango, Strawberry, Peter, Salome, McIntosh, Yellow Transparent, Late Strawberry, Red Astrachan, Milwaukee, Hamilton, McMahon White, and Northwest Greening.

These trees were planted in 1896. Trees planted in 1897 and bearing are: Magog, Red Streak, Arabka, Excelsior, Boiken, Roman Stem, Shackleford, Fannie, Peach of Montreal, and Montreal Beauty.

Longfield. This much advertised variety will prove a disappointment to those planting it for profit. It is an early and heavy bearer, inclined to overbear, but it matures a crop of apples too small to be of any commercial value. Its fruit is thin-skinned, of a light color and shows bruises and finger marks. Its season is September and October, instead of being a winter apple as it is claimed to be.

Milwaukee is the most promising variety yet tested, from a commercial standpoint. This is a seedling of the Duchess by Jeffreys. The tree takes the character of the parent. It is an early and heavy bearer. Fruit large in size, 3 x 2 1-2 inches; color, yellowish green, blushed and streaked on the sunny side; calyx, closed, in wide shallow basin; stem, slender, one-half inch in a narrow deep basin; flesh, rather coarse; brisk acid; no aroma; season from November to March. This variety is more suitable for cooking than for a table apple.

Peter. This apple is similar in every respect to the Wealthy and should hardly be classed as a distinct variety.

Salome has fruited with me for the second time, and although the tree is a hardy, vigorous grower, the fruit has proved very unsatisfactory, being of small size, less than two inches in diameter, poorly colored and liable to drop before maturity.

In the St. Lawrence Valley we have yet to find an apple that will be as profitable to the grower, tree for tree, or acre for acre, as the Fameuse, and apples belonging to that group, such as the McIntosh, Scarlet Pippin, etc. These apples grow to perfection, and when kept free of spot, command the very highest prices, and are sought for in all the markets, both at home and abroad.

Notes by Charles Young (Algoma Fruit Station).

I have now at this station over forty varieties of apples under test, some are doing remarkably well, and a few have proved too tender. It is rather too early yet to say which should be discarded as some reputed tender varieties so far have proved quite hardy; while some others, Transparent for instance supposed to be iron clad, have shown a tendency to sun scald. Of the apples planted in 1899 the following have fruited this year: Duchess, Yellow Transparent, Wealthy, Wolf River, Scott's Winter and Longfield, the latter yielding a heavy crop. I would not alter the list of desirable apples for Northern Ontario. A few new varieties are coming well to the front, but want a further trial before recommending them to plant, except for testing. Some, which have been extensively planted, Ben Davis for instance, are so far not desirable: the tree is healthy and vigorous, but the fruit is small, poorly colored and apparently out of its climate. Sweet Bough is too tender; Wallbridge is our best long keeper; the appearance is good, quality second class to eat, good for cooking.

NOTES BY R. L. HUGGARD, (*East Central Station*).

Number.	Varieties of Apples.	Class.	Age.	Vigor. In. of growth.	Vigor. Hardiness. Scale 1-10.	Productiveness. Yield in quarts per tree.	Productiveness. Scale 1-10.	Season. 1st and last.	Remarks
	Alexander	Fall	6 yrs.	30	8	1 peck	Large	Sept. and Oct.	Fine large fall apple.
	Baxter	Winter	6 "	26	7	3 quarts	9	Jan.-April	Badly spotted this year.
	Ben Davis	"	6 "	24	9	½ bushel	7	Feb.-May	Spotted ; not well colored.
	Bell de Boskoop	"	6 "	22	7	2 quarts	8	Jan.-March	Clean fruit ; dark green.
x	Bethel	Fall	6 "	24	5	1 quart	8	Nov.-Dec.	Spotted and rough.
x	Chenango Strawberry	Early Fall.	6 "	15	5	3 pecks	7 to 8	September	No use only for cider
	Duchess	Fall	6 "	20	10	1 bushel	9	September	Very fine and clear.
	Fameuse	"	6 "	17	7	1 peck	5	Oct. and Nov.	Very badly spotted.
	Gravenstein	"	6 "	24	6	10 samples	6	Nov. and Dec	Clean fruit.
	Gideon	"	6 "	26	8	1½ bushels	9	Oct. and Nov.	Very large, clean and fine.
	Green Newton Pippin	Winter	6 "	20	8	30 samples	5	January	Medium good quality.
	King of Tompkins	"	6 "	35	7	1 peck	10	Nov. and Dec.	Very fine and well colored clean fruit.
x	Longfield	Fall	6 "	30	10	1 bushel	4	Oct. to Nov.	Too small for export.
	Mann	Winter	6 "	20	7	12 samples	8	Jan. to March	Clean fruit and good quality.
x	McIntosh Red	Fall	6 "	24	6	20 "	6	November	Bad color and shape ; no good here.
x	Peter		6 "	20	7	6 "	5	December	Not very promising.
	Russian No. 277	Fall	5 "	20	9	30 "	8	September	Large, clean, coarse fruit.
	Russian No. 230	"	5 "	18	9	50 "	7	September	Resembles Duchess ; not so good.
	Red Canada	Winter	5 "	15	8	½ peck	6	Jan. and April	Spotted considerably.
	Red Bietigheimer	Summer	6 "	25	8	26 samples	10	Aug. and Sept.	No improvement on Fillbasket.
	Salome	Winter	6 "	20	8	½ bushel	7	Jan. to May	Smooth, clean, and beautiful color.
	Sutton's Beauty	"	6 "	14	6	10 samples	7	Nov. to July	Rather rough skin.
	Stark	"	6 "	30	9	20 "	8	Nov. and Jan.	A medium apple ; very vigorous grower.
	Stump								No use here.
	Scott's Winter	Winter	5 "	22	8	17 samples	6	Nov. and Jan.	Rather small fruit.
	Tetofsky	Summer	6 "	12	5	3 quarts	8	Aug. and Sept.	Not as good as Transparent.
	Winter Maiden's Blush	Winter	6 "	17	7	17 samples	6	January	Requires further test.
	Walbridge	"	6 "	18	6	1 peck	5	Jan. and Feb.	Too small for commerce.
	Winter Greening	"	6 "	22	8	25 samples	7	January	Appears promising.
	Wealthy	Fall	6 "	20	10	½ bushel	6	November	Clean and a great bearer.
	Wolf River	Late fall	6 "	28	9	1 peck	10	Oct. and Dec.	Fine, clean, large, well colored, very attractive
	Western Beauty	Fall.	6 "	24	9	1 bushel	9	Sept. and Oct.	A very fine fall apple.
x	Wine Sap		6 "	20	7	10 samples	2		No use here ; too small.
	Wellington		6 "	18	7	few samples	7	Late fall	Only medium.
	York Imperial		5 "			3 samples			Promising.

NOTES BY W. W. HILBORN (SOUTH WESTERN FRUIT STATION).

The past season has not been favorable to the fruit grower. The spring was cold and backward. May, June and July were unusually wet and cold and proved disastrous to many of our fruits.

Apples suffered least, they were a large crop, much above the average both in quantity and quality. The buyers however are not all living up to their agreement, and considerable loss will result from this cause. On account of the orchards yielding more good fruit than the buyers expected, and not being able to dispose of the surplus to advantage, a large quantity has been left in the hands of the grower. Most varieties are unusually free from scab, especially in orchards that were sprayed with Bordeaux mixture.

BLACKBERRIES.

NOTES BY A. W PEART (BURLINGTON STATION).

Blackberries were a fine crop. Few, if any, dried up, the frequent rains leading to a continuously moist condition of the soil. Owing to the summerless nature of the summer, both blooming and ripening were considerably later than the average, the former about a week and the latter probably ten days.

In weeding out undesirable varieties of blackberries the following are classified as too tender for this district : Early Cluster, Early Harvest, Minnewaski and Ancient Briton. These sorts are considered too unproductive for commercial purposes : Maxwell, a very fine berry, but a weak, light grower ; Wachusetts, Dorchester, Eldorado, Wilson's Junior and Child's Tree, Lovett's Best, Gainor, Early King and Wilson's Early, deserve further trial.

The leading varieties for the planter appear to be the Agawam, Kittatinny, Ohmer, Snyder, Stone's Hardy, Taylor and Western Triumph.

Agawam. Cane upright, spreading, hardy, vigorous and productive ; berry roundish-oblong, medium size 7-8 x 3-4 inch, sweet, but rather insipid. Season medium, July 25-Aug. 20. A standard variety.

Ancient Briton. Cane upright, spreading, medium vigor, but tender and unproductive. Berry oblong, conical, medium size, 7-8 x 3-4 inch, good flavor. Season medium, July 25—Aug. 20.

Child's Tree. Cane spreading, vinous in habit, hardy, fairly vigorous, but unproductive; berry ovate-round, small to medium, 3-4 x 1-2 inch, firm, sweet and sprightly in flavor. Season medium, July 25—Aug. 20.

Dorchester. Cane upright, spreading, very vigorous, hardy, but a poor bearer. Berry, large to very large, 1 1-8 x 3-4 inch, roundish-oblong, firm, of fine quality. Season medium, July 25—Aug. 20.

Early Cluster. Cane upright, moderately vigorous, but tender and unproductive. Berry roundish-oblong, medium size 7-8 x 3-4 inch, of good quality. Season medium to late, July 28—Aug. 25. Evidently misnamed "early."

Early Harvest. Cane upright, stiff, medium vigor, tender, but very productive; berry medium to large, 1 x 3-4 inch, oblong, conical, fair in quality. Season early, July 15—Aug. 5.

Early King. Cane upright, spreading, medium vigor, somewhat tender, but quite productive. Berry small to medium, 3-4 x 5-8, roundish oblong, quality good. Season early to medium, July 18—Aug. 10.

Eldorado. Cane upright, spreading, vigorous, hardy, but not very productive; berry medium to large, 7-8 x 3-4, oblong, conical, sprightly flavor. Season medium, July 25—Aug. 20.

Erie. Cane upright, spreading, vigorous, hardy, and productive; berry medium, 7-8 x 3-4, roundish, conical. Season medium, July 25—Aug. 20.

Gainor. Cane upright, vigorous, hardy and productive. Berry very large 1 1-4 x 7-8 inch, roundish oblong, fine in quality. Season, medium, July 25—Aug. 20. Promises well.

Kittatinny. Cane upright, very strong and vigorous, hardy and productive; berry large to very large, 1 1-8 x 3-4, ovate, oblong, rich and juicy. Season late, July 30—Aug. 30. One of the best commercial varieties.

Lovett's Best. Cane upright, stiff, hardy and productive. Berry oblong, round, small, 3-4 x 5-8; quality fair. Season late, July 30—Aug. 30.

Maxwell. Cane being weak and light spreading and unproductive; berry roundish, oblong, large to very large, 1 x 3-4 inch of excellent quality. season medium, July 25—Aug. 20.

Minnewaski. Cane upright, spreading, vigorous, but tender and unproductive; berry medium to large, 7-8 x 3-4, roundish, oblong, of good quality. Season early to medium, July 20—Aug. 15.

Ohmer. Cane upright, spreading, vigorous, productive, and hardy; berry very large, 1 1-4 x 3-4, oblong, oval; quality good. Season medium, July 25-August 20.

Snyder. Cane upright, moderately vigorous, hardy, and very productive; berry medium size, 7-8 x 3-4; oblong, oval; of good quality. Season early to medium, July 20—August 15. Requires a rich soil. One of the best varieties for market.

Stone's Hardy. Cane upright, spreading, hardy, vigorous, and productive; be ry oblong, oval, medium, 3-4 x 5-8, quality good. Season medium, July 25—August 20. A very promising variety.

Taylor. Cane upright, vigorous, hardy, and productive; berry medium size, 7-8 x 3-4, oblong-oval, quality good. Season medium, July 25—August 20. A valuable commercial berry.

Wachusetts. Cane almost thornless, upright, vigorous, hardy, but not p oductive. Berry of fine quality; medium size, 3-4 x 5-8; roundish-oblong. Season medium to late, July 25—August 25.

Western Triumph. Cane upright, strong, and vigorous; hardy and very p oductive. Berry medium, 7-8 x 3-4; roundish-oblong; of good quality. Season medium, July 25—August 20. A good market berry, but requires a damp, rich soil.

Wilson's Early. Cane upright, medium; vigorous, hardy, and fairly productive. Berry large, 1 x 3-4; oblong-round. Quality good. Season medium, July 25—August 20.

Wilson's Junior. Cane vinous in habit, trailing, spreading, hardy, but a poor cropper; berry medium, 7-8 x 3-4, oval, oblong, sweet. Season medium, July 25—August 20. Propagates by both tips and suckers.

Blackberries appear to thrive best on soils having a quicksand bottom; very heavy croppers as the Snyder and Western Triumph, should be pruned severely.

NOTES BY A. E. SHERRINGTON (LAKE HURON FRUIT STATION).

Agawam. A strong vigorous grower, healthy and hardy; fruit, large; quality good; ripe Aug. 16th; yield 403 oz.

Ancient Briton. Plant fairly vigorous, hardy; fruit, medium; quality poor; ripe May 16th; yield 108 oz.

Eldorado. A strong vigorous grower, healthy and hardy; fruit, large; quality best; ripe Aug. 8th; yield 555 oz.

Early Cluster. Plant a strong grower; rather tender; fruit very large; quality good; ripe Aug. 19th; yield 199 oz.

Gainor. Plant a strong grower, hardy; fruit very large; quality, good; ripe, August 13th; yield 185 oz.

Ohmer. Plant strong, vigorous and hardy; fruit large; quality good; ripe Aug. 16th; yield 59 oz.

Stone's Early. Plant vigorous, hardy and productive; fruit large, quality good; ripe Aug. 13th; yield 65 oz.

Snyder. Plant strong, healthy and hardy; fruit medium; quality fair; ripe Aug. 19th; yield 511 oz.

Taylor. Plant strong, vigorous and hardy; fruit, large; quality very good; ripe Aug. 13th; yield 184 oz.

Wilson's Junior. Plant a weak grower; tender fruit; very large; quality good; ripe Aug. 13th; yield 165 oz.

Wachusetts. This is a thornless variety; plant not as vigorous as it ought to be; tender; fruit medium; quality good; ripe Aug. 8th; yield 200 oz.

The most profitable blackberries are the Eldorado, Agawam and Synder, in order named.

NOTES BY G. C. CASTON (SIMCOE FRUIT STATION).

In blackberries I have tested about 15 varieties, and have narrowed them down to two, and these two fill the bill for this locality. They are the Eldorado and Agawam. These two have given excellent results. They do not lose any of the bearing wood during the cold of winter, and give excellent crops, both in quantity and quality. And I recommend these two varieties for this section with the greatest confidence.

NOTES BY L. WOOLVERTON (CHERRY STATION).

This has been an exceptionally good season for cherries in Ontario. The dry May seemed to largely destroy the fungus rot, (Monilia) so that, in spite of a wet June and July, the cherries were comparatively free from this evil. The aphis too, which is one of the worst pests of the cherry tree, has been less troublesome than usual. A large portion of the experimental orchard was sprayed with an exceedingly fine spray of undiluted crude petroleum, just at the time of the opening of the buds, to destroy the young aphidae, and this seemed to be effective. Injury to the trees was predicted by many, but so far, July 28th, the trees are in good condition.

The experimental plot consists of a deep rich sandy loam, which causes too vigorous a growth of wood, and consequently the trees are less productive than if the soil were a clay loam. The following are a few notes on the behavior of some of the varieties under test :

Abbesse. Similar to Downer's Late.

Belle De Choisy. A sweet Duke, and one of the most delicious of eating cherries. Usually a shy bearer, this year it bore a good crop. Season July 1—15, in 1902.

Black Eagle. A delicious black cherry, but as usual the trees were very unproductive. The crop was too small to pay as a market cherry; besides it soon becomes too soft to handle.

Black Tartarian. Set a heavy crop, but thinned out very much before maturity. The fruit ripens somewhat unevenly; berry sweet and tasty; was relished by the robins, which took a large share of the crop. The season was from July 15—30.

California Advance. Similar to Late Duke; in season 1st to 10th of July.

Centennial. This came to us described as a large firm cherry. Probably it is not correct, for it is similar to La Maurie. Ripe June 13—20, and mostly taken by birds and boys; sweet but too small.

Cleveland. The best White Oxheart; in season from June 19 to July 1st; some were hanging as late as July 8th. The crop was good, for the size of the tree, the fruit better colored than Governor Wood.

Downer's Late. Ripe about 13th July, but a small crop. Cherry very good quality, and similar to Abbesse on our grounds.

Dyehouse. Very similar to Richmond, quite as early and about as productive. In season June 19—29.

Early Purple. Harvested June 21st, a tree six years old yielded 25 quarts, but they were gathered before fully ripe or all the cherries would have been taken by the birds.

Elkhorn. Yield was better than Windsor, and less inclined to rot. In season June 23rd to July 1st.

English Morello. Constant rains made this cherry begin rotting about July 25th, before fully mature, and on this account it was harvested at that time. The yield was very large, quite equal to that of Montmorency; disputes the claim for first place for commercial purposes with Montmorency.

Governor Wood. Was much wanted in the market; one tree 40 years old yielded 40 quarts, an unusually small yield; an 8 year old tree yielded 18 quarts; and a 6 year old tree 12 quarts. In season June 19 to 27.

King's Amorelle. (Purity?) This with the other Amarelles, red or Kentish cherries, was given thorough cultivation; tree quite productive, equal to Montmorency; fruit firm, of good size; in season June 25 to July 10.

Knight's Early Black. Tree a fine vigorous grower, and very productive; in season June 23rd to July 1st; birds troublesome about 27th, when at its best.

Late Duke. (California Advance?) Tree very productive; a perfect picture, the very finest of the Dukes; not inclined to rot; ripens early and evenly, in season July 1st to 15th.

Lutoka. Tree not productive this season; fruit subject to blight and curculio.

May Duke. Excellent for house use because of its long season; ripens unevenly, beginning about July 1st.

Montmorency. Trees bore great loads of beautiful fruit. In season July 15th to 30th.

Montmorency Ordinaire. Same as Montmorency.

Morello. (English.) Tree most productive; a competitor of the Montmorency for profit. Ripe about August 1st.

Napoleon Bigarreau. Tree very productive; rotted quickly after gathering; would not carry in good order more than twelve hours; ripe July 5th.

Olivet. Tree was not productive; fruit scattered but very large; a very dark rich red; in season July 10th to 20th.

Ostheim. Tree unproductive; cherries very scattered; quality good but small, dark red; ripe July 21st; valuable only at the north.

Orel. Tree bears young and heavily; a pie cherry in season between Early Richmond and Montmorency.

Plymouth. Tree of Duke habit; very productive; not attacked by birds or rot; a fine shipper, keeps a long while; seems to be best late, light-colored sweet cherry.

Purity. Probably same as King's Amarelle.

Reine Hortense. Tree six years old; very full of very large, fine cherries, evenly distributed; ripe in 1902 on July 8.

Rockport. Tree very productive; fruit usually nearly all rots on the tree, but this season there was no rot, owing to the dry May, and the fruit was so good that it was packed directly off the trees into the shipping baskets; in season June 23rd to July 1st.

Royal Duke. Tree not so productive as Late Duke, fruit not equal to Late Duke.

Schmidt's Bigarreau. Tree six years planted in sandy loam made magnificent growth, but bore very few cherries; fruit very large, black, sweet and rich; in season July 10th to 20th.

Schatten Amarelle. Probably same as Brusseler Braune.

Suda. Hardy; much like English Morello.

Windsor. Tree too vigorous in sandy loam, to be productive; on clay loam one of the most productive kinds, subject to rot on sand, but not on clay; in season July 15th to 25th.

Wragg. Same as English Morello.

Yellow Spanish. Tree more productive than usual, but fruit thinned by blighting; and not so large as usual. Harvested July 2nd.

Season of Ripening.

Variety.	1899.	1900.
Belle de Choisy	June 22-July 2-4	June 27-July 12.
Black Tartarian	June 25-July 10	June 25-July 12.
Black Eagle	July 4	July 4-July 13.
Belle Magnifique	July 16	July 12-August 1.
Cleveland	June 17-July 3	June 15-July 10.
Early Purple	June 10-June 27	
Empress Eugenie	June 16-July 5	June 16-July 7.
Elton	June 21-July 2-10	June 20-July 5.
Governor Wood	June 20-July 6-10	June 17-July 5.
Late Duke	June 27-July 6-10	June 28-July 12.
Ida	July 10	July 6.
English Morello	July 10	July 9.
May Duke	June 15-July 6	June 16-July 11.
Montmorency		June 30.
Olivet	June 24-July 5-10	June 28-July 13.
Ohio Beauty	June 16-July 4	June 20-July 18.
Orel		June 19.
King's Amarelle		July 7.
Mercer		June 25-July 1.
Dyehouse		June 21.
Knight Early		June 25.
Schatten Amarelle		July 5.
Strauss Weichlel		July 5.
Spate Amarelle		July 10-19.
Rockport Bigarreau		July 8.
Ostheim		July 10.
California Advance		July 13.
Suda Hardy		July 13.
Plymouth		July 8-14.
Purity		June 28.
Royal Duke	June 30	June 26-July 18.
Reine Hortense		June 28-July 28.
Wragg	July 10	July 9.
Downer's Late		July 5.
Schmitz's Bigarreau		No change.
Windsor		July 7.
Centennial		June 4.
Rockport		June 10.
Napoleon		June 28-July 13.
Yellow Spanish		June 25-July 13.
Early Maurie		June 15.
Early Richmond		June 21.

Notes by W. W. Hilborn (Southwestern Station).

Cherries promised a large yield early in the season, but the latter unfavorable weather destroyed a large portion of them. Sweet varieties were nearly all destroyed by rot (Monilia). Rain occurred nearly every day for a

week just before they began to ripen, and most of the fruit was destroyed while yet unripe. Sour varieties did not suffer much from this cause, but a hail storm in this locality injured about one-half of the crop to such an extent that they were not fit for market. A mysterious disease has appeared among the sour cherries, that is causing considerable uneasiness. I first noticed it last season on some Montmorency trees. The leaves turn yellow and drop off when the fruit is about half grown. The fruit of course did not fully mature on the trees most affected. Those injured most last season died this season. They came out in leaf and set a crop of fruit which grew to about half its normal size, when the foliage again turned yellow and dropped off and the trees died. This season the disease has affected nearly all the trees in this locality, especially those grown on sandy loam, to a greater or less extent. All sour varieties appear to be susceptible to the disease.

NOTES BY G. C. CASTON (SIMCOE FRUIT STATION).

Cherries were almost a total failure this year; the unfavorable weather during bloom and the cool, wet summer was against them. Then a peculiar blight attacked the foliage, a kind of sporadic fungus, causing the leaves to become spotted, then turn yellow, and then fall off, leaving some of the trees almost bare. Whether this is the advent of a new disease or the effects of the cool, wet summer, and excess of moisture, I am unable to say. We only got in one real good spraying this year and that was early. When the time came for successive sprayings, it was raining three days in the week, and we gave it up. I believe that cherries like corn, revel in hot weather. In the summer of '91 I had a fine crop of cherries, and the hotter the weather the better they seemed to be. I have frequently watered plum trees, in hot dry weather, to stop them from dropping their fruit when heavily loaded, and have been successful, but cherries seem to enjoy hot dry weather. Wet cool weather in summer seems to be decidedly against them. All my tree fruits get clean cultivation. Several varieties bore a few specimens, but they never seemed to mature properly, and lacked flavor. The trees affected most by the foliage blight, were English Morello, Wragg, Bessarabian and Shatten Amarelle. I think probably that next year, with normal weather conditions and thorough and persistent spraying, there will not be any further trouble from this disease.

No varieties fruited this year that have not been described in former reports.

CURRANTS.

NOTES BY A. W. PEART (BURLINGTON FRUIT STATION).

Currants were a good crop. Many of the red and white varieties, such as the Red Dutch Versailles, Belle de St. Giles, White Grape, White Imperial, North Star, Brayley, and Fay's Prolific, lost their entire foliage prematurely, thus materially injuring the crop. Pomona, Red Cross, Wilder and Cherry, suffered somewhat, while the New Victoria, Raby Castle, and Old Victoria were entirely exempt from the fungus.

The currant worm was destroyed by spraying with Paris green, 1 lb. to 250 gallons of water, using a double spramotor nozzle. The black varieties were exempt from disease of any kind.

The leading commercial varieties tested so far are: Red: Wilder, Cherry, Pomona, Fay's Prolific, Red Victoria and North Star. Black; Saunders, Naples. Black Victoria, and Collin's Prolific. The last kind appears to be an uncertain cropper—one year very heavy and the next very light. The White

Grape still leads the Imperial in point of productiveness. Like the blackberries they were later in blooming and ripening than the normal.

Belle de St. Giles. Bush spreading, medium vigor, healthy and hardy, but rather a shy bearer; bunch long and compact; berry red, large 1-2 inch in diameter; sub-acid of fine quality; season, medium, July 10th to Aug. 5th. A large showy, but unproductive currant, yield per bush 3 lbs.

Black Victoria. Bush a light grower, spreading, healthy, hardy and productive; berry large, 1-2 inch, firm, sweet, of excellent quality; season medium, July 15th to Aug. 10th. Yield 5 lbs. A good commercial variety.

Brayley's Seedling. Bush moderately vigorous, upright, healthy, hardy and fairly productive; bunch, long, straggling, loose; berry red, medium size 3-4 inch, very acid; season, medium, July 10th to Aug. 5th. Yield 4 lbs.

Champion. (Origin England.) Bush, upright, vigorous, healthy, hardy and moderately productive; berry very large 5-8 inch, black, somewhat acid; season, late, July 25th to Aug. 15th. Yield 4 lbs.; like Collin's Prolific, it is a very variable cropper from year to year.

Cherry. (Origin Europe.) Bush upright. vigorous, hardy, healthy, and very productive; bunch, short and compact; berry, dark red, firm, large 1-2 inch, acid; season, medium, July 10th to Aug. 5th; yield 6 lbs. per bush. A standard commercial currant of the older types.

Collin's Prolific. Bush an upright, spreading, rampant grower, hardy and variable in yield from year to year; berry large 1-2 to 5-8, firm, acid; season, medium to late, July 20th to Aug. 10th; yield 1902, 3 lbs.

Crandall. Bush somewhat spreading, very strong and vigorous grower, hardy, healthy and productive; berry, variable in size, 3-8 to 3-4 inch, uneven in ripening, bluish-black, sub-acid; season, July 20th to Sept. 1st; yield 5 lbs.

Fay's Prolific. (Origin New York.) Probably a cross between Cherry and Victoria. Bush, spreading, moderate grower, hardy, healthy and fairly productive; bunch, very long, somewhat loose; berry, large to very large, 1-2 to 5 8 inch, red firm, sub-acid; season, medium, July 10th to Aug. 5th; yield 4 lbs.

Lee's Prolific. (Origin England.) Bush spreading, moderately vigorous, healthy, hardy, fairly productive; berry, black, very large, 1-2 to 5-8 inch, sub-acid; season, medium, July 15th to Aug. 10th; yield, 1902, 3 1-2 lbs. per bush. This currant as well as Fay's Prolific requires careful cultivation for the best results.

Naples. (Origin Europe.) Bush spreading, vigorous, hardy, healthy and very productive; berry, large 1-2 inch, black, sub-acid; season, medium, July 15th to Aug. 10th; yield, 4 lbs. One of the old reliable kinds.

New Victoria. Bush spreading, vigorous, hardy and productive; bunch long and loose; berry red, small to medium, 3-8 inch, acid, but agreeable flavor; season, medium, July 10th to Aug. 5th; yield 6 lbs.

North Star. (Origin Minnesota.) Bush medium vigor, upright, hardy, healthy and productive; bunch, medium length, compact; berry, red, medium to large, 3-8 to 1-2 inch, acid, sprightly; season, medium to late, July 15th to Aug. 10th; yield, 1902, 6 lbs. A desirable late currant.

Pomona. Bush spreading, moderate grower, healthy, hardy and productive; bunch, long, compact; berry, red, large, 1-2 inch, sub-acid, excellent quality; season, medium, July 10th to Aug. 5th; yield 6 lbs. A very promising currant.

Prince Albert. Bush moderate grower, spreading, healthy, hardy and productive; leaves, large, deeply cut; bunch, short to medium; berry, small to medium, 3-8 inch, red, very acid; season, late, July 15th to Aug. 10th; yield 5 lbs.

Raby Castle. (Origin Canada.) Bush upright, very vigorous, hardy, healthy, and very productive; bunch, short and compact; berry red, small to

medium, 3-8 inch, firm, acid; season, medium, July 10th to Aug. 5th; yield 6 1-2 lbs. Very productive, but too small for good price.

Red Cross. (Origin New York.) Probably a cross between Cherry and White Grape; bush, spreading, vigorous, hardy, healthy, and productive; bunch, short and compact; berry, small to medium, 3-8 inch, red, firm, sprightly, sub-acid; season, medium, July 15th to Aug. 10th; yield, 5 lbs. Rather small for commercial purposes.

Red Dutch. (Origin Europe.) Bush upright, vigorous, healthy, hardy, and very productive; bunch, medium length, loose; berry, red, small, 1-3 to 3-8, sub-acid, of fine flavor; season early to medium, July 10th to Aug. 5th; yield 8 lbs. Rather too small for profit.

Red Victoria. Bush upright, vigorous, hardy, and very productive; foliage dark geen, deeply cut; bunch, long and loose; berry, large, 1-2 inch, bright red, tenacious, firm, acid; season, medium, July 10th to Aug. 5th; yield 8 lbs. A leading commercial variety.

Saunders. (Origin Ontario.) Bush upright-spreading, vigorous, hardy, healthy and productive; berry, black, large, 1-2 inch, of a good sub-acid flavor; season, medium, July 15th to Aug. 10th; yield 4 lbs. A very promising currant.

Versailles. (Origin France.) Bush spreading; moderately vigorous, healthy, hardy, and fairly productive ; bunch medium length, rather compact ; berry red, medium size, 3-8-inch ; not so acid as the cherry. Season early to medium, July 10-August 5. Yield 4 pounds.

White Grape. (Origin Europe.) Bush spreading; moderately vigorous, productive ; bunch long and loose ; berry white, large, 1-2-inch ; sub-acid ; pleasant flavor. Season medium to late, July 15-August 10. Yield 6 pounds.

White Imperial. Bush fairly vigorous, spreading, hardy, healthy ; moderately productive ; bunch long and loose ; berry white, medium to large, 3 8 to 1-2 inch ; fine quality. Season medium, July 10-August 5. Yield 4 pounds.

Wilder. (Origin New York.) Bush vigorous, hardy, healthy and very productive ; bunch medium length, compact ; berry red, large, 1-2-inch ; sub-acid ; of excellent quality. Season medium, July 10-August 5. Yield 6 pounds. One of the best all-around currants tested.

From past experience here, the following may be omitted from a commercial list : Belle de St. Giles, Raby Castle, Red Cross, Red Dutch, Versailles, and Champion.

NOTES BY A. E. SHERRINGTON (LAKE HURON FRUIT STATION).

The crop of the past season has been quite satisfactory, although Pomona and Versailles were somewhat affected with blight, so much so that the foliage all dropped, but not before the fruit was matured.

Black Victoria. Bush strong and vigorous, hardy ; fruit large ; quality good ; yield 7 ounces ; 3 years old.

Cherry. Bush slow grower, not as vigorous as the Fay's; fruit very large ; quality good ; color red ; yield 62 ounces.

Champion. Bush a strong, vigorous grower ; fruit large, black ; quality good ; yield 87 ounces.

Fay. A strong, vigorous grower; healthy and hardy; fruit very large ; color red ; quality good ; yield 62 ounces. One of the best.

Naples. A strong, vigorous grower, healthy, and hardy ; very productive ; fruit very large ; quality good ; color black ; yield 87 ounces.

North Star. Bush partly vigorous, of spreading habit ; canes small ; fruit small, red ; quality poor.

Pomona. Bush a strong, compact grower ; hardy, but fruit and foliage destroyed by blight.

Prince Albert. A strong, upright grower ; healthy and hardy ; fruit medium; color red; quality fair; yield 89 ounces.

Saunders. Bush vigorous ; strong, hardy ; fruit medium ; color black ; quality very good ; yield 7 ounces.

Versailles. Bush partly vigorous, hardy ; was attacked with blight ; fruit large ; color red ; quality good ; yield 41 ounces.

GOOSEBERRIES.

Notes by Stanley Spillett (Nantyr, Simcoe County).

Pearl and Downing gave a large crop (six quarts to the bush) of fine fruit, which sold readily at five cents per quart.

Twenty-five per cent. of the whole crop of Downing, Pearl, and Red Jacket fell off prematurely. The fruit commenced to fall just as the seed colored to ripen. I was in hopes last season that this falling was largely due to overloading, that the drain on the bush, just at the ripening period, was too great, but I am afraid, after this year's experience, that it is due to an insect.

Champion was fit to use green again fully two weeks earlier than Downing. This variety gave seven quarts to the bush ; it runs small on old wood.

Red Jacket gave four quarts to the bush, of splendid fruit, which sold readily when ripe at six cents per quart. Though not so large as Whitesmith, it is, when ripe, or nearly ripe, the most beautiful gooseberry in my collection. I have to explain that I pruned Red Jacket and Downing very severely, both last fall and this spring, to prevent the fruit falling, which it did not do, as there was not wood enough left for a big crop of fruit. In my opinion this berry has no peer, where the gooseberry is used when ripe, or just when the berry commences to color. At this stage the berry is a pinkish transparent color, very beautiful. After ten years' experience with this variety, I have to say I am digging out everything else, except for experimental purposes, and putting in Red Jacket for market. Downing, Pearl, Champion, and Red Jacket had not a speck of mildew this season, upon either fruit or foliage.

The fruit of the foreign varieties, and their seedlings, was not affected by mildew, but the foliage was so badly mildewed that it all fell off. The mildew made its appearance on the 16th of June, and in two weeks the stems were bare of leaves, so the fruit never ripened properly, and was not fit for use.

Autocrat gave the largest crop of fruit, of the foreign varieties. The berry is very large, but of poor quality.

Large Golden Prolific, Columbia, Whitesmith, Chautauqua, Queen, and Dominion, bore a large crop of fruit, and are very much alike in fruit and bush. All mildewed, as I have described.

Crown Bob, and Keepsake were well loaded with very large berries ; so was Crosby's Seedling, and Lancashire Lad. Crosby's Seedling gave the largest berries this season.

Green Chisel was loaded, but the fruit is poor in quality. All the other pure English varieties, sent to the station in 1896, have gradually died out, till now ; out of six each of 50 varieties, I have, besides Green Chisel, only a dozen small, stunted bushes.

Success is identical with Downing, and Oregon Jumbo with Red Jacket.

Golden Prolific and Keen's Seedling are worthless.

Ontario is a beautiful, large berry, and the bush is very vigorous for a foreign seedling. Yellow Scotch is not up to Whitesmith. Taken all around, I find Whitesmith the best foreign variety. The bush is a good grower.

In conclusion, I desire to give reasons why I consider Pearl and Red Jacket superior to any of the foreign varieties or their seedlings for general planting in this country :

(1) They are more vigorous, and grow lots of wood for renewing, and to stand the winter. (2) They are not affected by the mildew fungus. (3) They are great croppers. (4) They are thin-skinned, and can, therefore, be allowed to get ripe, and the skin is not disagreeable when cooked. (5) They are large enough for all practical purposes, and of the very best quality. The Pearl, for those who prefer a sweet fruit. The Red Jacket is quite tart when ripe, and larger, and looks better in the baskets than the green berry.

To those who have soil and climate favorable to the growth of the foreign varieties, I say, do not send to Britain for plants, but use those already acclimatized, such as Whitesmith. I have found the Old Country plants utterly lacking in vigor. A gentleman three miles south of my place has grown Industry for years, and has yet to see the first speck of mildew, while Industry with me never fails to rot with mildew, so there are places in Ontario favorable for their growth.

Green Chisel has succeeded the best of any variety received here from the Old Land, and yet, after ten years, the bushes are no larger than Pearl at three years from sucker.

Notes by Charles Young (Algoma Fruit Station)

Gooseberries have all done well ; Pearl is, perhaps, the best ; the berries are larger than the Downing, but both are good, and, although the English gooseberry is free from mildew here, the former are to be recommended as best for this district. Nine varieties are under test.

GRAPES.

Notes by M. Pettit (Wentworth Station).

Another season's experience with the grapes planted at this station is still more convincing that not one of the 140 varieties that have been fairly tested here can be as profitably grown as the ordinary kinds that are generally planted for market purposes, such as Champion, Worden, Moore's Diamond, Lindley, Delaware, Niagara, Concord, Wilder (Rogers' No. 4), Requa (Rogers' No. 28), Barry (Rogers' No. 43), Herbert (Rogers' No. 44), Agawam (Rogers' No. 15), and Catawba. This list covers the entire season with very good, hardy, productive varieties, and, I think, there is little, if any, profit in adding more kinds that are not as hardy or productive, and very little, if any, better in flavor or appearance. Campbell's Early might be added ; its chief value, like the Champion, is its earliness, and Vergennes because it is a good, late-keeping winter grape.

To grow grapes of fine sample, and good quality, the first and most important thing is short pruning, to prevent overloading. The next is to apply sulphur about the last week of June or first of July, to prevent mildew, and the next is to allow them to fully ripen before they are picked.

If all grape growers would comply with these conditions, the market for grapes would require one-half more than it does at present, and at higher prices.

NOTES BY CHARLES YOUNG (ALGOMA FRUIT STATION).

Grapes are only to be planted here for amusement ; there is no profit, and but little pleasure, in trying to grow them.

PEACHES.

NOTES BY W. W. HILBORN (SOUTHWESTERN FRUIT STATION).

Peaches have been above an average crop, but, on account of the cold, wet summer, the quality was not up to the usual standard. Monilia was very prevalent, and destroyed a larger percentage than in former years. Even Smock was badly affected, a sort that is not often injured by this disease. All varieties suffered more or less, depending largely on the condition of the weather just previous to and during the ripening period. "Curl leaf" did considerable injury to most varieties that were not sprayed. We had conclusive evidence that early spraying with Bordeaux mixture will, if properly done, prevent "curl leaf." Perhaps no other sort is more susceptible to this disease than Elberta ; a number of trees of this sort were treated, the last week in March, with one thorough spraying, and the foliage was perfect. A few rods away a few trees were left without spraying, and they were badly affected with the disease. The latter consisted of several varieties that usually do not suffer so much as Elberta. One thorough spraying, if done in March, or before the buds swell, is sufficient. Every portion of the tree must be covered with the mixture. The regular formula was used, 4-4-40.

In practice, we find it difficult to spray a tree perfectly at one operation. The wind is usually blowing when the work should be done. To overcome this difficulty, we spray on the windward side ; when the wind changes, spray the other side ; by this method every portion of the tree can be covered perfectly in two operations.

The trees planted since the "freeze-out" have not come into bearing sufficiently to report on varieties. It is becoming more and more evident every season that only the finest varieties should be planted, for, whenever there is a glut in the market, it is found that it affects the small and inferior sorts most. In fact, when such fruit is not wanted at any price, strictly first-class grades will sell at a profit. Good cultivation, systematic pruning, and thinning of the fruit must be followed, if best results are to be obtained. In selecting varieties for the market purposes, the following kinds are among the most valuable, named in their order of ripening: St. John, Bridgen or Garfield, Early Crawford, Fitzgerald, Yellow Rareripe, Engle-Mammoth, New Prolific, Elberta, Late Crawford, and Smock. For localities outside the "peach belt," where hardiness of blossom buds are of prime importance, it would be more safe to plant Crosby, Longhurst, Golden Drop, and Lemon Free.

NOTES BY W. H. DEMPSEY (BAY OF QUINTE FRUIT STATION).

I had this year a nice crop of peaches on a few varieties. Bokhara was heavily loaded. Yellow St. John had a few very large samples, and so had Fitzgerald. Triumph yielded about a basket to the tree.

PEARS.

NOTES BY A. W. PEART (BURLINGTON STATION).

There was very little pear blight this season, but the scab developed to an unusual extent in a few varieties, notably the Duchess. The Flemish Beauty is scarcely ever free from it. There was also a considerable amount of knotty, gnarled fruit, due, probably, to the bite of the curculio.

In a general way, over-cultivation and very severe pruning seem to increase the blight, by inducing a soft, rank growth of young wood. Of varieties, the Bartlett, Clapp's Favorite, Duchess, and Idaho, appear to be most subject to this trouble. Trees have made a good growth, and are in a healthy condition.

Anjou. Planted in 1880. Tree a spreading, strong grower; vigorous, hardy, productive, stocky, and handsome. Fruit large, blunt pyriform; yellowish-green when ripe; fine texture, juicy and melting. Season, November. When picked too green, the fruit shrivels instead of ripening, to a greater degree than most pears. It is also lacking in tenacity. One of the very best export pears, and a profitable orchard variety.

Bartlett. Planted 1880. Tree an upright, moderate grower; hardy, and very productive; somewhat subject to blight; fruit large, obtuse pyriform, buttery, rich. Season, early September. With efficient cold storage, a very profitable export pear, as well as an old standard orchard variety.

Bartlett-Seckel. Planted 1898. Tree a spreading, moderate grower. No fruit yet.

Beurre Bosc. Planted 1896. Tree an upright, vigorous grower; hardy, and productive with age; fruit long pyriform, melting, and rich. Season, early October.

Beurre Gifford. Planted 1896. Tree very spreading, vigorous, hardy, and productive; fruit medium, pyriform, red blush on sunny side; juicy, melting, of fine quality. Season, early August.

Buffum. Planted 1897. A strong, upright grower; fruit small to medium, oblong obovate, slightly russet; sweet, pleasant flavor. Season, September.

Clairgeau. Planted 1896. Tree an upright, moderate grower; fruit large, pyriform, dotted with russet; juicy, sweet and perfumed. Season, November.

Clapp's Favorite. Planted 1889. Tree an upright, very vigorous grower; productive, with a tendency to blight; fruit large to very large; obovate, fine in the grain, juicy and melting. Season, last of August. One of the best early commercial pears.

Dempsey. Planted 1898. Tree an upright, moderate grower. Not fruited.

Dovenne Boussock. Planted 1896. Tree a spreading, moderate grower; fruit large, roundish pyriform, mantled with russet. Season, early September.

Duchess. Planted 1889. Grown here chiefly as a dwarf. Tree upright, only a moderate grower; fruit large to very large, oblong obovate, coarse, thick-skinned, but juicy and excellent. Season, October. One of the best export pears. Should be well cared for when grown as a dwarf.

Easter Beurre. Planted 1897. Tree spreading, very vigorous, and sturdy, branches somewhat straggling; fruit large, roundish ovate, russet dots, very solid and heavy, fine grained, rich, and juicy. Season, winter.

Flemish Beauty. Planted 1880. Tree spreading, vigorous, hardy, and very productive; fruit large, roundish pyriform, mottled with russet; juicy, sweet, rich, but very subject to the scab, and hence almost useless. Season, early September.

Howell. Planted 1896. Tree upright, vigorous, and productive; fruit medium to large, roundish pyriform, juicy and melting; smooth-skinned, and fine in grain. Season, late October and November.

Idaho. Planted 1896. Tree an upright, light grower; subject to blight. No fruit yet.

Josephine de Malines. Planted 1896. Tree spreading, moderate vigor; fruit conical obovate, melting, sweet, fine skin. Season, early winter.

Kieffer. Planted 1899. Tree an upright, strong, very vigorous grower when young, hardy, and very productive ; fruit medium to large, ovate pyriform, slightly coarse ; when fully ripe, melting, very juicy, with a decided quince flavor. Season, late October, November. A valuable export pear, very variable in size, and well adapted to lighter soils.

Lawrence. Planted 1896. Tree a spreading, vigorous grower; fruit medium, obtuse pyriform, yellow, with some russet ; juicy, sweet. Season, early winter.

Lawson. Planted 1896. Tree upright, moderately vigorous. No fruit yet.

Lincoln. Planted 1898. Tree upright, moderately vigorous. Not fruited.

Louise Bonne. Planted 1897. Tree a spreading, moderate grower ; fruit medium to large, long pyriform, greenish-yellow, mantled with brownish red ; melting, rich, vinous. Season, late September, early October.

Osband's Summer. Planted 1897. Tree somewhat spreading, moderately vigorous ; fruit medium, obtuse pyriform. Season, August. Bears early and freely.

Petite Marguerite. Planted 1896. Tree upright, vigorous ; fruit small to medium, obovate, melting, juicy and agreeable. Season, late August.

President Drouard. Planted 1897. Tree a spreading, moderate grower ; fruit medium, pyriform obovate, with collar at stem end. Season, mid-autumn.

Seckel. Planted 1897. Tree spreading, compact top, moderate grower ; fruit small, roundish oval, russet cheek, buttery, rich, aromatic. Season, late September.

Sheldon. Planted 1889. Tree strong, vigorous, upright ; fruit medium, roundish, obovate russet, melting, vinous, sweet. Season, October. A pear of excellent quality, but will not stand export.

Souvenir de Congres. Planted 1896. Tree upright, fairly vigorous; fruit large to very large, shaped something like the Bartlett ; quality good. Season, late August to early September. A large, fine pear.

Sudduth. Planted 1897. Tree spreading, vigorous ; fruit small to medium ovate round, thick in skin ; soft, coarse flesh. Season, October.

Summer Doyenne. Planted 1896. Tree upright, vigorous; fruit small, roundish conical ; melting, sweet. Season, early August.

Tyson. Planted 1897. Tree upright, vigorous, growthy. No fruit yet.

Vermont Beauty. Planted 1896. Tree spreading, vigorous, and shapely in appearance. Not fruited.

Wilder. Planted 1896. Tree upright, vigorous, growthy ; fruit obovate conical, medium size : rich, sweet. Season, middle of August.

Winter Nelis. Planted 1896. Tree a spreading, straggling, light grower ; fruit small to medium, roundish obovate ; russet skin, fine grained ; juicy, very rich and sweet. Season, December.

The French pears planted in 1900 are all growing well. So far they are hardy. Bergamotte, Esperen, Bonne de Malines, Triumphe de Jedoigne, Souvenir de la Salle, Citron Des Carmes, Olivier, and Figue D' Alencon, have made the most wood.

NOTES BY W. H. DEMPSEY (BAY OF QUINTE FRUIT STATION).

Pears have not come into bearing as soon as I expected they would. Kieffer has borne the last two years a bushel to the tree, of medium sized pears. Summer Doyenne, about a peck, very early, of no value here. Duchess precoce, a peck, similar in form to Bartlett, and nearly of the same season, not nearly as good.

Manning's Elizabeth, one peck to the tree, a nice summer pear. Dr. Jules Guyot has fruited every year since the second year after planting; very much like the Bartlett; it would be a profitable pear to grow. Andres des Portes,

one peck to the tree; ripened the middle of August, but rotted at the core before maturity. Lincoln has borne a few small pears for the last two years; ripens in September.

Idaho was top grafted in 1895; has fruited very well for the last three years; ripens in October; is of very good quality; the tree has been healthy so far.

NOTES BY HAROLD JONES (ST. LAWRENCE FRUIT STATION.)

Pears this year are succeeding much better with me than plums. I have had no sunscald, blight, or injury from last winter. The trees have made a strong, vigorous growth, and the wood is well ripened for the coming winter. Th following varieties fruited with me this year :

Bessemianka (Russian). Planted 1897. Tree a strong, spreading grower; blighted some in 1901 ; bloomed profusely ; set a fair crop of fruit ; fruit 2 x 2 1-8 inches ; shape slightly pyriform ; color greenish-yellow ; quality worthless, decaying on tree before ripe ; ripe September 27th.

Bergamot. Planted 1896. Tree fairly vigorous, wide spreading, drooping head ; foliage light green, with a greyish cast ; late bloomer ; sets fruit fairly well; fruit small, 1 1-2 x 1 3-4 inches; shape obovate; color dull yellow; quality medium ; stem is set in shouldered cavity ; ripe about October 5th ; yield about twenty fruits.

Dempsey. Planted in 1896; tree, vigorous grower, upright, healthy, compact head; five fruits only fairly well grown; ripened in October.

Flemish Beauty. Planted in 1896; tree, healthy and vigorous, upright, spreading head: the fruit and foliage are both subject to spot but are easily controlled by from two to three sprayings; fruit, large in size, matured perfectly; ripe about October 15th. This pear is very desirable and will probably grow to greater perfection in both size and quality than any variety I have yet fruited.

Howell. Planted 1896; tree, vigorous grower, upright, spreading head; foliage dark green and healthy; shows some blight, but fairly hardy; yield, ten fruits, well grown.

Kieffer's Hybrid. Tree, a strong, vigorous, healthy, upright grower; early and heavy bearer; fruit, medium to large and of fair quality if picked early in October and allowed to ripen in the dark. This variety is very desirable.

Ritson. Planted 1894; tree, upright, healthy and vigorous grower, slow to come into bearing; fruit, small 2 1-8 x 2 3-8; color, russet; quality, good; ripe October 15th. This is probably a desirable variety.

Winter Pear. (Russian.) Tree, a hardy, vigorous, upright grower; fruit, medium sized and worthless, decaying on the trees before ripening.

NOTES BY W. W. HILBORN (SOUTH WESTERN FRUIT STATION.)

Pears have been a large crop, but so low in price that there was no profit left for the grower. Kieffer produced wonderfully, but the demand was not equal to the supply. They have been sold in some cases at 10 cents to 15 cents per 12-quart basket. We find them very good for canning purposes when well grown and properly ripened. When their value is known for this purpose by the general public, no doubt the demand for them will increase to a considerable extent.

NOTE BY CHARLES YOUNG (ALGOMA FRUIT STATION).

Pears planted in 1899 so far have not proved very satisfactory, although no losses occurred last year, except that two trees were girdled by mice, which

Pears.—Notes by W. L. Huggard, (*East Central Station.*)

Number.	Varieties.	Age.	Vigor. In. of growth.	Vigor. Scale 1-10.	Productiveness. Yield in quarts, per tree.	Productiveness. Scale 1-10.	Season. First and last	Remarks.
	Asperen	5	8	....	2 quarts	Too small	Winter	No good.
	Bartlett	6	28	....	6 "	"	Sept	Fine fruit.
x	Bartlett Seckel	6	25	....	30 samples	Large	Sept. and Oct.	Not equal to Bartlett ; coarse.
	Belle Lucrative	6	20	....	12 quarts	"	Oct. and Nov.	Large fine fruit.
	Comice	5	15	....	8 "	Medium	Fall	A nice, smooth pear, good.
	Clairgeau	5	22	....	3 "	Large	Late fall	A very fine late pear, large.
	Clapp's Favorite	5	30	....	8 "	"	August	A good early pear.
	Dorset	5	20	....	8 "	Medium to large	November	A fine dark pear, good bearer and quality.
	Duchess precoce	5	18	....	12 "	"	October	Very heavy bearer, good and clean.
	Duchess de Bordeaux	5	22	....	3 "	"	November	A good late variety, juicy.
	Dempsey	6	28	....	10 "	Large	Nov. and Dec.	One of the best new sorts.
x	Doyenne D'Ete	6	30	....	18 "	Small	July and Aug	Too small for commercial purposes.
	Dr. Jules Guyot	6	25	....	20 "	Large	Fall	Equal to Bartlett or better
	Easter Beurre	6	20	....	5 "	"	Winter	Only fair quality.
	Fertility	5	18	....	12 "	Small	Fall	A beautiful small pear.
	Goodall	6	18	....	6 "	Large	Oct. to Jan.	A fine profitable pear.
	Garber	5	22	....	12 "	Medium	"	A promising variety.
	Howell	6	24	....	8 "	7	September	A good variety.
	Idaho	6	20	....	14 "	8	November	Good bearer, poor quality.
x	Indian Queen	5	25	....	6 "	4	October	Too small, very smooth, fair quality.
x	Japan Golden Russett	5	30	....	12 "	5	Jan. and June	Fine for ornament but good for little else.
	Koonce	5	28	....	8 "	6	November	Good yielder.
	Krull	5	24	....	10 "	5	"	Much like Keiffer.
	Keiffer	5	35	....	½ bushel	7	Nov. to Dec.	Very heavy bearer, profitable, poor quality.
	Lawson	6	36	....	12 "	6	July and Aug.	Fine showy early pear.
	LaLectier	6	14	....	8 "	5	Oct. and Nov.	Medium quality.
x	Lincoln	5	20	....	5 samples	6	October	Not attractive.
x	Lincoln Coreless	5	18	....	6 "	5	"	Not a showy kind.
x	Madam Hemingway	5	20	....	20 "	4	"	Not encouraging.
x	Petite Marguerite	6	22	....	4 quarts	5	September	Of little account here.
	President Drouard	6	13	....	10 "	6	Jan. and April	A good keeper, of fair quality.
x	P. Barry	5	17	....	3 "	4	Late	A poor variety here.
	Pitmaston Duchess	5	15	....	3 "	5	"	A good quality, small.
	Rutter	5	24	....	12 "	7	Nov. and Dec.	Fine large green pear of good quality.
	Ritson	6	28	....	3 "	5	October	Very hardy and thrifty.
	Seneca	5	20	....	8 "	7	Sept. and Oct.	A promising variety.
	Seckel	5	12	....	4 quarts	2	October	Excellent quality, small.
	Sheldon	5	28	....	10 samples	5	September	Good quality.
x	Tyson	6	20	....	3 "	4	"	Not profitable.
	Wilder	6	20	....	12 quarts	5	August	A hardy variety, good.

Those marked x I would recommend to be top grafted.

were very bad last winter. One small specimen, Kieffer, is all the fruit so far. Flemish Beauty is perhaps to be recommended. The Russians have made a very heavy growth, two years planted, and if the fruit is only fair, are to be recommended.

PLUMS.

Notes by W H. Dempsey (Bay of Quinte Fruit Station).

Plums planted in 1895 have not done much yet; many of them have only shown a few blossoms as yet.

Victoria, only two or three samples this year; fruit large; ripened in September.

Wild Goose, vigorous grower, a dozen small red plums this year; of no value here.

De Soto made good growth, and gave a heavy crop, but not one sample ripened; all rotted. Willard fruited abundantly, but all were lost through rot.

Abundance has not been a very abundant bearer yet; only a few samples. The tree has been killed back each winter until last year. Wickson was killed back each year; only three samples as yet; fair quality. None of the prunes have fruited yet, they have a few weak blooms on each year.

Richard Trotter fruits each year and each alternate year has a good crop; fruit above medium oblong oval; skin a light reddish purple with a thin bloom; flesh, yellow, juicy, sweet, with a pleasant flavor; season, September; I consider this one of the best I have.

Saunders (Hastings Co.) Tree a strong grower, fruits nearly every year, quite abundantly; fruit above medium size, oblong oval; skin clear, yellow with a whitish bloom; flesh yellow, juicy, sprightly; ripens early in August.

Notes by John Mitchell (Georgian Bay Fruit Station).

Japan Plums. Would that these plums had the quality of the Europeans. I could then recommend them without hesitation. Their hardiness is now firmly established, and they are exceedingly strong growers, wonderfully productive, and strikingly handsome and attractive. The following are the best we have in test:

Abundance has borne another heavy crop. Tree a strong and upright grower; fruit, large and very beautiful; color, yellow or amber, overlaid on the sunny side with dots and splashes of red; flesh extremely juicy, with a peculiar, sweet, delicious, mellow flavor; too juicy for a good shipper. Ripe ten days before Lombard.

Burbank, one of the strongest, but the most spreading and sprawling grower on the plantation. It is wonderfully productive, but to produce the finest fruit the tree should be severely thinned. The quality is fairly good, while its attractive color, large size, and good shipping quality, should recommend it as one of the best of the Japans. Ripe a few days after Abundance.

Red June, the earliest plum we have; also the most desirable of the Japanese varieties. Tree, a strong grower, forming a large, well-shaped top, bears the third year and abundantly; fruit, medium to large; color, bright red; conical in shape; quality good. Season about August 1st.

Orient, a very handsome symmetrical grower, and fairly vigorous. Fruit about as large as Burbank, and resembles that variety very much. September.

Chabot, a very strong grower, forming a most beautiful and symmetrical top; bears the third year; fruit about the same size and shape as Red June, but

not quite as conical. Skin amber, and well covered with splashes and markings of red; quite attractive; quality about the best of the Japans. A regular and abundant bearer. Trees six years old average this season 11 twelve-quart baskets each of marketable fruit.

Hales' Japan, a handsome upright tree; fruit, larger than medium; color, cream yellow, well splashed with red and covered with a very beautiful light bloom, making it most attractive; flesh, light yellow, very juicy and agreeable in flavor. A good desert plum. Early September.

Satsuma or Blood, a most remarkable plum. Tree a very strong spreading grower, like Burbank, but not so sprawling; also a great bearer; fruit, if not too heavily loaded, will be large; color a dark maroon red, covered with a light bloom; flesh, blood red, resembling wounded and bleeding flesh; quality very good when fully ripe. Season, middle of September.

Blood No. 4, the same as Satsuma, except that the fruit is uniformly smaller in size.

Wickson. Tree, a slender and very close and upright grower; appears to be rather delicate in foliage; fruit of the largest size, 2 3-8 in. long, 2 in. wide; conical, slightly heavy on one side; suture, distinct; stem stout, 5-8 in. long, set in a narrow, deep cavity; flesh, yellow, slightly coarse, juicy, with a sweet and pleasant flavor; stone almost free, sometimes quite free; quality, almost best; good for desert or cooking. This is, I believe, without doubt the best quality of all the Japans. Should it prove hardy it will be a great acquisition. Season, middle of September.

Hybrid Plums.

Gold. This is one of Mr. Luther Burbank's hybrids, a cross between the wild red and a Japan plum, and it is certainly a most striking combination of the two families. The trunk is gnarled with hollows and bulges, as though the more vigorous Japan nature were trying to overcome the slower growing native. It is moderately vigorous, the leaves and branches showing strongly the characteristics of both parents. It is proving a good bearer of the most handsome, even-sized fruit; to use Mr. Burbank's own words: "Nothing on earth so beautiful or good." It certainly was the most beautiful, both on the tree and in the basket of anything on the grounds this season, and that includes 120 bearing varieties. Fruit, above medium, nearly round; size 1 3-4 in. by 1 3-4 in., often larger; color, a rich golden yellow, lightly but beautifully shaded with red; flesh, yellow, not coarse, juicy, good; stem, slender, 5-8 in. long, set in a wide but not deep cavity; suture, only a line; stone, small, semi-cling. This is a most remarkable new plum. Its record will be noted again.

Notes by A. E. Sherrington (Lake Huron Fruit Station).

Abundnace. Tree, vigorous and hardy; fruit, large; color, reddish purple; quality, good; yield per tree, two baskets, last year ten baskets; date of blooming, May 16th; ripe August 25th; seven years old.

Burbank. Tree, sprawling, vigorous and hardy; fruit, large, one and a half in. by one and three-quarters; color, red, resembles Abundance; quality good; did not fruit this season; yield, last year nine baskets.

Bradshaw. Tree, upright and spreading, hardy and vigorous; fruit, very large, two and a half in. by two; color, purple; quality, good; bloomed, May 16th; ripe, Sept. 10th; yield, two baskets; last year one-half basket; four years old.

Golden Drop. Tree, strong, vigorous and hardy; fruit, two by one and a half inches; quality, medium; color, yellow or light green; bloomed, May 17th;

yield, six baskets; last year two baskets; ripe, September 29th. Six years old.

Duane's Purple. Tree, vigorous and hardy; fruit, large, one and three-quarter in. by one and three-quarters; color, purple; quality, good; bloomed, May 16th; ripe, September 15th; yield, three-quarters of a basket; last year one basket.

Field. Tree, vigorous and hardy; fruit, large, two in. by one and five-eighths; color, purple; quality, good; bloomed, May 17th; ripe, September 8th; yield, three-quarters basket; last year, one-half basket; five years old.

Guii. Tree, vigorous and hardy; fruit, large, one and three-quarter in. by one and a half; color, dark purple; quality, best; bloomed, May 16th; ripe, September 8th; yield, one and three-quarters baskets; last year one and a half baskets.

Grand Duke. Tree, strorg grower, hardy; fruit large, two by one and a half, with heavy bloom; quality, good; a fine shipping plum; bloomed May 16th; ripe, September 29th; yield, three baskets; last year one and a half baskets.

Gold. Tree, poor grower; fruit, small to medium; color, yellow, turning red at maturity; quality poor; bloomed, May 19th; yield, two quarts; last year about the same.

Hale. Tree, vigorous and hardy; fruit, large, one and three-quarters by two inches; quality, good; first class for dessert; color, yellow; bloomed, May 16th; ripe, September 10th; yield, three baskets; last year three baskets.

Hugh's Seedling. Tree, upright grower, hardy and vigorous; fruit medium to large, resembles yellow egg, but quality not so good; bloomed, May 17th; yield, one basket; ripe, October 1st.

Imperial Gage. Tree, forming a compact head, vigorous and hardy; fruit, medium size, one and a quarter in. by one and five-eighths; color, yellow; quality, best; bloomed, May 17th; ripe, September 10th; yield, five and two-thirds baskets; yield last year two baskets; one of the best of the light colored varieties.

Lombard. This is an old and valuable plum, but is being displaced by newer and better sorts, owing to its liability to being attacked by the black knot and plum rot. Tree, vigorous and hardy, inclined to overbear itself, needs thinning to give best results; fruit, medium, size one and a half by one and a half; color, reddish purple; bloomed, May 18th; ripe, September 22nd; yield, two and a half baskets; last year, six and a quarter baskets; seven years old; quality good.

Monarch. Tree, vigorous and hardy, early bearer, and productive; fruit, large, one and three-quarter in. by one and three-quarters; color, purple, with heavy bloom; bloomed, May 16th; ripe, September 29th; yield, four and one-third baskets; last year, two and three-quarter baskets; five years old; quality good.

Moore's Arctic. Tree, is a vigorous grower and hardy, and an early bearer; fruit, medium; color, purple, becoming almost black, when fully ripe; bloomed, May 19th; ripe, September, 4th; yield, six baskets, last year eight and a half baskets.

McLaughlin. Tree, good grower, early and annual bearer; fruit, yellow with reddish dots; quality of the best; medium to large, one and a half by one and a half; bloomed, May 16th; ripe, September 16th; yield, two baskets; a good one.

Pond's Seedling. Tree, an upright grower, vigorous and hardy; fruit, very large; color, reddish purple; bloomed, May 19th; yield, one-quarter basket; last year half a basket; five years old; very subject to rot.

Purple Egg. Tree, a good vigorous grower, hardy; fruit, large; color, purple; quality good; bloomed, May 18th; ripe, September 20th; yield, two and a half baskets; last year two baskets; five years old.

Quackenbos. Tree, vigorous and hardy; fruit, very large, two in. by one and a quarter; color, dark blue; quality very good; bloomed, May 16th; ripe, September 16th; yield, two baskets; last year, one and a half baskets.

Red June. Tree is strong and vigorous grower, hardy and productive; fruit, large, one and three-quarters by one and a half; bloomed, May 10th; ripe, August 20th; yield, small, as we had a heavy frost when in bloom; this is the earliest plum we have and the quality is good.

Spaulding. Tree, vigorous and hardy; fruit, medium; one in. by one and a quarter; color, greenish yellow; quality, good; flavor, very sweet; bloomed, May 16th; ripe. September 6th; yield, five baskets; last year, six baskets.

Shipper's Pride. Tree, upright, strong and vigorous grower; fruit, large, one and a half in. by one and a half; color, purple; quality very good; bloomed, May 19th; ripe, September 17th; yield, two baskets; last year, two baskets; a good shipper.

Satsuma. A strong vigorous grower, hardy; fruit, large, one and three-eighths in. by one and three-eighths; color, very dark; flesh, the color of a blood beet but quality first class for canning; bloomed, May 19th; ripe, September 22nd; yield, seven and three-quarters baskets; last year, two baskets; this is a valuable plum of the Japan variety.

Victoria. Tree, vigorous and hardy; fruit, large, two by one and three-quaters; color, yellowish, turning red or mottled when fully ripe; bloomed, May 17th; ripe, September 8th; yield, two baskets; last year, six baskets; a very fine plum.

Washington. Tree, a good grower, hardy; fruit, large, two in. by two inches; of the best quality; color, yellow; bloomed, May 16th; ripe, September 5th; yield, one basket; last year, 4 baskets.

Wickson. An upright grower, forming a close head, rather tender; fruit very large, two and a quarter by two; quality, fair; yield, one basket.

Yellow Egg. Tree, a good vigorous growth, hardy; large size, two by one and a half; ripe, September 29th; yield, three baskets.

Notes by G. C. Caston (Simcoe Fruit Station).

Plums were a failure, but few varieties produced any fruit. We have from 400 to 500 trees grown to bearing age, comprising most of the commercial sorts. Bradshaw took the lead and produced about one-fourth of a crop. Imperial Gage and Monarch were next in productiveness. All other kinds failed to produce more than a few specimens on a small proportion of the trees. None of the Japan varieties produced a crop.

My experience with plums goes to show that two or three of the Japan varieties suit this section better than any. The European varieties are very uncertain. The most of them are very short lived. They will produce a few good crops and then fail, while twenty miles northwest of here, around the shores of the Georgian Bay, all kinds of plums flourish, better perhaps than in any other part of the Province. I have tested here about forty varieties of European plums, and I would not feel justified in recommending any of them as likely to give profitable results in this section. Of the Japan plums that I have tested I would narrow down to three: Abundance, Burbank and Red June. These, though not up to the European varieties in quality, produce fruit that sells well and seems to suit the taste of most customers for canning purposes. The trees are seemingly quite hardy, and instead of failing like the European varieties, rather seem to improve as they grow older.

I have a small plum, the scions of which I got from Prof. Craig at Ottawa some years ago, under the name of Early Botan. It is top-worked on native stock, and bears heavy crop. It comes in two or three weeks ahead of any other plum. It falls from the tree before quite ripe, but will ripen perfectly after. It is rather small, but has a very small pit. It is covered with a pink bloom; quality first rate with a delightful aroma. It seems to suit this section well, the defect being its small size.

NOTES BY CHARLES YOUNG (ALGOMA FRUIT STATION).

Plums have all done well and made a very satisfactory growth, but for the north and on heavy clay I would most emphatically say plant Japans, they are away ahead of all others. All I have tested, except Wickson, have proved quite hardy, and most of them have fruited. The following are especially to be recommended: Ogon, quality fair; Burbank, quality very good, but a very straggling grower and requires cutting back to keep it in shape; does not make as handsome a tree as the former, but the fruit is better, although not quite as fine in appearance; Willard, quality poor, but very early, habit of growth good, appearance good; Reine Claude, good all round; Lombard, fruited, but not very satisfactory; Moore's Arctic bore a few plums; of the Americana class there is not much to say in favor; they lack toughness of wood which is against them; half the top wil break off with its own weight. All those planted in 1899 have fruited this year, but none of them of good quality; when Japans can be grown so well they are not to be recommended. America is the tenderest plum I have grown; it is killed back every year.

NOTES BY W. W. HILBORN SOUTHWESTERN STATION).

Plums were a failure; but few varieties produced any fruit. We have from 400 to 500 trees grown to bearing age, comprising mostly of the commercial varieties. Bradshaw took the lead, and produced about one-fourth of a crop. Imperial Gage and Monarch were next in productiveness. All other kinds failed to produce more than a few specimens on a small proportion of the trees. Nine of the Japan varieties produced a crop.

NOTES BY HAROLD JONES (ST. LAWRENCE FRUIT STATION).

European plums are not at all satisfactory. There will be very few, if any, that will bear annually and many varieties are entire failures. Of those planted in 1896, Grand Duke, Coe's Violet, Emerald, Muir, and Pond's Seedling are dead, and Yellow Egg, Green Gage, Prince of Wales, Lincoln, Hugh's and Montreal are more or less injured and likely to die. The most healthy trees that I have are Lombard, Guii, Saunders, and Glass Seedling. These so far, are healthy, both in limb and foliage, but bear very little fruit. This year there are no European plums whatever.

The Japanese plums are doing better with me than the European, and all varieties planted are healthy and doing well. The blossom buds were nearly all injured last winter. Some fruit set on the Gold and the Abundance, and I had one plum on the Wickson, which was planted in 1900. The foliage of these trees is freer from fungus attacks and aphis than any of the European varieties, and the later blooming varieties may prove with us more valuable than the European.

So far as tested the American plums will be the ones upon which we shall have to depend as sure croppers. Some of the varieties of this class are of very good quality and have ready sale at fair prices in some of our eastern markets, particularly the later varieties, that come in after the main

crop from the western part of the Province. The season extends from early in August until October.

The following is a list of some of the varieties that fruited this year :

Charles Downing. Planted in 1896. Tree, slow grower with a spreading to drooping head ; foliage very subject to plum pocket and attacks by aphis; shy, late bloomer; sets fruit poorly. This seems to be an undesirable variety.

Col. Wilder (Americana). Planted 1897. Tree moderately vigorous, hardy, wide-spreading head, moderate bearer ; foliage, light green, healthy, subject to attacks by aphis; fruit, size, 1 x 1-16; color, dark red; skin thick; flesh, fibrous and soft; quality, poor to fair; stone, small and cling.

Forest Rose. Planted 1897. Tree, rapid grower, spreading, liable to split and break down with the wind; fruit, in size, color and quality, similar to the Hammer; ripe, October 1st to 5th; yield, one-half twelve-quart baskets per tree.

Hammer (Chickasaw.) Planted 1896. Tree, strong, healthy and vigorous, round compact head, hardy; foliage, dull green, free from shothole fungus, very subject to attacks from aphis ; profuse, early bloomer ; sets fruit well; fruit, size, 1 1-8 x 1 1-8 inches; skin, dull red; covered with whitish dots; tough and thick; quality, fair to good; flesh, tough, sweet and juicy; and skin liable to crack when ripening ; stone small cling ; ripe October 1st to 6th ; yield, two twelve-quart baskets to the tree.

Milton (Chickasaw). Planted 1896. Tree, vigorous grower, hardy, compact spreading head; foliage light green and healthy, sometimes attacked with plum pocket, free from shothole fungus, but subject to attack from aphis; late bloomer; sets fruit well; fruit, 1 1-16 x 1 1-8; color, purplish red, covered with grey specks or dots ; skin, rather tough ; quality poor to medium; flesh yellow and soft; stone, medium cling; ripe, August 25th; yield, one and one-half twelve-quart baskets to the tree.

Weaver. Planted 1896. Tree, rapid grower, sprawling uneven head, not very healthy ; a few limbs dying every year ; early profuse bloomer ; sets very little, if any, fruit. This variety has so far proved of very little value.

Whitaker (Chickasaw). Planted 1896. Tree, a rapid grower, hardy, a wide spreading head; foliage, bright green and glossy; free from shothole and other fungous diseases; late bloomer; fruit 1 1-8 x 1 1-4 inches; skin, thin, tender, bright glossy red; quality, good; flesh, light yellow, tender and juicy; stone, small and semi-cling; ripens rather unevenly from 1st to 10th of September. Yield of two twelve-quart baskets from trees planted in 1897. Of all the varieties of this class, which have fruited, I consider this the best.

RASPBERRIES.

Notes by A. E. Sherrington (Lake Huron Fruit Station).

Yield from the raspberry plantation will be small this season, owing to the new plantation being used for experimental purposes ; besides, some of the varieties did not do well the previous year.

Brandywine. A poor grower ; canes small, has not sufficient vigor to make a profitable variety ; fruit small ; quality very good, soft ; color red ; ripe July 18th ; last picking August 2nd ; yield 7 ounces.

Conrath. Plant strong, vigorous, healthy, hardy ; fruit large and firm : quality good ; color black ; ripe July 22nd ; last picking August 2nd ; yield 18 ounces. One of the best.

Cuthbert. A very strong, vigorous grower ; not as hardy as some, but

is seldom destroyed by the frost ; fruit very large ; color red ; quality best; yield 96 ounces. This is the best medium to late variety grown.

Columbian. Plant strong, vigorous, healthy ; not hardy ; fruit large ; color purple ; quality very good ; yield 272 ounces ; first picking July 26th, last picking August 16th.

Hilborn: Plant vigorous; healthy and hardy; fruit large and firm; quality of the best ; color black ; ripe July 13th ; yield 65 ounces. This is one of the best of the black caps.

Kansas. Partly vigorous, but not as hardy as it ought to be ; fruit large, black ; quality good ; ripe July 22nd ; yield 32 ounces.

Marlboro. Canes strong, but not vigorous enough ; healthy and hardy ; fruit large and firm ; quality fair ; ripe July 18th ; yield 41 ounces.

Older. Not as vigorous as it might be, and the canes are weak and of a trailing habit ; fruit large ; quality good ; ripe July 22nd ; yield 9 ounces.

Phoenix. Plant fairly vigorous; healthy and hardy; fruit large, red; quality good; yield 51 ounces; a very good, late variety.

Pioneer. Plant fairly vigorous, half hardy ; fruit medium ; color black ; quality good ; yield 22 ounces ; ripe July 22nd.

Golden Queen. Canes strong, vigorous and hardy ; fruit large ; quality good ; ripe July 18th ; yield 40 ounces. The best light variety.

Reliance. Plant fairly vigorous, healthy and hardy : fruit small to medium; quality good; ripe July 18th; yield 38 ounces. A good early sort.

Smith's Giant. Plant strong and vigorous, fairly hardy, and healthy ; fruit very large ; quality good ; ripe July 22nd ; yield 71 ounces. A good one.

Shaffer. Plant a vigorous grower, tender ; fruit large ; color purple ; quality good for canning ; ripe July 26th ; yield 25 ounces.

Strawberry Raspberry. This variety is a great success here, and quite a demand has sprung up for it for canning purposes ; plant grows about 18 inches high ; fruit large, bright red ; quality very poor, except when canned ; ripe July 5th ; yield 249 ounces from a plot of three by ten feet.

Tyler. Plant fairly vigorous, not hardy ; fruit medium ; quality good ; ripe July 18th ; yield 19 ounces.

Turner, Reliance and Marlboro are the three best early red raspberries ; the Cuthbert and Phoenix are the two best medium to late; Hilborn, Conrath, and Smith's Giant are the three best black caps.

Notes by Charles Young (Algoma Fruit Station).

Raspberries. I would recommend Loudon; the fruit is no better, nor is the plant a heavier bearer than Cuthbert, but the latter freezes back considerably every year. I know of no better berry than Loudon. The Black Caps are not desirable here ; the heavy weight of snow melting in spring breaks them off at the ground. Mice also have a fondness for the bark of the Black Caps in winter.

Notes by G. C. Caston (Simcoe Fruit Station).

In raspberries, the Cuthbert, notwithstanding its liability to kill back at the tips during winter, in a good season leads all others in quantity and quality. I have almost entirely discarded Black Caps. There is only a very limited demand for them, and it does not pay to grow them.

STRAWBERRIES.

NOTES BY E. B. STEVENSON (STRAWBERRY STATION).

I will now proceed to give a short description of each variety that fruited with me :

Aroma (perfect blossom). Strong, healthy plant. One of the good late ones.

Annie Laurie (perfect). One of the best for quality ; not productive enough for market grower ; plant strong, and healthy.

August Luther (perfect). Healthy ; plant small, good runner, productive; a good early kind ; a day or so behind Michel this season; last season ripened first.

Blonde. Plant medium size ; good grower, makes wide row ; good cropper ; berries stand up above the foliage ; shape somewhat like Nick Ohmer ; plant rusts some.

Bobolink. The plant fails; not many berries, and not desirable.

Bubach No. 5 (imperfect). An old stand-by ; hard to beat for large, fine berries, and lots of them. Valuable for near market.

Bismarck (perfect). Plant healthy like its parent, the Bubach ; good grower ; berry round and large ; bright, glossy, with yellow seeds. A very good kind.

Brandywine (perfect). Rampant grower ; well known now. One of the best medium to late.

Bederwood (perfect). A good early ; grown altogher for early by some ; very productive; plant in some places rusts somewhat. A good one.

Clyde (perfect). Plant large, strong, and vigorous ; makes good row ; berry large and fairly firm ; plant very productive. One of most profitable for near market.

Challenge (perfect). Plant is healthy ; large, and strong grower, making plants freely ; the berry is large, sometimes cleft at end ; the color glossy red ; quite dark when fully ripe ; shape somewhat like the old Parker Earle, only it is flattened ; it has quite a neck and is round at the end ; the quality is the best. I should say it would prove to be a good one.

Carmi Beauty. Plant strong, vigorous grower, good plant maker, healthy, and quite productive ; berry medium sized ; somewhat irregular, does not ripen evenly, but good flavor ; roundish in shape.

Corsican (perfect). Plant very large, strong and healthy, fairly good runner ; quite productive ; it resembles the New York and Uncle Jim very much, somewhat like the Woolverton ; berry very large, good quality.

Cobden Queen (perfect). Strong flower, healthy, makes lots of plants ; light color ; leaves curl like the Greenville ; quite productive ; berry medium in size, good color, good quality, firm ; seeds prominent ; late ; worth a trial.

Downing's Bride (imperfect). A good, healthy grower, free plant maker. This variety did not do as well as usual.

Earliest (perfect). This resembles Michel so closely that I am not able to distinguish between them.

Excelsior (perfect). A good plant maker, and fairly productive for an early kind ; some grow this altogether for early, and say it is the best ; worth trying.

Eleven-fifty-nine p.m. or Midnight. This comes from a cross of Haverland and Parker Earle ; from J. H. Hale, of Connecticut. The plant is a good grower ; some traces of rust ; medium in size ; makes a fair row ; the berry is similar to Parker Earle in shape, but flattened ; color light rose on upper side almost white on under side ; it is very late ; does not color well ;

the flavor is good, but it must be eaten before it is all colored, or it will then be overripe and soft ; quite productive. I do not think it will ever be in favor as a market berry.

Emperor and Empress. Very like each other ; both good, strong plants ; free runners, and very healthy ; quite productive ; both large berries ; good quality ; worth trying. Both did well the past season.

Gibson (perfect). Healthy plant, large and strong ; very productive ; berry large and very dark when ripe ; does not ripen well—that is, the under side does not color well ; good in shape, conical and regular ; firm and of good quality ; shape very like Nick Ohmer ; a very dark red, almost black on upper side, and quite light on under side ; except for this it would be a first-class berry.

Glen Mary (perfect). This variety is now quite widely grown, and is a favorite ; plant strong and healthy ; a good runner and quite productive ; berry very large ribbed and green at tip ; fair quality ; firm, and good shipper.

Greenville (imperfect). A good grower ; plant healthy ; leaves curl up somewhat ; very productive ; a profitable variety to grow.

Haverland (imperfect). Plant strong and healthy ; one of the best ; very productive, in fact, may be taken as a standard of productiveness ; the berry is long, large, bright, glossy, a little light in color, but attractive in the basket ; a good shipper ; about the same season of blooming as the Clyde.

Howard's No. 4. A seedling originated by Mr. Howard of Massachusetts. The plant is strong, healthy and quite a vigorous grower ; quite productive ; the berry is large; one of the largest, true conical; rich dark scarlet in color; the quality is very good ; a new one, of very great promise ; not yet introduced; sent me by Mr. Howard for trial; I have fruited it once; mid-season to late.

Hero (perfect). Plant a strong grower, healthy, little rust ; very dark color ; makes very wide row if allowed to run ; one of the best plant makers ; quite productive ; berry large, bright red color. A good one, well worth a trial.

Honest Charlie. Sent out by Mr. Farmer of New York State ; plant large, strong and healthy ; stools out, makes few runners ; a fine one to grow in the hill system ; quite productive ; berries medium in size ; fine flavor.

Hunn (imperfect). A strong, vigorous grower ; plant large, sometimes rusts a good deal ; quite productive ; late in ripening ; berry large, very dark, red, with dark red seeds ; roundish, firm and fine quality. A good extra late one.

Joe (perfect). One of J. H. Black's pedigree seedlings from New Jersey, sent me for trial ; a very good late variety ; the plant is large, healthy, fine ; bright green leaves, quite free from rust ; the berry is large, somewhat oval in shape, with a neck ; strong fruit stems, holding the fruit well up in the foliage ; the quality is very good ; the plant is quite productive, not so late as Nettie and Robbie, but late; ripens with Gandy. I consider it well worth a trial by those who want late berries. It did very well with me the past season.

Jersey Queen (imperfect). The plant is small, very flat on the ground, a free runner and very healthy ; fairly productive ; very late in ripening its fruit ; a good late variety ; the fruit is large, roundish, light scarlet, with gold seeds ; good quality.

Johnson's Early (perfect). The plant is only medium in size, dark green in color, a fair runner ; the berry is medium in size, bright red in color ; fair quality; almost as early as August Luther and Michel; is highly spoken of in some places, but has not done as well with me. It is worth a trial.

Klondike (perfect). Plant a strong, good grower ; some rust ; making

plenty of runners that take root easily ; quite productive ; berry large, light scarlet ; flesh pink, medium in firmness, somewhat irregular ; yellow seeds ; large to very large, like Clyde ; quite late ; a good late variety.

Lovett (perfect). Plant a strong, healthy grower ; well known ; did not do as well as usual ; berry very like Williams and Saunders ; medium to late in season ; a good market berry. No one can go wrong in planting it ; of the three I like Saunders the best.

Leo (perfect). Healthy plant, good runner and plant maker; many others much better, so I will drop it; some think very highly of the Leo.

Lord Sheffield (perfect). A variety from England, a good early kind; good plant maker, rusts somewhat; quite productive; berry is roundly conical, bright red, large.

Marie (imperfect). From seed of Crescent, fertilized with Cumberland. Plant healthy, fair grower, makes fair row; berry large, round, somewhat irregular, scarlet, yellow seeds, solid; flesh pink, medium in firmness; somewhat sour, but spicy; worth a trial.

Margaret (perfect). Plant is a good, healthy grower, makes plants freely in rich soil, quite productive; berry large and beautiful, well worth growing if given good care.

Miller (perfect). Did well this year; plant very large and strong, healthy, no rust; berry large, conical and ribbed like Glen Mary; firm; bright red. Season medium to late; a good one.

Michel (perfect). So well known that it needs no description; did well when it was not hurt by frost, as all the first bloom was killed.

Monitor (perfect). A seedling of Crescent and Capt. Jack, from Missouri; the plant is small but a rampant grower; dark green in color, foliage glossy; stands dry weather well; the berries are large, roundish and bright scarlet; there are no small berries; the vigor of the plant is such that it is about to mature and ripen its immense crop; the flesh is firm and good flavor; taken altogether, the Monitor is one of the best, if not the best, of the late introdudctions; its season is from early to late; I would recommend it to sell.

Nettie (imperfect). One of Black's pedigree seedlings ; the plant is a very strong grower ; makes wide row ; productive ; the berry is very large and quite irregular, does not color up well ; color pink inside ; medium in firmness ; good quality ; acid ; very late, the latest of all ; will give further trial.

New York (perfect). Plant is large, healthy, strong grower ; makes runners freely ; the berry resembles the Woolverton ; flesh white and pink ; very large in size ; medium in firmness ; good quality ; fairly productive ; mid season.

Nick Ohmer (perfect). A good plant, healthy and vigorous; making a good stand of plants, quite productive; this season it was hurt very much here with the frost, but was uninjured at Guelph; the berry is large, very firm, conical; good quality; a favorite with us here.

Parson's Beauty (perfect). A good one; did very well this season; a beautiful berry of very good flavor; productive; worth trying.

Pride of Cumberland (perfect). This variety suffered somewhat from rust this year; the berry is large and firm and good flavor; plant productive.

Ruby (perfect). This is one of the best this year; very healthy plant; good runner; productive; berry large, conical, good looking, firm and good quality.

Rough Rider (perfect). I have tried this now for several years; am very much disappointed in it; it does not do with me at all; shall let it go.

Smith's Seedling (perfect). Very much resembles Michel's; same season but more productive; a good early.

Saunders (perfect). Did very well this season; one of the best varieties for market growing; is becoming well known.

Seaford (imperfect). Is a good one, but it suffered from frost this year and rusted somewhat; did not do its best.

Senator Dunlap (perfect). The plant is small but deep rooted, a great plant maker, is healthy, very productive; berries large dark crimson, conical in shape, quite firm; a second early in season; will be a good market berry.

Splendid (perfect). Plant vigorous and healthy, making plants freely, quite productive; berry large, roundish, scarlet, firm; a good early market variety.

Sample (imperfect). From Massachusetts. Plant a strong, healthy grower; good runner and quite productive, free from rust; berry is large, conical fairly firm, sometimes has a neck; season middle to late; a good late variety.

Tennessee Prolific (perfect). A good market variety; did well the past season, has always done well since its introduction.

Van Deman (perfect). In some localities the only early variety; does not succeed in some places; did well here the past season.

Wm. Belt (perfect). This is a good one. Plant is strong grower sometimes rusts somewhat; the berry is large, bright red, an attractive berry; it has done well here; fairly firm and of good flavor.

Williams (perfect). Now so well known at it needs no description; did well the past season; mid season; produced some fine berries; it is grown very extensively in the Jordan section.

Woolverton (perfect). A strong healthy plant, vigorous grower, fairly productive; berry very large, conical, mild, pleasant flavor; a fancy sort.

Uncle Jim (perfect). Plant strong, vigorous and healthy; makes plants freely, very productive; berry very large; flesh white and firm, of good quality; ribbed somewhat; has a shoulder, but is large and attractive.

Yant (perfect). Plant healthy, a vigorous grower; berry, large, roundly conical, with neck; dark red; red and yellow seeds; firm and good flavor; large green hull; from one year's fruiting I should judge it a good one.

NOTES BY STANLEY SPILLETT (SOUTH SIMCOE STATION).

Williams strawberry took the lead here again this season; though I got but one picking, for a big flood destroyed the rest. I have Saunders, Sadie, Glen Mary and Clyde this season; and Van Deman, Tennessee Prolific, William Belt, Woolverton, Green's Big Berry, and Michel's Early in addition for next season.

Japan plums, Willard, Abundance, Burbank, and Wickson gave just a few specimens this season, but the trees, of which there are five set, are making a phenomenal growth, and so far have not lost a shoot. I have added Red June.

I have one dozen Dyehouse cherries, five years set, which gave this year a little fruit of fine quality.

My Princess Louise apple received from the Association some years ago, gave a barrel of splendid fruit. Every one who has sampled the fruit declares it superior to the Snow; one thing is certain, the fruit is as red and much larger; as a dessert apple, I think it has few equals.

Spraying was a very difficult matter throughout the early part of the season, owing to the continuous downpour of rain, which not only washed off the Bordeaux mixture, but made it difficult to draw the cart. We had during one spraying a man at each wheel and one pulling.

Map showing relative situations of the Ontario Fruit Experimental Stations.

CATALOGUE

OF THE VALUES OF

THE FRUITS AND FRUIT TREES OF ONTARIO

ALSO SHOWING

THEIR ADAPTABILITY TO THE VARIOUS PARTS OF THE PROVINCE

DESIGNED TO AID PLANTERS IN SELECTING SUITABLE VARIETIES.

SUBJECT TO REVISION.

COMPILED BY THE SECRETARY OF THE FRUIT EXPERIMENT STATIONS

CATALOGUE OF ONTARIO FRUITS.

APPLES.

Key to Quality:
1 Very Poor.
2—3 Poor.
4—5 Fair.
6—7 Good.
8—9 Very Good.
10— First Class.

Key to Market Value:
1—3 4th Rate.
4—6 3rd Rate.
7—8 2nd Rate.
9—10 1st Rate.

Key to Stations:
1 Southwestern.
3 Wentworth.
4 Burlington.
5 Lake Huron.
6 Georgian Bay.
7 Simcoe.
8 East Central.
9 Bay of Quinte.
10 St. Lawrence.
13 The Secretary's Fruit Farm.
14 Algoma.
15 Wabigoon.

Key to Adaptation:
*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Varieties.	Tree.			Fruit.						Adaptation.												
										Southern Stations.					Middle Stations.				Northern Stations.			
	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Quality.	Value for home market.	Value for foreign market.	Season of use.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Archer	9	10	8	L	S.R	7	4	.....	Sept.	....	....	....	....	....	....	....	....	0	....	....	....	....
Andrew Sweet	9	10	7	....	Y	6	6	.....	.....	....	....	....	....	....	....	....	....	0	....	....	....	....
Arabka	9	10	6	L	R	3	4	.....	Jan.-Feb.	....	....	....	....	....	....	....	....	0	....	....	....	....
Adams Pearmain	7	8	8	L	R	10	9	10	Jan.-Feb.	....	....	....	....	....	....	....	....	*	....	....	....	....
Albury	8	10	6	L	Y	8	4	.....	Aug.-Sept	....	....	....	*	....	....	....	....	0	0	....	....	....
Alexander	10	10	8	L	R	7	8	8	Sept.	....	....	*	0	*	0	*	*	*	*	**	*	....
American Golden Russet	8	10	6	.....	.....	.....	7	.....	Jan.-Mar.	....	....	....	*	*	*	*	**	0	*	*	....	....
American Pippin	8	9	6	M	S.R	8	8	8	April-May	....	....	....	....	....	....	....	....	0	....	....	....	....
Atonovka	8	10	7	M	Y	6	6	6	Feb.-Mar.	....	....	....	....	....	....	....	....	0	....	....	....	....
Astrachan	9	10	8	L	R	8	7	.....	August	*	....	....	*	**	0	**	*	0	0	*	*	
Akin	9	10	9	M.L	R	8	9	9	Mar.-Apr.	....	....	....	....	....	....	....	....	**	....	....	....	....
Arabka	8	10	8	L	R	7	8	....	Feb.-Mar.	....	....	....	....	....	....	....	....	*	....	....	....	....
Arnold	8	9	9	L	Y	8	7	....	.....	....	....	....	....	....	....	....	....	0	....	....	....	....
Bailey Sweet	7	8	8	L	R	8	8	....	Dec.-Mar.	....	....	....	....	....	0	....	....	0	....	....	....	....
Baldwin	7	8	9	L	R	8	10	10	Jan.-Mar.	..	....	....	**	*	**	**	*	0	00	*	00	....
Blenheim	10	10	8	L	R	9	9	9	Nov.-Mar.	....	....	....	*	**	*	*	*	*	**	....	....	....
Bonum	8	9	8	M	R	5	8	.....	Dec.-Feb.	....	....	....	....	....	....	....	**	0	....	....	....	....
Barry	9	9	9	M	Y	5	5	.....	Jan.-Mar.	....	....	....	....	....	0	....	....	0	....	....	....	....
Baltimore	10	10	9	L	R	5	8	8	Jan.-Mar.	....	....	....	....	....	....	....	....	*	....	....	....	....
Banks' Gravenstein	10	10	8	L	R	9	9	....	Sept.	....	....	....	....	....	....	....	....	*	....	....	....	....
Blunt	10	10	8	L	R	6	7	.....	Oct.-Nov.	....	....	....	....	....	....	....	....	0	....	....	....	....
Blue Pearmain	8	10	6	.....	.....	8	8	9	Oct.-Feb.	....	....	....	....	0	....	....	*	....	*	....	....	....
Boiken	9	10	10	L	Y	9	9	.....	Jan.-Mar.	....	....	....	....	....	....	....	....	†	....	....	....	....

Beauty of Kent	10	10	9	L	Y	6	7		Sept.-Oct				*	*	0	*	**	0	**				
Ben Davis	8	8	10	L	R	4	9		Mar.-May				*	*	**	**		**	**	*	†		
Benoni	8	9	10	L	Y	10	7		July-Sept						*	*		*					
Benton Co. Beauty	8	9	9	L	R	6	8		Feb.-Mar									*					
Banana	9	9	10	L	Y	10	9		Jan.-Mar									*					
Barcelona Pearmain	9	9	8	M	Y.R	10	7		Mar									0					
Bethel	7	7	5	L	R	6	7		Nov								†						
Bogdanoff	10	10	8	L	Y	6	6		Nov.-Oct									0	†				
Bietigheimer	..	..	..	..	..	..	..												*	*			
Bismarck	7	10	10	L	R.S	7	8		Dec.-Feb						†			†					
Borsdorf	6	9	2	..	..	1	2														0		
Brockville Beauty	10	10	9	M	R	7	6		Aug.-Sept									0	*	0			
Cabashea	10	10	5	L	R	5	6		Oct.-Dec				0	0	*	*	0	0	0				
Canada Red	7	9	8	L	R	6	8		Dec.-Mar					*				0	*				
Canada Reinette	..	..	..	..	..	..	..													*			
Cayuga Red Streak	7	6	8	L	R	6	8	8	Oct.-Dec					*		**	**	0	*				
Canada Baldwin	7	8	8	M	R	8	8		Jan.-Feb					0				†	*				
Carolina Red June	6	7	7	M	R	8	8		Aug									†					
Carlough	8	8	8	L	Y	7	..		Jan.-Mar									0					
Cellini	8	8	8	L	R	6	6		Oct.-Nov									0					
Clayton	7	9	8	L	Y	8												†					
Chenango Strawberry	6	7	8	L	R	8	8		Sept.-Oct				0	*	*	*	0	0	*				
Colvert	8	10	10	L	R	7	7		Oct.-Nov				*	0	*	**	*	0	*				
Cox's Orange Pippin	6	8	9	L	R	10	10	10	Dec.-Jan									*					
Coo's River Beauty	8	9	9	L	R	8	..											†					
Cooper's Market	9	10	9	L	R	7	9	9	Feb.-Mar					0				*					
Cranberry Pippin	9	10	7	L	R	5	9	9	Dec.-Feb					**				*					
Charlamoff	6	10	7	..	..	10	10		Sept												**		
Duchess	9	10	10	L	R.S	8	10		Aug.-Sept					**	*			**			**		
Domine	9	9	9	L	R	8			March									†					
Dora	9	9	10	L	Y	8			Aug.-Sept									0					
Duffey's Seedling	9	10	10	L	R	6			Jan.-March									†					
Early Harvest	9	9	10	L	Y	8			July-Aug				*	0	0	*	*	0	0	**			
Early Joe	8	9	10	M	R	8			Sept									0					
Ella	8	9	10	L	R	8			Sept									0					
English Codling	7	8	9	L	Y	7			Aug.-Sept									0					
Eicke	7	9	9	S	R	7			March-April									0					
Esopus Spitzenburg	8	8	7	L	R	10			Jan.-March				*	*	*	*		*		*			
Fallawater	10	9	6	L	R	5			Jan.-March				0	0	*	*		0	**				
Fall Jenneting	9	9	9	L	Y	5			Sept.-Oct									0					
Fall Pippin	10	10	8	..	..	6	6	6	Oct.-Dec				0	0	0	*	*	0	*				
Fameuse	9	9	10	L	R	10	10	10	Sept.-Dec				0	0	*	**	**	**	*	**			
Fanny	9	9	9	L	R	8			Oct.-Nov									†					
Gano	9	9	10	L	R	6			Feb.-May									**					
Garden Gem	9	9	10	L	R.S	10			Oct.-Nov									*					
Golden Sweet	9	9	10	L	Y	6	1		Aug.-Sept				*	0			0	0					
Grand Sultan	10	10	10	L	Y.S	7	6	6	Aug.-Sept							*		0					
Golden White	10	10	10	L	R	8	8		Sept.-Oct									*					
Gravenstein	10	10	9	L	R	10	10	10	Aug.-Sept				*	**	0	**	*	*	*				
Green Fameuse	9	9	9	M	Y	8												0					

CATALOGUE OF ONTARIO FRUITS.—APPLES.—*Continued.*

Varieties.	Tree.			Fruit.						Adaptation.											
										Southern Stations.					Middle Stations.				Northern Stations			
	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Quality.	Value for home market.	Value for foreign market.	Season of use. With dates.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Gideon	8	8	10	.....	.....	10	10	8	Oct.-Dec	....	....	....	....	....	*	....	....	*	*	**	**	....
Grimes Golden	9	9	9	M	Y	10	.....	.....	Dec.-March	....	....	....	...	0	*	*	*	*	00	...	....	....
Greening	8	9	9	L	S.Y	8	10	10	Jan.-March	....	....	....	**	*	**	**	**	*	**	....	00	....
Gravel Pippin	8	9	8	L	R	7	.....	.....	Nov.-Dec	....	....	....	....	....	....	....	....	*	....	....	....	....
Graice	8	9	8	L	Y	8	.. ..	.....	October	....	....	....	....	....	....	....	....	0	....	....	....	....
Haas	9	10	9	L	R	5	.....	.....	Sept.-Oct	....	....	.	....	0	0	*	**	0	0	0	..	....
Hastings	8	9	9	L	R	8	.....	.....	Jan.-Feb	....	....	....	....	....	....	....	...	0	....	....	....	....
Hawthornden New	8	8	9	L	Y	6	.....	.....	Oct.-Dec	....	....	....	....	...	....	..	...	0	....	....	....	....
Hawthornden Old	8	8	9	L	Y	6	.....	.....	Sept.-Nov	....	....	....	*	....	....	0	...	0	....	....	....	....
Hawthornden Seacliffe	8	10	10	L	Y	7	.....	.....	Sept.-Oct	....	....	. .	....	....	....	....	....	*	....	....	....	....
Hardtimes Pippin	8	10	10	L	R	9	.....	.....	Oct.-Nov	....	....	....	....	....	....	....	....	†	....	....	....	....
Hawley	8	10	6	L	Y	8	..	.....	Sept.-Oct	....	....	....	....	0	....	....	....	0	....	....	....	....
Highland Beauty	8	9	9	L	Y.R	8	....	.....	"	....	....	....	....	....	....	....	....	0	....	....	....	....
Hamilton	8	9	10	L	Y	6	..	.....	"	....	....	....	....	....	....	..	....	0	....	....	....	....
Horn	8	10	10	M	R	7	.....	.....	Dec.-Mar	..	....	....	....	....	....	....	....	*	....	....	....	....
Holland Pippin	8	10	8	L	Y	8	.....	.....	Oct.-Dec	....	....	....	*	....	....	0	*	0	....	....	....	....
Hubbardston's Nonesuch	8	10	9	L	R	8	8	.....	Dec.-Mar	....	....	....	....	*	...	....	0	*	....	....	....	....
Hurlbut	8	10	10	M	R	8	8	.....	Nov.-Feb	....	....	....	....	....	†	....	....	*	*	....	....	....
Hare Pipka	9	10	7	8	R	6	7	.....	Sept	....	....	....	....	....	....	....	....	....	*	....	....	....
Isabella	10	10	5	L	Y	6	.....	.....	Oct.-Dec	...	...	....	....	....	....	....	....	0	....	....	....	....
Isham	8	10	9	L	R	6	... ..	.....	"	....	....	....	....	....	....	....	....	0	....	....	....	....
Ingram	8	10	8	M	R	8	.....	.....	Jan.-Mar	....	....	....	....	....	....	....	....	0	....	....	....	....
Jonathan	8	10	10	M	R	10	10	.....	Dec.-Mar	....	....	....	....	†	....	*	....	0	....	....	....	....
Jefferis	8	9	9	L	R	8	.....	....	Sept.-Oct	....	....	....	....	....	....	....	....	*	....	....	....	....
Jersey Sweet	10	10	10	L	Y	6	.....	.....	Oct.-Dec	....	...	....	....	....	....	....	....	0	....	....	....	....
Kentish Fillbasket	10	10	8	L	R	6	9	.....	Oct.-Nov	....	....	....	....	0	*	*	*	0	*	....	....	....
Keswick Codling	8	8	9	L	Y	6	.....	.....	Sept	....	....	..	....	0	0	...	....	0	....	....	....	....
Kean's Seedling										....	....	....	....	....	....	....	....	....	*	....	....	....
King	10	10	4	L	R	10	10	10	Dec.-Mar	....	....	....	**	**	*	**	*	0	*	....	00	00
Lady	7	9	10	S	R	10	...	.....	"	....	....	....	....	0	....	....	....	0	....	....	....	....
La Rue	10	8	5	L	R	6	8	.....	Sept.-Oct	....	....	....	....	0	....	**	....	0	*	*	*	....
Lawver	8	10	9	L	R	7	8	.....	Jan.-Apr	.. .	....	....	....	....	....	....	....	*	....	....	....	....
Lady Sweet	8	9	8	L	R	7	.....	.....	Jan.-Mar	....	....	...	...	....	....	....	....	*	....	*	....	....
Longfield	8	8	8	M	Y.R	7	.....	.....	Oct.-Dec	...	....	....	....	...	....	....	0	0	....	....	....	....

Lord Burleigh	10	9	9				8	8	Jan.-May									0	0					
Lord Suffield	6	8	9				5	3	Aug.-Sept									0						
Lovell	6	8	9				5	5	Sept						0				*					
Mann	10	10	6	L	G.Y	7	8	9	Feb.-May				0	*	*	*	*	0	*	*	0			
Maiden Blush	9	10	10	L	Y.R	8	8	8	Oct.-Dec					*				0	*					
Margil	6	7	9	M	R	9			Nov.-Jan									0						
Magog Red Streak	8	9	9	L	Y.R	5			Nov.-Dec									0						
Mammoth Black Twig	9	9	9	L	R	7			Dec.-March									*						
McLellan	9	9	7	L	Y	10			Oct.-Nov.									*						
McIntosh Red	9	10	9	L	R	10	10	10	Nov.-Jan					*		*	*	*	**	*	**			
Minkler	9	10	8	L	R	6			Jan.-April								**	+						
Mother	6	7	7	L	R	10			Nov.-Jan						*			+						
Mountain Beet	8	9	8	L	R	7			Sept.-Oct									+						
Mountain Tulip	7	7	8	L	R	6			Sept.-Oct						0			0						
Missouri Pippin	8	9	9	L	R	8			Jan.-March									**						
Munson Sweet	10	10	10	L	Y	7			Sept.-Oct							0		0						
Malinda	8	9	8	M	Y	7			Feb.-March									+						
Milwaukee	10	10	9			7	8		Dec.-March 1st.											*				
Newton Pippin (Green)	8	10	8	L	G	9		10	Feb.-March						0			0						
Northern Spy	10	8	10	L	R	9	9	9	Jan.-March				**	**	**	**		**	**	0	00			
Northfield Beauty	9	9	9	M	R	9			September									0						
Norcaster Spy	8	9	9		R	9			September									0						
Ontario	9	10	10	L	Y R	9			Jan.-March				*	**	**	**	*	**	**	*				
Oldenburg	9	10	10	L	R	9	10	7	Aug.-Sept				*	**	**	**	*	**	**	*	**			
Old Pearmain	8	10	10	S	G	6			Jan.-March									0						
Pewaukee	10	10	8	L	R	8			Jan.-March				*	0	*	0	*	0	**	*				
Parlin's Beauty	8	9	9	L	R	9			Nov.-Dec									*						
Palouse	8	9	8	L	R	8			Oct.-Nov									+						
Peter	8	10	8	L	R	8			Sept.-Oct						+			+		*				
Princess Louise	6	7					8		Dec.-Feb					*			*		*					
Peck's Pleasant	8	9	8	L	Y	8			Nov.-Jan					*				+						
Plumb's Cider	8	9	8	L	R	5			Oct.-Dec				0					0						
Prinyea	8	8	9	L	Y	9			Sept.-Oct									0						
Pioneer	8	9	8	L	Y	7			Nov.-Dec									0						
Primate	8	9	10	L	Y	10			July-Sept									*						
Pomme Gris	8	10	10	S	Rus	10			Oct.-Dec									0						
Pound Sweet	10	10	9	L	Y	7			Dec.-Feb.									0						
Pointed Pipka	8	10	10	L	R	8			Aug.-Sept									*						
Rawle's Janet	6	9	10	S	R	6			Jan.-May									0	**	*				
Rambo	8	9	9	L	R	7			Oct.-Jan				*	0	0	0		0						
Red Russet	8	9	9	M	R	8			Jan.-May									+						
Reinette Verte	9	9	9	L	R	8			Jan. Mar									+						
Rome Beauty	9	8	9	L	R	7			"									*						
Reinette Gris	8	9	9	L	R	9			Nov.-Jan									+						
Ribston	8	9	6	L	R	10			Dec.-Feb				*	*	0	*	*	*						
Rivers Winter Peach	8	9	8	S	R	8			"									0						
Rochelle	9	10	8	L	R	7			Oct.-Dec									0						
Roxbury Russet	8	9	9	L	Rus	7	9	9	Feb.-May				**	**	*	*		*	*					
Saxton	8	9	9	L	R	7			Oct.-Nov									+						
Scotts Winter	9	10	10	S	R	6			Jan.-Feb									+		**	*			

CATALOGUE OF ONTARIO FRUITS.—APPLES.—*Continued.*

Varieties.	Tree.			Fruit.						Adaptation.												
										Southern Stations.					Middle Stations.				Northern Stations.			
	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Quality.	Value for home market.	Value for foreign market.	Season of use.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Scarlet Pippin	9	10	10	.....	.....	10	10	.....	Sept.-Dec	...	....	....	....	....	....	....	....	....	....	**	....	....
Shannon	10	10	10	L	Y	7	..	.....	Nov.-Dec	....	....	....	....	....	....	....	....	†	....	....	....	....
Swaar	8	8	7	.....	.....	.....	8	.....	Dec.-Mar	....	....	....	....	0	....	....	*	0	....	....	....	....
Sops of Wine	8	8	7	L	R	5	.....	.....	Aug.-Sept	....	....	....	....	....	0	0	. .	0	....	..	....	....
Seek-No-Further	8	9	10	M	R	7	.....	.....	Dec.-Mar	....	....	....	*	0	0	...	0	*	*	*	....	....
Stuart's Golden	8	10	10	M	Y	8	.....	.....	Jan.-Mar	....	....	....	....	....	....	....	....	†	....	....	....	....
St. Lawrence	9	10	10	L	R	8	.....	.....	Sept.-Oct	...	....	....	*	0	0	....	....	†	†	....	....	....
Stump	8	9	9	L	R	7	.....	....	.....	....	....	....	....	....	....	....	0	0	....	....	....	....
Stark	10	10	10	L	R	6	.....	.....	Feb.-May	....	....	....	....	*	....	....	....	**	**	....	....	....
Sutton Beauty	8	9	9	L	R	7	....	.....	Dec.-Feb	....	....	....	....	....	*	....	**	**	....	....	....	....
Switzer	10	10	8	L	R	7	.....	.....	Sept	....	....	....	....	....	....	....	....	0	....	....	....	....
Stotts Russet	9	10	7	L	Rus	6	.....	.....	Dec.-Jan	....	....	....	....	....	....	....	....	0	....	....	....	....
Swazie	9	10	10	L	Rus	10	.....	....	Feb.-May	....	....	....	0	**	*	*	*	†	*	....	....	....
Star	9	10	9	L	Y	9	.....	.....	Sept	....	....	..	....	....	..	....	....	†	...	....	....	....
Salome	10	10	8	L	R	9	9	9	Jan.-Mar	....	....	....	....	....	†	....	**	..	....	*	....	....
Sweet Bough	8	7	6	.....	Y	10	7	.....	Sept.-Oct	....	....	....	*	*	†	....	....	....	*	....	....	....
Sour Bough	10	10	9	..	Y	1	2	.. ...	Sept ..	....	....	....	....	....	0	....	....	....	....	....	....	....
Tolman Sweet	10	10	10	L	Y	7	.....	....	Dec.-Apr	....	....	....	*	*	*	†	*	*	**	....	*	....
Trenton	10	10	10	L	R	9	.....	.....	Sept.-Oct	....	....	....	....	....	....	....	....	**	....	....	....	....
Tetofsky	4	8	6	S	Y	5	5	.....	Aug	....	....	....	....	....	*	0	†	....	....	....	....	....
Utters Red	9	10	8	L	R	5	.....	.....	Nov	....	....	....	..	....	*	....	*	0	....	....	....	....
Vermont Sweet	9	10	10	L	Y	6	.....	.....	Nov.-Dec	....	....	....	....	....	....	....	....	0	....	....	....	....
Wagener	8	9	10	L	R	9	.. ...	.....	Nov.-Jan	....	....	....	*	*	0	*	....	*	*	....	....	....
Wellington	8	9	8	L	Y	8	.....	.....	Jan.-Mar	....	....	....	....	....	....	....	....	0	....	....	....	....
Wealthy	9	10	10	L	R	8	.....	.....	Oct.-Nov	....	....	....	*	*	*	*	**	*	**	**	**	....
Western Beauty	9	9	9	L	R	8	.....	... .	Sept.-Oct	....	....	....	....	....	....	....	....	†	....	....	....	....
Walbridge	9	10	9	L	R	8	.....	.....	Dec.-Feb	....	....	....	....	....	....	0	†	0	0	....	....	....
Whinery	9	10	9	M	R	8	.....	.....	Jan.-Mar	....	....	....	....	....	....	....	....	0	....	....	....	....
Walter	9	10	9	L	R	8	.....	....	Nov.-Dec	....	....	....	....	....	....	....	....	†	....	....	....	....
Winesap	8	9	9	M	R	8	.....	.. .	Feb.-May	....	....	....	....	....	....	†	....	0	...	....	....	...
Winter St. Lawrence	9	10	8	L	R	9	.....	.....	Jan.-Mar	....	....	....	....	....	....	....	....	†	....	....	....	....
Wolf River	10	10	9	L	R	7	.....	....	Nov.-Jan	....	....	....	....	....	....	....	†	†	**	*	†	....
Windsor Chief	9	9	6	L	R	7	.....	....	.....	....	....	....	....	....	....	....	....	0	....	....	....	....
White Pippin	8	9	8	L	G.W	7	.....	.....	Feb.-Mar	....	....	....	....	....	....	....	....	0	....	....	....	....

Washington Strawberry	8	9	8	L	R	9			Sept.-Oct									†				
Winter McLellan's Blush	8	9		L	Y	8			Jan.-Mar									†				
Winter Banana	9	9	10	L	Y	9			"									†				
Winter Fameuse	9	9	9	M	R	8			Jan.-Feb									†				
Yellow Bellflower	8	10	9	L	Y	9			Jan.-Mar				0	0	*	0	*	0	*	*		
Yellow Transparent	8	10	9	L	Y	9			July-Aug					**	*	*	*	*	0		**	
York Imperial	8	9	9	L	R	8			Jan.-Mar								*	**				
Yellow Newton Pippin																		*	00			

Varieties.	Tree.			Fruit.						Adaptation.											
										Southern Stations.					Middle Stations.				Northern Stations.			
	Vigor.	Hardiness.	Productiveness.	Size.	Color of skin.	Flavor.	Quality.	Value for market.	Season of use. With dates.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Brusseler Braume	9	10	6	L	D.R	A	8	8	Sept. 1										*			
Bessarabian	9	10	7	L	D.R	A	8	8	" 1										*			
Choisy	6	9	4					5	June					*								
Cleveland	9	8	8					6	"					**								
Coe	10	8	6					6	June-July					0					**			
Dyehouse	9	10	10	M	D.R	A	8	9	July 16					*					**			
Eagle	7	8	4					8	" 1-10					0								
Early Purple	9	9	5					8	June 15-25					*								
Elkhorn	8	8	10					10	July 10-20					**			*					
Elton														*								
English Morello	10	10	10	L	D.R	A	9	10	" 16					**		*	**			**	**	
Eugenie	9	10	7						June					*			**					
Early Richmond	8	10	7											**							**	
Griotte Du Nord	9	10	6	L	D.R	A	9	10						*					*			
Grenner Glas	10	9	8	L	B.R	A	9	9	July 10					*					**			
Geo. Glass	10	9	8	L	B.R	S	10	10	" 12										**			
Hortense														**	*							
Kentish (Late)													*	*	*			*	*			
Knight	7	8	6					9	June 20-30		**			**								
Koslov Morello									July					*								
Late Duke														**	*							
Lutovka	10	10	8	L	B.R	S	10	10	July 12					*					*			
Litham	10	10	9	S	B.R	A	9	9	" 15										*			
Magnifique														*			*					
May Duke	8	9	7						June 15 30					**								
Mazzard	10	10	4						July 1-12					0								
Mezel	10	8	10						" 4-15					**								
Montmorency	6	10	8						" 1-10	**	**	**	*	**	*	**	**		*			
M. Ordinaire														*	**	**						
Napoleon	9	8	10						July 4-12		*			**								
Olivet	8	10	7											**	*							
Orel	8	10	9	L	R	A	9	9	July 15					*					*			
Orel 24	8	9	9	M	B	S	10	10	" 15										**			

Ostheim	5	10	8	...	D.R	S	7	6	July 18.					*										
Philippi															**							*		
Rockport											*			*	*		*							
Russian 207	10	10	9	L	R	A	9	10	July 10											**				
Spanish	10	8	6	Y	S		10	7	" 4-12					**	*									
Tartarian	8	8	7								**			**			*	**		0			*	
Vladimir														0						0				
Windsor	8	10	8											**	*				**					
Wood	7	8	8						June 20-July 4.					**			*			0				
Wragg	8	10	7		D.R	A	4	6	July 22					*	**									

Key to Quality:
1 Very poor.
2—3 Poor.
4—5 Fair.
6—7 Good.
8—9 Very good.
10 First class.

Key to Market Value:
1— 3 4th rate.
4— 6 3rd rate.
7— 8 2nd rate.
9—10 1st rate.

Key to Season:
E—Ear'y.
M—Medium.
L—Late.
Dates of use.

Key to Adaptation:
* Desirable.
** Especially desirable.
† Promising
0 Undesirable.
00 Not hardy.

Key to Stations:
1 Southwestern.
3 Wentworth.
4 Burlington.
5 Lake Huron.
6 Georgian Bay.
7 Simcoe.
8 East Central.
9 Bay of Quinte.
10 St. Lawrence.
13 Secretary's fruit farm.
14 Algoma.
15 Wabigoon.

CATALOGUE OF FRUITS—GRAPES.

Key to Quality:

1 Very Poor.
2— 3 Poor.
4— 5 Fair.
6— 7 Good.
8— 9 Very Good.
10 First Class.

Key to Market Value:

1— 2 4th Rate.
4— 6 3rd Rate.
7— 8 2nd Rate.
9—10 1st Rate.

Key to Adaptation:

*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Key to Stations:

1 Southwestern.
3 Wentworth.
4 Burlington.
5 Lake Huron.
6 Georgian Bay.
7 Simcoe.
8 East Central.
9 Bay of Quinte.
10 St. Lawrence.
13 Secretary's fruit farm.
14 Algoma.
15 Wabigoon.

Tested at Wentworth Experimental Station by M. Pettit, Winona.	Season in use.	Vine.					Fruit.			Adaptation.											
										Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1.10.	Freedom from disease, scale 1-10.	Total value of Vine, max. 40.	Quality, scale 1-10. Dessert.	Value, scale 1-10. Home market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
Adirondac	September	3	2	2	2	9	9	2	11	....	....	....	....	....	....	....	....	....	....	....	....
Agawam (Rog. 15)	Oct.-Nov.	9	9	8	4	30	9	9	18	....	**	....	*	**	....	....	**	....	....	....	....
Alvey (Hagar)	October	7	8	6	8	29	2	2	4	....	..	....	....	....	....	....	....	....	....	....	....
Amber	"	6	6	3	4	19	2	2	4	...	....	....	....	....	....	....	....	....	....	....	....
Amber Queen	Oct.-Nov.	7	6	5	6	24	6	5	11	....	....	....	....	....	....	....	0	....	....	....	....
Aminia	September	6	8	7	7	28	6	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
America	October	8	9	6	7	30	2	.....	.....	....	....	....	....	....	....	....	*	....	....	....	....
August Giant	September	8	8	7	8	31	5	5	10	....	....	....	....	0	....	....	....	....	....	....	....
Bacchus	October	9	9	8	8	34	2	.....	.....	....	....	....	....	0	....	....	....	....	....	....	....
Barry	"	9	9	8	7	33	7	7	14	....	....	....	*	...	....	....	....	....	....	....	....
Berckman's	September	6	6	5	7	24	7	.....	...	....	....	....	....	....	....	....	....	....	....	....	....
Black Delaware	"	4	7	4	7	22	8	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Black Eagle	"	7	5	6	6	24	8	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Black Pearl	"	9	9	9	9	36	2	2	4	....	....	....	....	....	....	....	....	....	....	....	....
Brighton	"	8	10	7	6	31	8	7	15	....	*	....	0	**	*	**	*	....	....	....	....
Brilliant	"	8	8	7	7	30	7	....	.....	....	....	....	....	..	....	....	....	....	....	....	....
Cambridge	October	8	8	8	6	30	8	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Catawba	Oct.-Nov.	8	10	8	5	31	10	.....	.....	....	*	....	0	*	....	....	....	....	....	....	....
Colerain	September	7	7	8	8	30	8	10	20	....	....	....	....	....	....	....	....	....	....	....	....
Concord	Sept.-Oct.	10	10	10	9	39	6	10	16	....	*	....	**	**	**	*	*	....	....	*	*
Cottage	September	6	8	3	8	25	4	4	8	....	....	....	....	....	....	....	....	....	....	....	....
Clinton	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	*	...	0	0	**	0	*	....	....	....	....
Creveling	September	10	10	6	6	32	6	4	10	....	...	....	....	*	....	....	....	....	....	....	....
Croton	"	6	7	6	6	25	8	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Cynthiana	October	7	8	5	6	26	2	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Champion	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	*

Delaware	September	5	8	8	6	27	10	10	20		*		**	**	*	*	**			*	
Diana	October	9	9	7	6	31	6	6	12					*							
Dracut Amber	September	6	9	7	6	28	2	4	6												
Dr. Collier	October	7	8	8	7	30	4														
Duchess	"	6	5	6	8	25	5	6	11					*			0				
Early Ohio	August	7	8	8	8	31	6										**				
Eaton													0								
Eldorado	September	8	8	6	7	29	9	6	15				0								
Empire State	"	7	8	4	7	26	4	4	8		0			*			†				
Eumelan	"	6	7	6	7	26	7	5	12												
Goethe (Rog. 1)	October	9	9	8	8	34	4	7	11					0							
Herbert											**						0				
Jefferson	Oct,-Nov.	4	5	5	7	21	6	6	12												
Janesville														*			**				*
Jessica														*					*		
Lady	September	2	10	2	6	20	8	8	16				*	**							*
Lady Washington	October	9	9	7	5	30	4	4	8		0			0			0				
Lindley (Rog. 9)	September	9	10	8	8	35	9	9	18		**		*	**	*		**				*
Lutie	"	7	8	9	8	32	4														
Marion	October	8	8	7	8	31	2														
Martha	September	4	6	4	6	20	7	4	11								0			*	
Massasoit (Rog. 3)	"	10	9	6	6	31	8	7	15		0		*	*		*				*	
Mills	"	6	8	4	7	28	8							†							
Merrimac											*			*							
Missouri Reisling	October	7	8	7	5	29	4	3	7					0							
Moore's Diamond	September	6	8	6	7	27	7	7	14				*	*		**	**		*		
Moore's Early	"	5	9	4	9	27	7	8	15		*		*	**	**	*	*		*		**
Moyer													**	0			*		*		**
Niagara											**		*	**		**	**		*		*
Noah	October	9	9	10	5	33	2	3	5					0							
Oneida	"	8	7	8	7	30	5														
Perkins	September	8	8	7	7	30	3	5	8					*							
Pocklington	October	5	8	6	8	27	7	6	13		0		*	*		*	*				
Poughkeepsie Red	"	7	6	5	6	24	8							†							
Prentiss	"	6	7	6	6	25	5	5	10												
Rebecca	September	3	4	3	3	13	8	5	13												
Requa (Rog. 28)	"	10	8	8	7	33	8	8	16												
Rockwood	October	7	8	9	6	30	8														
Salem	September	10	8	8	6	32	8	9	17		*		*	**		*	0			**	
Taylor	October	9	9	3	7	28	2	2	4												
Triumph	"	9	9	9	8	35	6							0							
Transparent	"	7	7	7	6	27	6							0							
Ulster Prolific	"	7	8	8	7	30	5							†							
Vergennes	Oct.-Nov.	7	7	6	7	27	6	8	14		**		*	**		*	0				
Victoria	September	7	6	6	7	26	6							*							
Wilder	"	7	9	7	7	30	7	8	15		*		*	**		*					
Woodruff Red		9	9	8	8	34	8							†							
Worden	September	7	10	7	8	32	9	8	17		**		**	**	**	*			*		
Wyoming Red	"	8	8	7	8	31	4	6	10		*		*	†							

CATALOGUE OF ONTARIO FRUITS.—BLACKBERRIES.

Varieties.	Tree.			Fruit.				Southern stations.	
	Vigor.	Hardiness.	Productiveness.	Size.	Quality.	Value for home market.	Season of use. With dates.	No. 4.	No. 13.
Agawam	4	10	8	M	7	8	July 23-Aug. 15	*	*
Ancient Briton	7	9	6	M	7	7	" 21 " 10	0	.....
Child's Tree	7	9	7	S.M	8	6	" 20 " 10	0	.....
Dorchester	9	9	7	L	9	8	" 23 " 12	0	.....
Early Cluster	9	7	6	M	6	7	" 25 " 10	00	.....
Early Harvest	7	7	9	S.M	5	8	" 12 " 1	*	
Early King	7	9	8	S.M	7	8	" 12 " 5	*	.....
Eldorado	8	9	7	M.L	8	8	" 23 " 10	0	.....
Erie	9	10	8	M	8	8	" 23 " 10	*	
Gainor	9	9	8	L	9	9	" 23 " 10	*	.....
Kittatinny	10	9	9	L	10	10	" 25 " 20	*	**
Lovett's Best	8	10	7	S	6	5	" 25 " 15	0	.....
Maxwell	5	7	5	L	8	9	" 20 " 10	00	.....
Minnewaski	8	7	6	M	8	8	" 20 " 10	00	.....
Ohmer	8	9	8	L	8	9	" 23 " 10	†	.....
Snyder	7	10	10	M	8	9	" 18 " 5	*	*
Stone s Hardy	8	10	8	M	9	9	" 23 " 10	†	*
Taylor	9	9	8	M	9	9	" 23 " 10	*	*
Wassachusetts	9	10	6	M	10	7	" 23 " 15	0	.....
Western Triumph	9	10	9	M	8	9	" 23 " 10	*	.....
Wilson's Early	6	9	6	L	8	9	" 20 " 12	0	*
Wilson's Junior	10	9	6	L	8	9	" 20 " 10	0	*

CATALOGUE OF ONTARIO FRUITS—CURRANTS.

Varieties.	Bush.				Fruit.					Southern Stations.	
	Origin.	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Quality.	Value for Home Market.	Season of Use. With Dates.	No. 4.	No. 13.
Belle de St. Giles	.....	7	All hardy thus far.	5	L	R	10	8	July 8—Aug. 1	0	.....
Black Victoria	.....	8		8	L	B	9	9	" 10— " 5	†	.....
Brayley's Seedling	.....	8		9	M	R	6	8	" 10— " 1	†	.....
Champion	Eng.	9		7	L	B	7	8	" 25— " 15	0	.....
Cluny	Europe	8		9	L	R	7	10	" 6—July 31	**	.....
Collin's Prolific	.....	10		9	L	B	8	10	" 20—Aug. 10	†	.....
Crandall	.....	10		7	M-L	B	7		" 15— " 30	.....	.....
Fay's Prolific	N. Y.	7		7	L	R	8	9	" 8— " 1	*	**
Lee's Prolific	.....	8		7	L	B	8	9	" 15— " 10	*	*
Naples	Europe	8		8	L	B	8	10	" 12— " 10	**	.....
New Victoria	.....	8		6	S-M	R	8	8	" 9— " 1	0	.....
North Star	Minn.	8		7	M-L	R	7	9	" 12— " 15	0	.....
Pomona	.....	8		8	L	R	9	10	" 11— " 5	†	.....
Prince Albert	.....	8		.....	S-M	R	6	.....	" 17— " 10	.....	*
Raby Castle	.....	8		10	S-M	R	7	8	" 12— " 5	*	*
Red Cross	.....	7		7	S-M	R	8	6	" 12— " 1	0	.....
Red Dutch	Europe	8		7	S	R	9	6	" 5— " 1	0	.....
Red Victoria	Eng.	8		9	L	R	8	10	" 9— " 1	*	.....
Saunders	Ont.	8		8	L	B	9	10	" 15— " 10	†	.....
Versailles	France	8		7	M	R	8	8	" 7— " 1	0	.....
White Grape	Europe	8		8	L	W	7	7	" 14— " 7	*	0
White Imperial	.....	8		7	L	W	10	8	" 8— " 1	†	.....
Wilder	N. Y.	8		10	L	R	9	10	" 8— " 1	**	...

CATALOGUE OF ONTARIO FRUITS.—PEACHES.

Key to Quality:
1— Very Poor.
2—3 Poor.
4—5 Fair.
6—7 Good.
8—9 Very Good.
10— First Class.

Key to Market Value:
1—3 4th rate.
4—6 3rd rate.
7—8 2nd rate.
9—10 1st rate.

Key to Season:
E—Early.
M—Medium.
L—Late.
Dates of use.

Key to Adaptation:
*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Key to Stations:
1 Southwestern.
3 Wentworth.
4 Burlington.
5 Lake Huron.
6 Georgian Bay.
7 Simcoe.
8 East Central.
9 Bay of Quinte.
10 St. Lawrence.
13 Secretary's fruit farm.
14 Algoma.
15 Wabigoon.

Varieties.	Tree.				Fruit.						Adaptation.											
											Southern Stations.					Middle Stations.				Northern Stations			
	Origin.	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Adhesion to pit.	Value for home market.	Value for foreign market.	Seasons of use. With dates.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Alexander	Ill	9	9	10	6	W	C	3	2	July 22-31	0			*	*							
Amsden	?	9	9	10	6	W	C	3	2	"	0											
American Apricot	?	8	9	8	6	Y	F	5	5	Aug. 1	†											
Barnard Early	Ill	8	9	10	5-6	Y	F	8	5-8	Sept. 1	*				*							
Beer's Smock	N. J.	9	9	8	8-9	Y	F	9	9	Oct. 1	*											
Brunson	Mich.	9	10	10	7	Y	F	9	8	Sept. 15	*											
Brigden	?	8	8	8	8-10	Y	F	10	10	Aug. 10	**				**							
Boyl's Yellow	Mich.	8	9	10	6	Y	F	7	7	" 25	†											
Banner	Ont	10	10	9	8	Y	F	10	9	Oct. 1	*											
Bokara	Asia	8	10	9	2	W	C	0	0	Sept. 25	0											
Carlisle	?	9	9	10	7	W	F	5	5	" 1	†											
Crosby	Mass.	9	10	10	6-8	Y	F	9	8	" 15	*			†	*							
Connecticut	Conn.	8	9	10	7	Y	F	5	4	" 5	0											
Champion	Ill	8	8	7	9-10	W	C	8	6	" 3	†			*	**							
Canada (Ea)	Ont	9	9	10	6	W	C	3	2	July 22	0											
Crane's Yellow	Mich.	9	9	9	8-9	Y	F	10	10	Aug. 15	**											
Dumont	?	8	8	9	4 6	Y	F	6	5	Sept. 8	†											
Elberta	Ga	7	7	8	10	Y	F	10	10	" 12	**			**	**							
Early Rivers	Eng.	8	9	10	7-8	W	S.C	5	4	Aug. 5	†				*							
Early Crawford	N. J.	9	8	8	8-10	Y	F	10	10	" 24	*			*	**							
Early Michigan	Mich.	8	10	10	7	W	F	3	2	" 25	0											
Engle Mammoth	Mich.	9	9	10	6-8	Y	F	10	10	Sept. 8	**											
Fitzgerald	Ont	8	9	10	8-9	Y	F	10	10	" 28	**				*							
Foster	?	8	8	2	9-10	Y	F	9	9	Aug. 30	0				*							
Family Favorite	?	8	8	8	7-9	W	F	7	6	Sept. 15	†											
Globe	Penn.	10	10	1	10	Y	F	5	7	Oct. 1	0											
Garfield	U. S.	8	8	8	8-9	Y	F	10	10	Aug. 20	**				**							
Golden Drop	Mich.	8	10	10	6-7	Y	F	8	8	Sept. 20	**											
Great Western	U. S.	8	10	8	7	W	C	2	1	Oct. 5	0											
Greensboro	?	9	9	10	7-8	W	C	5	5	Aug. 6	†				*							

CATALOGUE OF ONTARIO FRUITS.—PEACHES.—*Continued.*

Varieties.	Tree.				Fruit.						Adaptation.											
											Southern Stations.					Middle Stations.				Northern Stations.			
	Origin.	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Adhesion to pit.	Value for home market.	Value for foreign market.	Seasons of use. With dates.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	No. 15.
Hinman	?	9	9	9	8-9	Y	F	9	9	Sept. 4	†	....	....	....	....	....	....	....	....	....	....	....
Hales Early	Ohio	9	10	10	4 6	W	S	5	3	Aug. 18	0	....	....	....	0	....	....	....	....	....	....	....
Hills Chili	N. Y.	7	10	10	5-8	Y	F	8	7-9	Sept. 12	†	....	....	....	....	....	....	....	....	....	....	....
Horton Rivers	?	8	9	9	7-9	W	C	6	5	Aug. 8	0	....	....	.	....	....	....	....	....	....	....	....
Jacques Rareripe	Mass.	9	9	9	7-8	Y	F	8	8	Sept. 12	*	....	....	....	....	....	....	....	....	....	....	....
Kalamazoo	Mich.	9	10	10	7	Y	F	8	7	" 30	*	....	....	....	*	....	....	....	....	....	....	....
Lee's Choice	Ont	8	9	7	6-8	W	F	5	5	" 25	0	....	....	....	....	....	....	....	....	....	....	....
Lemon Free	Ohio	9	10	10	6-10	Y	F	8	6	" 28	*	....	..	....	....	....	....	....	....	....	....	....
Late Crawford	N. J.	9	9	6	10	Y	F	10	10	" 24	*	....	....	....	*	....	....	....	....	....	....	....
Longhurst	Ont	8	10	10	5-8	Y	F	8	8	" 12	*	....	....	*	*	....	....	....	....	....	....	....
Lewis	Mich.	8	9	9	6	W	F	3	2	Aug. 25	0	....	....	....	....	....	....	....	....	....	....	....
La Grange	?	8	9	7	7-9	W	F	6	5	Oct. 5	†	....	....	....	....	....	....	....	....	....	....	....
Lorentz	?	8	8	5	7	Y	F	7	6	" 18	0	....	....	....	....	....	....	....	....	....	....	....
Marshall's Late	....	9	8	6	7-8	Y	F	8	8	" 6	†	....	....	....	....	....	....	....	....	....	....	....
Mt. Rose	N. J.	8	8	8	7-8	W	F	8	7	Aug. 24	*	....	....	....	*	....	....	....	....	....	....	....
Moore's Favorite	Msss.	8	8	7	7-8	W	F	6	5	Sept. 12	0	....	....	....	....	....	....	....	....	....	....	....
New Prolific	Mich.	8	10	10	7-9	Y	F	10	10	" 6	**	....	....	....	....	....	....	....	....	....	....	....
Namaper	U. S.	8	8	9	10	Y	F	10	10	" 16	**	....	....	....	....	....	....	....	....	....	....	....
Oldmixon Free	U. S.	8	6	4	8-10	W	F	10	8	" 1	*	....	....	....	*	....	....	....	....	....	....	....
Oscar's Black Prince	....	9	9	10	7	W	C	4	3	July 25	†	....	....	....	....	....	....	....	....	....	....	....
Orleans	....	8	8	8	7	Y	F	7	7	Sept. 10	†	....	....	....	....	....	....	....	....	....	....	....
Orange Free	....	8	9	8	5	Y	F	6	5	" 12	0	....	....	....	....	....	....	....	....	....	....	....
Picquett's Late	....	8	8	6	8	Y	F	8	8	Oct 5	†	....	....	....	....	....	....	....	....	....	....	....
Pearce	Ohio	9	9	6	10	Y	F	8	9	Sept. 20	*	....	....	....	....	....	....	....	....	....	....	....
Roser	?	8	9	8	3	W	F	1	1	Oct. 5	0	....	....	....	....	....	....	....	....	....	....	....
Red River	?	9	9	10	7-8	W	S.C	5	4	Aug. 5	*	....	....	....	....	....	....	....	....	....	....	....
Smock Free	N. J.	9	9	6	8-10	Y	F	8	9	Oct. 1	*	....	....	*	**	....	....	....	....	....	....	....
St. John	A. M.	8	8	9	7-8	Y	F	10	9	Aug. 14	**	....	....	....	**	....	....	....	....	....	....	....
Stephen's Rareripe	?	9	9	8	7-8	W	F	6	5	Sept. 20	†	....	....	....	....	....	....	....	....	....	....	....
Snow's Orange	Mich.	7	8	8	5-6	Y	F	5	5	" 3	0	....	....	....	....	....	....	....	....	....	....	....
Stump	N. Y.	8	8	7	6-7	W	F	6	5	" 28	†	....	....	....	....	....	....	....	....	....	....	....
Salway	Eng	9	9	10	7-8	Y	F	8	7-9	Oct. 10	*	....	....	....	....	....	....	....	....	....	....	....
Summer Snow	?	9	9	10	7	W	C	2	1	" 5	0	....	....	....	....	....	....	....	....	....	....	....
Triumph	Mich.	8	9	10	5 8	Y	S.C	7	8	Aug. 9	*	....	....	....	....	....	....	....	....	....	....	....
Wager	N. Y.	8	9	10	5-7	Y	F	5	3-6	Sept. 8	0	....	....	....	0	....	....	....	....	....	....	....
Wonderful	?	9	9	1	10	Y	F	6	3	Oct. 4	0	....	....	....	....	....	....	....	....	....	....	....
Wheatland	N. Y.	8	8	1	8-9	Y	F	4	3	Sept. 1	0	.	....	....	....	....	....	....	....	....	....	....
Yellow Rareripe	U. S.	8	8	6	8-9	Y	F	9	9	" 6	*	....	....	..	....	....	....	....	....	....	....	....

CATALOGUE OF ONTARIO FRUITS.—RASPBERRIES.

Varieties.	Season of use. With dates.	Southern Stations.		Middle Stations.
		No. 4	No. 13.	No. 5.
All Summer	July 8—Oct. 15	0	.....	0
Columbia	" 13—July 28	†	.....	.....
Cuthbert	" 13— " 31	**	**	.....
Golden Queen	" 5— " 20	*	*	.....
Gregg	" 13— " 31	*	*	.....
Hilborn	" 5— " 20	*	*	.....
Japan Wine	" 25—Aug. 10	0	.....	.....
Kansas	" 5—July 20	**	.....	.....
Kenyon	" 12— " 25	0	.....	.....
Lottie	" 10— " 25	0	.....	.....
London	" 13— " 31	*	.....	.....
Lovett	" 10— " 25	0	.....	.....
Marlboro	" 5— " 25	**	**	.....
Miller	" 6— " 25	*	.....	.....
Mills	" 9— " 20	0	.....	.....
Ohio	" 23— " 25	*	.....	.....
Older	" 8— " 25	*	.....	.....
Palmer	" 1— " 20	*	.....	.....
Phoenix	" 11— " 25	0	.....	.....
Progress	" 3— " 20	0	.....	.....
Redfield	" 10— " 20	†	.....	.....
Reliance	" 3— " 31	†	.....	.....
Royal Church	" 13— " 31	0	.....	.....
Shaffer's Colossal	" 10— " 30	*	.....	.....
Smith's Giant	" 13— " 31	*	.....	.....
Souhegan	" 8— " 25	*	.....	.....
Thompson	" 8— " 31	0	.....	.....
Winant	" 10— " 30	0	.....	.....

Varieties.	Tree.			Fruit.			Adaptation.									
							Southern Stations.			Middle Stations.				Northern Stations.		
	Vigor.	Hardiness.	Productiveness.	Quality.	Value for home Market.	Season of use. With dates.	No. 2.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
Ananas d Ete	7	6	7	8	8	Sept.-Oct.							0			
Bartlett	8	8	9	9	10	Sept	**	**	**	**	**	**	**	†	00	00
Bergamot Gansels	6	9	5	8	5	Sept.-Oct										
Bergamot Gansels, late	6	8	8	2	4	Jan.-March										
Belle Lucratlve	7	6	7	8	6	Sept.-Oct.		*		*	*	**	0			
Beurre Antoine	7	7	7		6	Oct.- Dec						**				
Beurre Assomption	7	5	6	6	8	Sept										
Beurre Bosc	8	7	8	9	10	Oct.-Nov	**	**	**	**		†	*	†		
Beurre Bachelier	7	8	8	5	9	Oct.-Nov										
Beurre Baltet Pere	6	6	8	5	6	Nov.-Dec.										
Beurre Clairgeau	6	5	8	5	8	Nov.-Dec.						*				
Beurre d' Amanlis	8	9	9	5	4	Sept.										
Beurre d' Anjou	9	10	4	9	10	Nov.-Dec.	**	**	**	**		†	*	†		
Beurre Diel	7	8	6	8	7	Nov.-Dec.			*			*				
Beurre Hardy	8	8	6	7	7	Oct.			**	*	*	*	*			
Beurre Superfine	8	10	6	8	6	Oct.						*				
Beurre Giffard	7	7	7		9	Aug.										
Brandywine	8	8	5	7	5	Sept.						0				
Buffum	8	7	8	6	5	Sept.-Oct.			*				*	*	†	
Clapp's Favorite	9	7	9	9	9	Sept.	*	**								
Doyenne d' Ete	7	7	8	7	4	July-Aug.							**			
Doyenne Boussock	9	8	7	7	9	Sept.-Oct.										
Duchess de Bordeaux	7	7	6	7	5	Jan.-Mar.										
Duchess Precoce	17	8	10	6	10	Sept.						**	†			
Dorset													†			
Flemish Beauty	10	8	9	8	8	Oct.			*	*	*	0	*			
Goodale	8	9	9	7	8	Oct.				*	*	*	0			
Glout Morceau	5	4	6	5	4	Dec							0			
Graslin	8	6	8	6	7	Oct.-Nov										
Howell	7	7	9	6	8	Oct.					*	*	0			
Idaho	8	7	8	7	5	Oct.					*	*	0			
Josephine de Malines	7	7	8	9	7	Dec.-Feb			*	*		*	*	†		
Keiffer	7	7	10	5	6	Nov.-Dec.			*		*	**	0			
Lawrence	7	7	8	9	7	Nov.-Jan			*			**	0			

Louise Bonne	7	7	9	7	7	Sept.-Oct						*		†			
Lawson												*		†			
Le Conte	9		10	5	5	Oct.			0				0				
Manning's Elizabeth			10	7	4	Nov.-Dec							0	0			
Mount Vernon	8	8	7	4	7	Nov.-Dec			*			*	0				
Margaret									*								
Osband's Summer	6	7	6	7	5	Aug.			*								
P. Barry						Dec.			*								
Petite Marguerite				8	5	Aug.			*								
President Druard	7	9	7		5	Dec.-Jan.						*					
Ritson	9	10	8		6	Oct.-Nov										†	
Rostiezer	8	7	6	9	4	Aug.-Sept			*			**	0				
Sheldon	9	8	7	9	9	Oct.	*	*				*	0	†			
Souvenir de Congres	7	6	7	5	8	Aug.-Sept	0					*	0				
Tyson	10	9	7	8	5	Sept.	*		*		*	*	0				
Seckel	7	9	8	10	7	Sept.-Oct	*	*	*		*	*	0				
Vicar of Wakefield	8	6	8	3	6	Nov.-Feb			0		*	*	0				
Winter Nelis	6	7	8	9	9	Jan.-Dec			*			**		†			

CATALOGUE OF ONTARIO FRUITS.—PLUMS.

Varieties.	Tree.			Fruit.							Adaptation.											
											Southern Stations.					Middle Stations.				Northern Stations.		
	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Adhesion to pit.	Quality.	Value of home market.	Value of foreign market.	Season of use, with dates.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No 8.	No. 9.	No. 7.	No. 10.	No. 14.
Abundance										September		**		*	*	†	*	**		†	†	†
Arch Duke	8	10						10		August		**					**					
Bradshaw	9	8	8							September		**		*	**	*	**	*		†		†
Burbank	10													*	**	†	*			**		
Bleeker's Gage																	*					
Bingham																						
Chabot																						
Coe's Golden Drop	4	8	8					10		Sept-Oct		**		*	*	*	**	*		†		
Columbus	10	8	10					10				*			**		*					
Damson	9	10	10					4				**		*		*	*					
Duane's Purple	9	8	5					7		August		*		*	*		*			†	*	
De Soto																						
Fellemberg												*		*			*	*				
General Hand	10	9	6					10		September		0		0	*	*	0	*		*		
Glass	10	10	9					7		"		*		*			**	*		*		
Goliath	8	7	8					7		August		*										
German Prune	7	7	7					8		Sept.-Oct		**		*		*	**	**		†		

CATALOGUE OF ONTARIO FRUITS.—PLUMS.—*Continued.*

Varieties.	Tree.			Fruit.							Adaptation											
											Southern Stations.					Middle Stations.				Northern Stations.		
	Vigor.	Hardiness.	Productiveness.	Size.	Color.	Adhesion to pit.	Quality.	Value of home market.	Value of foreign market.	Season of use, with dates	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8	No. 9.	No. 7.	No. 10.	No. 14
Grand Duke	....	....	....	....	....	....	....	....	....	....	....	†	....	..	....	†	**	..	....	..	....	....
Guii	10	10	8	....	....	....	....	7	....	August	....	*	..	0	....	....	*	*	....	*	....	....
Howard's Favorite	8	10	8	....	....	....	....	6	....	Sept.-Oct	....	....	....	....	....	..	*	....	....	....	....	....
Huling's Superb	....	..	....	....	....	....	....	....	....	....	....	**	....	....	....	....	*	**	....	*	....	....
Imperial Gage	10	8	9	....	....	....	....	10	....	August	....	**	....	**	**	**	*	**	....	....	....	....
Jefferson	7	6	6	....	....	.. ..	....	10	....	Early Sept	....	*	....	*	*	....	*	....	....	....	....	....
Lawrence's Favorite	10	8	8	....	....	....	....	7	....	August	....	....	....	....	....	....	....	....	....	....	....	....
Lincoln	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lombard	10	0	10	....	....	....	....	8	....	September	....	*	....	**	*	**	*	**	....	**	*	....
McLaughlin	8	7	6	....	....	....	....	9	....	August	....	*	..	....	*	....	*	**	....	....	....	....
Moore's Arctic	7	10	10	....	....	....	....	7	....	Early August	....	*	....	....	0	**	*	*	....	....	....	**
New Goderich	9	9	10	....	....	....	....	8	....	September	....	....	....	....	....	....	*	....	....	....	....	....
Niagara	....	.. ..	....	....	....	....	....	....	....	....	..	**	....	....	....	....	....	....	....	....	....	....
Ouillan's Golden Gage	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....
Orange	9	8	8	....	....	.. ..	....	8	....	August	....	**	....	*	*	....	*	*	....	*	....	....
Prince of Wales	6	7	6	....	....	....	....	10	....	September	....	**	*	*	*	....	*	*	....	†	....	....
Peach	7	6	4	....	.. ..	....	....	8	....	August	....	....	....	....	....	....	....	....	....	....	....	....
Pond's Seedling	10	10	8	....	.. ..	....	....	7	.. ..	Last of Sept	....	....	*	0	*	*	*	**	....	*	†	....
Peter's Yellow Gage	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	*	....	†	....	....
Prince's Yellow Gage	9	10	8	....	....	....	....	6	....	Early August	....	**	....	*	....	....	*	....	....	**	....	....
Purple Egg	..	....	....	....	....	....	....	....	....	....	..	**	*	**	....	....	....	....	....	....	....	....
Quackenbos	10	10	9	..	....	.. ..	....	7	....	September	....	*	....	**	*	....	**	*	..	*	....	....
Reine Claude	10	10	8	....	....	....	....	....	....	Sept.-Oct	**	**	**	**	*	....	**	*	....	....	....	....
Reine Claude Violette	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Red Magnum Bonum	....	....	....	....	....	....	....	....	....	....	....	*	*	....	....	....	....	*	....	....	....	....
Saunders	7	9	10	....	....	....	....	....	8	....	*	*	*	....	....	....	....	....	....	....	....	....
Smith's Orleans	10	10	9	....	....	....	....	....	....	Aug.-Sept	....	*	....	*	....	**	*	*	....	....	....	....
Spaulding	....	....	....	....	.. ..	....	....	....	....	....	....	....	....	....	....	....	....	0	....	....	....	....
St. Catharine	8	8	8	....	....	....	....	....	....	September	....	*	....	....	....	....	....	....	....	....	....	....
Victoria	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	*	*	....	....	....	....
Washington	9	7	8	....	....	....	....	....	....	Aug. Sept	*	**	*	*	*	*	**	**	....	0	....	....
Willard	10	10	10	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....	....	....	....	....
Wild Goose	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wickson	10	10	....	....	....	....	....	....	....	....	*	....	....	*	†	†	....	....	....	†	....	....
Yellow Egg	8	8	6	....	....	....	....	....	....	September	*	*	**	*	*	*	**	**	....	*	*	....
Yellow Gage	6	7	8	....	....	....	....	....	....	August	....	....	....	**	....	*	0	....	....	....	....	....

THIRTY-THIRD ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO

1902.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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1903.

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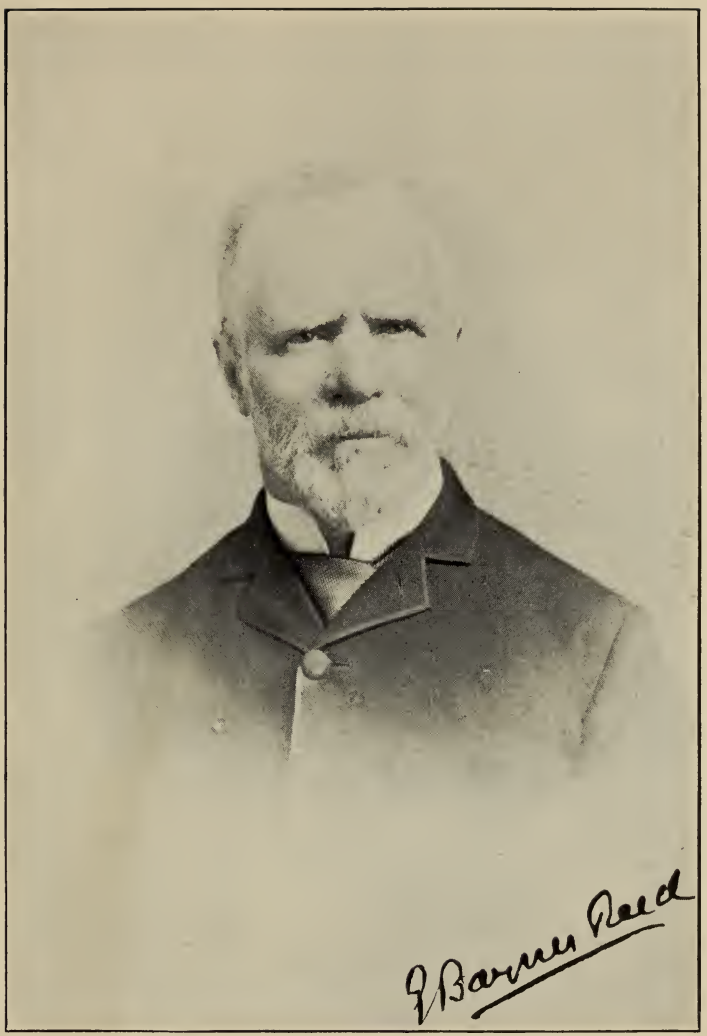
CONTENTS.

William E. Saunders,
Secretary of the Entomological Society of Ontario from 1887.



Edmund Baynes Reed,
An original member of the Entomological Society of Ontario.

THIRTY-THIRD ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY OF ONTARIO

1902.

To the Honorable John Dryden, Minister of Agriculture :

SIR,—I have the honor to present herewith the Thirty-Third Annual Report of the Entomological Society of Ontario.

The Thirty-Ninth Annual Meeting was held in London, on Wednesday and Thursday, October 29th and 30th, 1902. A full account of the proceedings, with the papers read and reports submitted, is given in the following pages. An interesting and important feature of the meeting was a conference on the Pea-Weevil, its injuries to the crop in Ontario and the best means of reducing its ravages.

The *Canadian Entomologist*, the monthly organ of the society, has been regularly issued during the past year, and has now completed its thirty-fourth volume. It continues to maintain its reputation as a scientific magazine of high character.

I have the honor to be, Sir,

Your obedient Servant,

CHARLES J. S. BETHUNE,

Editor.

LONDON, ONTARIO.

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Directors Ex-officio—(Ex-Presidents of the Society)—Professor Wm. Saunders, LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa; W. H. Harrington, F.R.S.C., Ottawa; John Dearness, Normal School, London; Henry H. Lyman, M.A., F.R.G.S., F.E.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Librarian and Curator—J. Alston Moffat, London.

Auditors—W. H. Hamilton and S. B. McCready, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; W. H. Harrington, Ottawa; Professor Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Committee on Field Days—The Chairmen of the Sections and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie and Saunders, London.

Library and Rooms Committee—Messrs Balkwill, Bethune, Bowman, Dearness, Moffat and Saunders, London.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

ANNUAL MEETING.

The thirty-ninth annual meeting of the Entomological Society of Ontario was held in London on Wednesday and Thursday, the 29th and 30th, of October, 1902. The chair was taken by the Rev. Dr. Fyles, of South Quebec, President. Among the members present were Mr. Henry H. Lyman, Montreal; Dr. James Fletcher and Mr. Arthur Gibson, Central Experimental Farm, Ottawa; Mr. Charles H. Young, Hurdman's Bridge, Ont.; Mr. John D. Evans, Trenton; Mr. George E. Fisher, Inspector of Scale Insects, Freeman; Prof. W. Lochhead, Ontario Agricultural College, Guelph; Rev. Dr. Bethune, Dr. Woolverton, Dr. Stevenson, Messrs. J. A. Balkwill, J. H. Bowman, E. A. Browne, J. Dearness, C. J. Fox, C. W. Horton, John Law, J. Alston Moffat, W. E. Saunders, Walter Smith, and other residents of London. The Society was also favoured with the presence of Prof. C. C. James, Deputy Minister of Agriculture for Ontario; Mr. W. L. Smith of the Toronto *Weekly Sun*; Messrs. Thompson and Black of the *Farmers' Advocate*; Mr. Pearce, and other visitors.

Letters expressing regret at their inability to attend were received from Mr. W. Hague Harrington, Ottawa and Mr. E. M. Walker, Director, Toronto; also from Prof. F. M. Webster, Urbana, Illinois.

During the morning of Wednesday, Oct. 29th, a meeting of the Council was held for the transaction of the business of the Society and the preparation of their annual report. It was decided to hold the next annual meeting of the Society in Ottawa in September, 1903. Sheet Cork and Entomological pins were ordered to be sold to members at cost and to others at twenty per cent. advance on cost, and arrangements were made for obtaining a supply of black enamelled steel pins. A resolution was adopted permitting the Ornithological Section to alter its name to "The McIlwraith Ornithological Club (Ornithological Section of the Entomological Society of Ontario)."

In the afternoon the Society met at 2.30 o'clock, the President, Rev. Dr. Fyles, in the chair, and proceeded to discuss the prevalence of the Pea Weevil in Ontario and the best means of controlling its ravages.

THE PEA WEEVIL CONFERENCE.

At the request of the President, Dr. Fletcher, of Ottawa, introduced the subject of the Pea Weevil. The following is a condensed summary of his remarks:

Dr. FLETCHER: Mr. President and Gentlemen. Everyone must have noticed for many years the great reduction which has been gradually taking place in the area of land devoted to the cultivation of Peas. This I find has been almost entirely due to the fact that farmers find that pea growing is not a remunerative occupation, owing to the diminution both in output and the value of the grain due to the attacks of the Pea Weevil. In my own Reports, which reach a considerable number of farmers in the Dominion, I have constantly drawn attention to this injury and the simple means of controlling the insect which causes it, but the loss at the present time is so serious and the pea crop is one of such enormous importance that I feel something more definite than has been done in the past should be done to bring this subject prominently before the country, so as if possible to stir up the pea-growers and seed-dealers throughout the Dominion and in the adjacent United States where peas are grown to join in one great, universal, and co-operative effort. The pea crop is of special value to farmers be-

cause nothing quite takes the place of peas as feed for pigs. This has a direct bearing, not only upon the pork and bacon trade of the country both for home use and export, but also upon the closely associated industry of dairying. Moreover, it seems to me that the problem now befor the country is an exceptionally simple one, and Prof. Lochhead and I have been considering what can be done to change the existing state of affairs. Naturally, in such an important matter we have the keenest sympathy of both the Honourable Sydney Fisher and the Honourable John Dryden, who are most anxious to find out what can be done to protect this important crop. It is for this reason that the Council of the Entomological Society of Ontario have thought it wise to arrange for to-day's conference, so that some steps may be at once taken to arouse interest and also that more energetic measures may be adopted than have been in the past.

The greatest enemy of the pea crop is the Pea Weevil, *Bruchus pisorum*, (Fig. 1), more generally known in trade as the Pea Bug. This insect has been established in Canada as a pest of the pea for a great many years but during the last ten years it has become such a serious enemy that in many of our Ontario districts where peas could be grown some years ago of the very highest quality—of such a high quality indeed that Canadian peas were considered the best that could be produced in all the markets of the world,—farmers have now given up the cultivation of peas altogether, and in many other districts they are now talking of doing the same. Personally, I do not believe that it is necessary to give up the cultivation of peas nor that it would be a wise thing to do so. The crop as I have stated above is one of exceptional value, and I cannot see how this step would be of very much benefit in controlling the insect. It has been suggested—and I may mention that this seems to be the favourite remedy proposed by most people who have written to me,—to stop growing peas for one or two years, and to pass some law by which everyone is prevented from sowing. I do not believe that, if any such legislation were passed, it could possibly be enforced ; for, to be effective, the cultivation of peas would have to be stopped absolutely in every pea field and private garden, both in Canada and the United States. I am quite certain that many would not regard this law and would insist on growing a few green peas for table use, and although every wise gardener who knows how to make the best use of his ground pulls up his vines as soon as his crop of green peas is picked and uses his land for something else, the people who would sow peas in opposition to the law, belong to the class of gardeners who leave their pea vines standing in the garden all through the summer, and upon these a sufficient number of small pods containing weevils would be left to ripen, to destroy the effects of the whole experiment. Many people would openly defy this law and claim that it was absurd, nor would this be much to be wondered at when we see how little informed most of the dealers and pea growers are with regard to the Pea Weevil and the extremely simple means by which this pest can be reduced. Although it is true that many of the large seed merchants have fumigating houses for the treatment of infested peas, many of them, I know as an actual fact, do not use them regularly and one of our large Canadian seed houses even wrote to me that as long as everybody was not forced to fumigate their peas they did not intend to do so, that it was an extra expense and caused trouble with the insurance companies. I believe that instead of legislation the proper course to adopt at the present time, is to provide accurate information with regard to the life history of the insect, the best remedies and the best way to apply them ; then, to distribute this so freely all over the country that everyone interested may at any rate be

Fig. 1.—The Pea Weevil.

reminded at the proper time what steps should be taken, and, not only this, but every other citizen of Canada, whether he knows that he is interested or not, should be made to wonder what all the agitation was about.

If all seed merchants would, for their own sakes, give the recognized remedy of fumigating peas with bisulphide of carbon a trial, and sell no peas for seed which they were not certain had been fumigated, and if all growers of peas would refuse and send back to their seed merchants every sample of peas containing living weevils, I feel sure that evident results would be seen in a single year. The problem is extremely simple, but it requires perfect co-operation. There are, of course, difficulties to be met. but I cannot yet find any of these which cannot be overcome. The amount at stake every year which runs into millions of dollars at any rate, makes it worth while for every member of this Society and for everyone connected officially with any agricultural institution, to make a great effort. The state of public opinion at the present moment seems to point out that this is an opportune time to make this effort. In many districts farmers have already practically given up growing peas. There are also indications that, owing probably to the damp cool season of 1902, a larger proportion than usual of the Weevils are passing this winter inside the seed peas and, consequently, could be easily destroyed by fumigating. The magnitude of the loss is now generally recognized, and farmers throughout the country are in a state of nervous anxiety and ready to listen to and act upon any suggestions which commend themselves to their common sense.

The life-history of the Pea Weevil is briefly as follows : The eggs are laid on the young forming pods by the beetles which have wintered over either in the seed peas or about buildings. As soon as the eggs hatch, the grubs eat their way through the forming pod and attack the pea which is nearest to them. They penetrate this, and soon by the increase in the size of the pea every trace of the hole is obliterated. The grub remains inside the pea until full grown, changing to a pupa in July and attaining the fully developed condition of a beetle before the middle of August. According to the season, a larger or smaller number of the beetles leave the peas in the autumn and pass the winter under heaps of rubbish, or secreted about buildings. I think the normal way for this insect to pass the winter is inside the seed peas. The important points to remember in this discussion and which induced me to say that the problem before us is a simple one, are the following: The Pea Weevil is not a native insect, and therefore has not an extensive range of food plants, in which it could live outside the cultivated pea. That plant, which is an exotic, is the only known food plant of the Pea Weevil and occurs nowhere in this country wild or even in a spontaneous manner. All plants which spring up in the field from accidentally dropped seeds are destroyed by our winters, therefore every seed sown for a crop of peas has at some time been in the hands of the grower or seed merchant, where it could have been treated by the well known remedy of fumigating with bisulphide of carbon, which for this insect is a perfectly practical remedy, and by a practical remedy I mean a remedy which is effectual, is simple so that it can be applied without any danger of error, and is cheap enough to make its application a paying operation. It is claimed by some that the chief difficulty in the way of trusting to fumigation as a main remedy for controlling the Pea Weevil is that a sufficient number of peas are shelled out in the field at harvest time to leave insects enough to emerge and infest the following crop, even if all the seeds were treated. To obviate this difficulty, I have recommended a plan which some have adopted to reap their crop as early as possible, as much on the green side as can be done with safety. It is a well known fact that seeds of all kinds reaped on the green side rather than when they are over-ripe, have a higher germinating power. It is certain that they would shell out in the field less, and, if such seed were fumigated at once, the weevils would be destroyed inside them before they had made a very serious diminution in the bulk of the seed. If there should be difficulties in the way of farmers themselves treating their seed at once, which however they are quite easily able to do,

they should without delay sell to the grain buyers, who knowing the advantage of fumigating early would soon make arrangements, even if they had not these already, to treat the seed so as to get the best sample possible. With regard to those peas which shell out in the field, I cannot see any very great difficulty with these. It is the common practice in the pea growing districts for farmers to turn in hogs after the crop is harvested. These pick up every seed cleanly, and with the assistance of poultry I imagine that few infested peas would be left on the field to carry over the infestation. If thought preferable, these peas could be turned down below the point where the weevils would be able to reach the surface after emerging, by ploughing down the land deeply either in autumn, and of course preferably then, or in spring.

I have here some samples of peas which have been treated at various dates from the end of July until the middle of September. These have been kindly supplied by Mr. W. P. Niles, of Wellington, Ont., a well known seed merchant who deals largely in peas. By examining those fumigated on the 31st July, it is evident that the weevil is at that time very small and that the proportion of the pea which has been destroyed, is much smaller than it is when the peas have been treated only one week later, the grub being at that time not even half grown and only a small amount of the seed being destroyed. From that date on the destruction to the seed is rapid and by the middle of the month of August most of the peas contain full grown larvæ or pupæ. I have here samples of peas grown this year and treated on the 28th August, which contain the fully developed beetles, and it is probable that by the middle of the month in an ordinary year perfect beetles may be found. My recommendation therefore is that farmers should reap early, thresh at once, treat their seed, or sell to others who will, before the middle of August, and never sow a single seed which has not first been fumigated. Talk the matter up whenever an opportunity arises and guard against pooh-poohing the whole matter and saying : "Oh we know all about the Pea Weevil, that's the same as the Pea Bug ;" we have always had that, and thereby arguing by inference that they always will have it.

Now I don't believe that there is any necessity for such a valuable Canadian crop as peas, either to be given up or to be infested by the Pea Weevil. I find from the August 1902 Ontario Crop Bulletin that the acreage this year under peas has been reduced from the area sown last year by 70,000 acres, and the yield by 1,274,000 bushels. This is undoubtedly a very serious loss, because certain districts of Ontario are particularly well suited for the production of this cereal. There is evidence to show that many of these districts specially suited to the cultivation of the pea crop, and where peas of the highest quality used to be grown, cannot now produce paying crops of peas owing to the depredations of the Pea Weevil. There are, however, many districts, as for instance the upper Ottawa country and other northern districts, where paying crops of peas are being or could be grown, and the passing of legislation forbidding the cultivation of peas over the whole province would therefore be a hardship. There is another point which may be referred to. It is frequently claimed by dealers that peas which have been injured by the pea weevil are just as good for seed as perfect seeds. This is manifestly nonsense, but, to be in a position to prove this, I have in several seasons experimented by sowing infested seed and taking careful notes on how many plants grew and what was the vigour of these plants. During the past season I planted several rows of early peas which had been bored by Pea Weevils. The average number of these seeds which grew and produced seed bearing plants was 7. and of these some were weakly. This is rather a lower average than has been obtained in previous years, but it was what the season of 1902 showed. It has been found by many experiments made by botanists at Washington and at Agricultural Colleges that large seeds of plants, as a rule, produce more vigorous plants than small seeds. Much more would this be the case where nature had laid up in a seed a certain amount of food to feed the embryo plantlet in that seed, and subsequently a large proportion even to one-fourth of its bulk was accidentally taken

away, as in the case of peas injured by the weevil. In the many cases where the germ is destroyed by the weevil, of course no growth takes place at all.

This question of controlling the Pea Weevil in Canada is one which concerns everybody. It is not with the large seed merchants and big houses with which most danger lies but with the individual farmer and private individual who grow a few seed peas for their own use and do nothing to destroy the weevils in them before sowing. As I have stated, there are easy remedies which are available for all, such as holding over the seed till the second year, or treat it with coal oil, using one gallon to 20 bushels ; but the best remedy consists in fumigating with bisulphide of carbon, and a farmer who has only five bushels of seed can fumigate this at the expense of a few cents by putting the five bushels in an ordinary coal oil barrel and then placing (either in an open dish on the top or by pouring the liquid straight upon the seed) one ounce of bisulphide for every hundred pounds of seed. A bushel of peas weighs about 60 lbs, therefore the five bushels would require three ounces. The barrel must be closed up tightly and left in an open shed away from other buildings for 48 hours. The bisulphide is a liquid with a very objectionable odour which vaporizes quickly at the ordinary temperature of the atmosphere. The vapour is heavy and quickly runs down through the peas, and, as it is exceedingly deadly to all forms of animal life, every insect in the peas will be killed. The unpleasant odour of the chemical is very soon dissipated when the peas are exposed to the air, and the value of this treatment is that not only are the infesting insects destroyed with certainty but this without injury to the seeds either as to their wholesomeness for food or as to their germinating quality for seed. If it is thought that there is any danger in using such an inflammable material as bisulphide of carbon or there is any hesitancy, as is sometimes the case in using a remedy with which farmers are not familiar, there is always at any rate available the old and well tried remedy of holding over the seed for two years, by bagging the peas immediately after threshing. If this is done with early harvested and threshed peas, not a single weevil can escape, for it has been proved that these cannot eat their way out from a bag of cotton, or even of paper, and all weevils which issue in the bags must die. A very rare instance is on record of a weevil living over in the seed until the second year, but this is such a rare exception that it need not be considered and does not amount to a proportion of one in many hundreds of millions ; indeed is so rare that I do not know of a single instance where it has been authoritatively confirmed.

One of the largest seedsmen in Canada tells me that he has to send to Germany to get his peas grown. And we have competition to-day in the London market. Indian peas shipped from Calcutta are being sold at a few cents cheaper than we can get them to the London market, and they are as good as our best peas ; therefore, our trade is in danger, and it is important that we should wake up at once and save this crop, which I believe can be saved if we will only go about it in the proper way.

Every letter I have received and every seedsman I have consulted, have agreed that public attention should be drawn to this matter. I have correspondents in all parts of the country, and all say it is a most important matter and requires immediate attention. There is no Society that can draw attention to it better than the Entomological Society. The seedsmen I have consulted, are of the opinion that, if the suggestions given above were adopted, a large reduction could be made in a very short time in the increase of this insect.

The acreage of peas is now reduced very low. It will not be increased very much next year, so that we have an opportunity to start now to draw public attention to this matter. Professor Lochhead and I have been corresponding about the subject for a year, and there is no doubt about it that the Federal and Provincial Governments will do all they can to draw public attention to the matter and to help in every possible way to get rid of this pest.

The Grass Pea, which has been suggested as a substitute for the field pea, has not proved as great a success as was hoped. It is not a pea, though it is considered a pea for many purposes,

but it belongs to the Genus *Lathyrus*. The pea is a *Pisum*. *Lathyrus* is another plant altogether, and that is the reason probably why the Grass Pea is free from the attacks of the Pea Weevil. It is a very late maturing pea, and I am sorry to say that those who planted it this year, owing to the late season, were disappointed in its growth, because it is a plant which comes from India ; for that reason this damp moist season did not mature it, and it was not a paying crop. Vines which bore ripe peas in September, had as much of the vine covered with green leaves and flowers, as there was with the ripe peas. In the St. Catharines and Niagara Districts it has been grown to some extent. Most of the seedsmen are not in favor of the Grass Pea. I would not say, "Do not grow it," because, where the Pea Weevil prevents the growth of the proper peas, the Grass Pea forms a substitute which is comparatively valuable. There are difficulties in harvesting it, and the seeds are thought to be very hard, therefore, some farmers do not like it, but that can be overcome by crushing them with machinery.

I shall not take any more time now, but I shall be very much obliged if any one else would give us their ideas, either on what I have said or upon matters which I have left unmentioned. I have letters here from some of the leading seedsmen in Canada, saying they would have liked to be at this meeting, if they could have made arrangments. I am pleased that Professor James is here with us, and that Mr. Smith is here from Toronto, for the *Weekly Sun*, and Mr. Black from the *Farmers' Advocate*.

Prof. LOCHHEAD : Mr. President. The PeaWeevil is one of the greatest enemies of the farmer of Ontario to day. Before coming here I secured from Professor James the difference in the amount of seed grown in the year 1891 and 1902. The crop in Ontario in 1891 was eighteen and one half million bushels ; in 1902 eleven and one half million bushels. That shows a decrease of seven million bushels in ten years ; that itself is sufficient to direct serious attention to the subject.

Dr. FLETCHER : What is the average value of a bushel of peas, Mr. Pearce ?

Mr. PEARCE : It is now about 60c. for field peas.

Dr. FLETCHER : I average it from 70c. to $1.00 taking the common peas and the high class.

Mr. PEARCE · That would be about right for the high class.

Dr. FLETCHER : It is a loss, at any rate, of between $5,000,000 and $7,000,000.

Prof. LOCHHEAD : The pest is known in the northern counties and all along the shore of Lake Ontario. This summer I visited North Grey, and I found that the farmers in that district were seriously disturbed over an enemy that was new to them—so new that they did not know what it was. This was the Pea Weevil. I was travelling through the County on Farmers' Institute work and I gave two lectures a day on the Pea Weevil. This summer I had the pleasure of going up through Manitoulin Island and as far as St. Joseph's Island ; no Pea Weevil exists there, and we saw beautiful crops. I have no doubt that Manitoulin Island is well adapted for pea growing, and I told the people up there that they had a great opportunity of making their island as famous for seed peas as the Jersey people had made theirs for Jersey cattle. If they would keep the Pea Weevil out, they might make it a reserve for growing pea seed. On St. Joseph's Island I found a good illustration of the fact that the Pea Weevil does not exist there. I spent one morning going through pea fields. One farmer told me he had imported some seeds and when they came the bag was literally alive with the Pea Weevil ; however, he sowed the peas but took the precaution to sow about five times the normal amount per acre, and he had a good field of peas, I could not find a single weevil in the whole morning's examination of the growing crop. It showed conclusively that this year, at any rate, the pea weevil does not thrive in St. Joseph's Island.

With regard to the point which Dr. Fletcher emphasized very strongly, that the pea-weevil does not reach its full size when the pea is harvested. I was unable to make an exam-

ination to any great extent, but I asked several farmers who were interested in the Pea Weevil to make an examination. Probably some of you know Mr. Lick of Oshawa, an up-to-date farmer. I asked him what in his opinion was the best time to treat peas and he said that in order to answer this question it is necessary to ascertain at what stage the crop was harvested ; he found that not more than one-half the damage was done until after the crop was harvested, and in many cases not more than a third of the damage was done before the pea reached maturity ; this was true of both the early and late varieties. He found a large percentage of the early crop was "buggy," and these were his conclusions : "Don't sow 'buggy' peas without treating the weevil. Harvest the crops as soon as ripe and thresh at once ; for seed peas fumigate at once ; if for feed, grind the peas up and so kill the weevil."

With regard to the number of weevils that germinate, Dr. Fletcher has given you his results, and you will also find them in his Reports. Mr. Zavitz, of the Ontario Agricultural College, also made experiments some years ago, and found in the case of the large variety of pea such as the Marrowfat, that three-fifths of the peas that had been entered by the weevil did not germinate. In the case of the small variety of peas such as the Golden Vine, he found only 13 per cent germinated.

I do not see any other way of treating the Pea Weevil except the method Dr. Fletcher has described ; I should like, however, to suggest another way by which we may reach the people. There is nothing like an object lesson. While we may do our best through the agricultural papers and reports of all kinds experience has shown that a great many people will not act ; they simply say they will not be bothered, and will grow enough peas for themselves, and not care whether they sell any or not. These are the kind of people we want to influence, as well as the larger growers. We do not know just exactly how far the Pea Weevil will fly ; I do not think they will fly much farther than from one farm to another. Mr. Pearce tells me that down in Elgin, in two sections that were separated by a woods, the Pea Weevils were in one section for many years but did not appear in the other section until they got in through the sowing of weevily seed ; I am of the opinion that the chief way in which the insect is dissem inated is by sowing weevily peas. I would suggest that help be obtained from the Government for a series of experiments. First secure a good man to act as foreman or manager of the whole experiment and let him appoint a corps of assistants. These men he could train himself, and they should be able to fumigate properly, and then I should choose a section of country of two or three townships, and have these sections scattered in different parts of the Province so as to form as many object lessons as possible, a concession or two concessions might be allotted to each man. Every farmer should be interested in the matter and got to provide a pen, or coal-oil barrel, or box, in which to fumigate, the government might provide the material. I would have these men go systematically down the concession at harvest time and see that the peas are threshed immediately, and then fumigate them for the farmers. It might probably be necessary to fumigate twice. The men would not need to stay very long in one place. If the farmer had already prepared the pens, he could fumigate in an hour, and then go on to the next farm, and return and ventilate them after forty-eight hours. I think one man could in that way arrange for the fumigation of three or four concessions, and a couple of men could do a township.

A great many people do not believe in the entire efficiency of this remedy, and if we can get to their farms, and kill all the weevils, we shall soon convince them of its efficiency. This is a simple suggestion and I should like the members to discuss the matter.

Mr. Fisher : We live in Burlington and we formerly grew peas but of late years we have abandoned them altogether. I have always held that the appearance and the disappearance of the Pea Weevil coincided with the change of temperature. If we had a very low temperature during the winter the Pea Weevils were destroyed.

Dr. Fletcher : What is your idea about the Grass Pea taking the place of the peas ?

Mr. Fisher : We grow the Grass Pea somewhat extensively. It is not infested with the bug, and we can grow it without the weevil ; I do not know any reason why it should not be grown. I would very much rather have the ordinary pea because the Grass Pea is a very difficult thing to cut. The vine is hard and wiry and dulls the tools that you use in cutting it, very quickly.

Dr. Fletcher : How does it ripen ?

Mr. Fisher : I do not think there is very much trouble about their ripening. We sow them about the time we sow the other peas. My experience in growing peas has been that the early-sown peas are altogether the best. I sowed a large field once in a snow storm and had a very superior crop. What is your opinion as to a cold winter killing the Pea Weevil ?

Dr. Fletcher : It is supposed that it does to a large extent affect them and that is the reason that the area of destruction has been so limited in Canada. I do not think it will kill them sufficiently to consider it a remedy.

Prof. Lochhead : I tried an experiment some years ago. I exposed some of the weevily peas to a temperature of 20 below zero, and in every case the weevil was killed.

Dr. Fletcher : It was not so with us, at 15 degrees below zero we exposed them in a glass bottle, and thought they were all dead, but in half an hour afterwards they became lively again.

Mr. Fisher : At what time do they mature ?

Dr. Fletcher : If the peas are left in the field too long, there are enough shelled out to carry the weevil over. The weevil matures about the middle of August. Peas fumigated by Mr. Niles of Wellington on the 5th of August had the weevil about half grown. In very early seasons the Pea Weevil has been found during the first half of August. That is a very rare thing. On the 5th of August this year the weevil was only half grown ; on the 15th of August it was more than half grown, and by the end of August the weevil was in a perfect state. Peas left in the field are certaintly a great source of danger ; they should receive special attention either by feeding them off or ploughing them down deeply.

Dr. Fyles : Do you suppose that the weevil leaves the pea on approach of winter ?

Dr. Fletcher : They may do so. A considerable number of them leave the peas in the autumn, and they hibernate around the barn or in the rubbish heaps, and a great many of them are killed during the winter.

Mr. Fisher : It is the practice of some fruit growers to work their orchards up to the middle of July, and then sow peas, and they usually get a crop. Where I live the peas will ripen if sown in the middle of July ; the peas will also gather nitrogen and increase the fertility of the soil to a considerable extent. We also keep hogs there and if we turn a hundred hogs on twenty acres of peas in the middle of July, we find that the hogs do very well in cleaning up the pea crop and the apples that fall. They serve the double purpose of freeing the orchard from pests that infest the fruit, and of making pork.

Dr. Fletcher : That is an excellent practice. There is no doubt that these peas would be practically free from weevil attack when sown so late, but the crop would be reduced by mildew. I should like to ask Mr. Pearce if it is not a general practice here to sow as early as possible ; because if sown late they will be affected with mildew.

Mr. Pearce : Yes, that is the experience with farmers in this section ; late sown peas are subject to mildew, but they are freer from the weevil. A good many of the farmers here sow them on the 24th of May, but the earlier they are sown the better,—the better the sample you get, and the better the yield.

Prof. James, being asked to say a few words on the subject, said : I certainly cannot add anything to what Prof. Lochhead and Dr. Fletcher have told us as to the nature of the trouble,

but I can emphasize what they have said regarding its extent. I think the evil of the Pea Weevil is co-extensive with the crop. I do not mean that it is co-extensive with the possibilities of the crop, yet there are very few sections where the pea is grown where you do not find the weevil. There are sections where the pea can be grown where you probably will not find the weevil for some time. We have been told about Manitoulin and St. Joseph Islands. Their contributions of peas to our general crops are very small, and I think at least ninety per cent. of the peas that are grown to-day are grown in weevil-affected sections. When you get to the remote sections, where peas play an unimportant part, you do not find any weevil, and I may say the finest peas I have seen in this Province came from the Temiskaming section. They were beautiful, perfectly grown peas, and there is no doubt we have, away in the east and up the Ottawa valley, sections where peas can be grown extensively for a time. The trouble is that where the great bulk of our peas are grown we have the weevil to an enormous extent, and if we give up growing peas because the weevil is here, it would mean that we have been beaten. We have never yet been brought to that position, and if we give up the fight of the weevil, we might as well retire practically from Agriculture in this Province. The weevil can be kept in check, and the whole question now is, how are we going to convince the farmers that they ought to help us in checking this evil. This is the problem that is before us, not only in connection with the Pea Weevil, but in connection with very many other things ; to try and prove to the farmers, and a great many others in the Province, that they ought to do certain things in their own interest. On the face of it, it appears to be a very easy matter to say to the farmer, here is a way you can get good seed peas, and then to expect them all to drop into line and do it at once. But that is the greatest difficulty we have to contend with. There is very little use passing a law, that they must do so and so, because you cannot enforce a law unless you have public opinion at the back of it. Something must be done, and something is going to be done, and I hope we shall get here to-day some practical suggestions that will help us to solve this problem. It is certain that both the departments at Ottawa and Toronto will spend what money is necessary to fight this evil, if we can only see some possibility of success ahead.

The pea crop is a unique crop in the Province of Ontario. It is one that we cannot dispense with. It cannot be measured by the number of bushels we produce, because along with it is another great industry, that is the pork and bacon business, which to a great extent depends upon the pea crop ; for to the pea crop and to the dairy industry of this Province we owe to a large extent our success in the pork and bacon industry.

Dr. FLETCHER said that there are large districts still in Ontario where there is no danger from the weevil. Peas have been sown from Newfoundland and Prince Edward Island, and occasionally these peas have, to a very small degree, been infested, but not to any extent. I think that in the case of the San José scale it will spread from its centre. The San José scale started in California, was then introduced in the Eastern States, gradually spreading from its centre, and if it had not been for the active measures adopted by the Ontario Government it would have spread throughout the Province more than it has, and the people of the Dominion ought to recognize what has been done by the Province to save them. They grow magnificent peas in Quebec, and they stopped because the crop fell off. They had been in the habit of specially treating their land to put back what they had taken from it. They stopped this and then their pea crop fell off. Some people connected with the trade find it necessary now to send to Europe to have their seed grown, and we shall lose our trade unless we wake up.

The CHAIRMAN : I think the way to reach the people would be for the Government to issue bulletins.

Prof. JAMES : They have had the information a dozen times through bulletins ; they get it year after year.

Dr FLETCHER : Mr. Carruthers has written me as follows :—"One of our largest buyers writes us that they are getting shipments from Calcutta and the quality is very fine, being free from bugs, and better than any we are shipping him from Canada. They also say they are buying them at one shilling per quarter, which is equal to 3c. per bushel, less than we are asking for our No. 2 grade of the present crop."

Dr. FLETCHER then moved the following resolution, seconded by Prof. Lochhead :—

Resolved, That the Entomological Society of Ontario request that the Superintendent of Farmers' Institutes have the matter of the Pea Weevil brought prominently before all meetings of Farmers' Institutes during the winter ; that from the discussion held this afternoon, the cessation in the cultivation of peas for two years is not the best remedy for preventing injury by the Pea Weevil, but rather the making known as widely as possible the nature of the pest, the extent of its injuries and the best remedies, and that if object lessons could be given throughout the country showing the way to fumigate peas and the advantage of doing so, it would materially help to reduce the injury by the weevil.—*Carried unanimously.*

Dr. BETHUNE : I should like to ask if it would be practicable to have some Legislative enactment to compel seedsmen to fumigate their peas. I do not think there would be the slightest use to pass an Act of the Legislature with regard to the general public, but we might get at a large proportion of the seed peas by rendering it compulsory on the part of the seedsmen to fumigate them. I know that not many years ago, in the neighborhood of Port Hope and Cobourg, and all through Prince Edward County, where all kinds of fancy peas were grown by the acre, that every seedsman had his "bug house" and fumigated all the seed, but it seems that some have discontinued that laudable practice. I was intending, before this resolution was read, to suggest that the Ontario Department of Agriculture might issue a mandate to those who attend Farmers' Institutes to make this a point of their proceedings during the coming winter, and if that were done, then if not only the Agricultural press, but the press generally, would take up this subject, and bring home to the whole country the seriousness of it, and the ease with which it really might be dealt, and if in addition to that some experiment were made upon the line Professor Lochhead has mentioned of object lessons, I believe it would have good results.

I remember when not many years ago it was impossible to get good butter in this country in the winter time. When we got butter made from our own cows in the summer time it was all right, but you could not buy butter fit to eat in the winter. That has all been remedied by this object lesson system, the travelling dairies showing the farmers' wives how to make good butter. It has been a great success, and now we can always get good butter, and if that experiment succeeded so well, I think it would be quite worth while to adopt a similar system to teach the farmers how to deal with this terribly destructive pest.

The other day I happened to notice in the market reports from the port of Montreal that the shipment of peas from Montreal up to the first of October last year amounted to 458,000 bushels. This year up to the same date it amounted to 269,000 bushels showing a decrease in one single year in that port, up to the first of October, of 189,000 bushels. This shows what the weevil has done in reducing our exports from one port alone.

I wish to ask Dr. Fletcher if there is any connection between the mildewing of peas and the Pea-Weevil. I mean in this way ; is it the case that if the pea plant is not healthy and strong and vigorous, it is far more subject to mildew than it would be if the nourishment of the plant had not been taken by the Pea-Weevil ? Would it be more subject to mildew than one grown from perfect seed ?

Dr. FLETCHER : I do not know from actual observation that that is the case but I can quite understand that the weakened plant would be more likely to be affected. Weevily seeds grow a weak plant which matures later and that would make it more liable to mildew.

Some of the seed merchants fumigate 2,000 bushels at a time by having a properly constructed building and by putting 20 pounds of bi-sulphide of carbon at the top and allowing it to vaporise, which is easily done. The peas can be left in the sack. A farmer with an ordinary coal oil barrel can put 5 bushels of peas in it and fumigate them by using three ounces of bi-sulphide of carbon, which would probably cost 15 cents.

At the present time there are very few seed peas imported into Canada ; because our peas are freer from the weevil than they are to the south of us, but directly we put any sort of pressure on our seedsmen, then the peas will be brought in from the other side.

First of all we want to make it known as widely as we can that it is a serious injury, and then that there is a simple practical remedy, if they will apply it.

Prof. LOCHHEAD : If you compel the seedsmen to fumigate their seeds it will not cover the point, because there is a large amount of seed exchanged among the farmers themselves. The Minister of Agriculture is thoroughly in earnest in this matter. I received a letter from him early in the season, and he wished me to go about it in some way and do something, and of course he will provide the funds. The Minister of Agriculture is a thorough believer in fumigation himself, and he fumigates all his own peas, yet they have weevily peas in his district because the other farmers do not fumigate.

Mr. SMITH : I think Prof. Lochhead has got the correct idea with regard to this particular matter. Some years ago there was established in Guelph what is known as the winter fair. They established a "block test," that is, they show the animal on the hoof first, and then the animal is slaughtered, and they make another test ; that is one of the best object lessons we have in the country, and as a result of that object lesson the Wm. Davies Company of Toronto say, that in one year the quality of the bacon of this country improved 50 per cent. That was wholly the result of that object lesson, and the work done by Farmers' Institutes. If you can get the Institute men to take up the weevil, I am satisfied, you will influence public opinion in this country, and you can then enforce any measure with regard to the weevil. I have gone over the province pretty generally and I find that the evil is steadily extending north. At one time it did not go further than Lake Simcoe ; but last summer and the summer before, I found it up on the shores of the Georgian Bay and it was becoming quite as prevalent as in the frontier counties.

THE PEA WEEVIL.

By W. LOCHHEAD, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

Although the Pea Weevil (see Fig. 1, p. 4) has been known as an enemy of the cultivated pea for over 150 years in America, it is not a native. It probably came from the East, whence came so many of our cultivated plants, and their insect enemies as well. Peter Kalm, the eminent Naturalist of the last century, states that in 1748 pea-growing had been abandoned in parts of Pennsylvania, New Jersey, and New York, on account of the pea weevil.

It is apparent that the pea-growing industry in Ontario is doomed unless radical measures are adopted (by the farmers themselves) for the control of the weevil. The pest has made its appearance in nearly every county in the western half of the Province, and in the Lake Ontario counties as far east as Frontenac. The more eastern counties and those further north are not much troubled with the "bug." Durham, Northumberland and Prince Edward used to be the favorite section for growing peas for French and American seedsmen, but the depredations in

NOTE.—The above paper by Prof. Lochhead was not read in connection with this discussion, but is placed here as a matter of convenience.

these counties have been so great that the growing of peas has been largely reduced during the past two or three years. Amherst Island, which was formerly a great pea-growing district, has scarcely a farmer this year who is growing peas. Throughout Wentworth, Wellington, Waterloo and Oxford the growing of the common cultivated pea has been abandoned, and the grass pea has been substituted to some extent. This latter variety does not suffer from the weevil, but it was attacked this past summer in the counties of Halton and Wentworth by a green louse, the exact nature of which I have not yet determined.

This summer I had the pleasure of visiting the Manitoulins and St. Joseph Island. There the pea-bug or weevil is unknown. Further west, around Fort William and Port Arthur, it is also unknown, and it is the duty of the farmers of these districts to initiate strict measures to prevent the importation of the weevil.

To give an idea of the diminution in the growing of peas during the last 10 years, it may be stated that in 1891 the yield of peas in Ontario was about 18½ million bushels. In 1902 the yield was nearly 11½ million—a decrease of over 7 million bushels in 11 years. The decrease would have been still greater if it had not been for the introduction of the grass pea variety.

The question of treatment is a very important one, and is not a difficult one to put into practice. Unlike many other pests, the pea weevil confines its attention to the cultivated and garden pea almost entirely. It attacks no wild varieties, hence there is no danger from re-infestation through those sources. The usual method of treatment is that of fumigation with carbon bisulphide. For several years the pea-growers of Prince Edward and other Lake Ontario counties practiced this method, but there was no wide-spread co-operation in this line of treatment among the farmers. The result was that the weevil thrived in spite of the efforts of many of the largest pea-growers.

The weevil is capable of flight, and it is possible that it may fly comparatively long distances. The first essential in a plan of campaign against the pea weevil is co-operation in the treatment of infested seed, and, without this, the campaign would be useless.

The method of treatment which has been recommended is to fumigate the seed peas in air-tight barrels or bins immediately after threshing. It is usual to use a pound or a pound and a half of carbon bisulphide for every 100 bushels of peas. For smaller amounts, the quantity is proportionately slightly increased. The peas are subjected to this treatment for 48 hours.

The question naturally arises : What is the best time for the treatment of the peas ? To answer this question, a study of the development of the grub is necessary to ascertain at what stage the grub ceases eating the pea. Mr. Elmer Lick, of Oshawa, who is a careful, accurate observer, found that in every infested pod he examined that not more than one-half the damage to the pea was done until after the crop was ready to harvest. In many cases he found not more than one-third the damage which the weevil would do before reaching maturity. This was true of both late and early varieties, which were growing side by side. He found, however, that a larger percentage of the early crop were " buggy." Mr. Lick naturally comes to the conclusion that it is highly advisable to treat the peas immediately after harvest, and not to wait until the grub has become full grown.

Mr. Lick's conclusions regarding the treatment of peas are as follows :—

1. Do not sow buggy peas without treating the weevil.

2. Harvest the crop as soon as ripe, and thresh at once.

3. For seed peas, treat at once ; but if for feed close up the concave of the machine tight ; use full speed, and thus crack the peas and kill every weevil ; or, if it is not desired to cut up the straw, run the peas, after threshing, through a crusher. (Mr. Lick would not care to risk grinding fine, for fear of heating).

"You must quit growing peas, unless there is co-operation in some way."

Mr. Lick thinks a great deal of coal-oil as a treatment. He uses about one gallon to 10 or 15 bushels of peas. The oil is applied in such a way that the peas are thoroughly covered.

In 1897, Prof. Zavitz, of the Experimental Department of the Ontario Agricultural College, made some interesting experiments to find the value of peas for seed which had been injured by the weevil. He found that in the case of a large variety of pea, like the Marrowfat, about three-fifths of the peas which had been injured by the weevil did not germinate. In the case of a small variety of pea, such as the Golden Vine, he found that only thirteen per cent of the peas which contained the weevil grew. Thus he says,—"If a person were sowing weevilly seed of the golden vine variety, it would be necessary to sow 15 acres of peas in order to get as many plants as would be produced from sowing 2 acres of sound seed."

There is one interesting fact which I observed while in St. Joseph Island, which was that, although weevilly peas are sown, the weevils never make their appearance on the new crop. Whether this peculiarity will hold out many years, it is impossible to say, but such is the case at present.

The life-history of the pea-weevil is as follows: The weevils deposit their eggs singly on the outside of the newly formed pods, and when the peas are in blossom. The grub, as soon as it is hatched, bores through the wall of the pod and enters the pea. Within it, it eats and grows. When full grown, it is about one-fourth of an inch long, and about one-eighth of an inch in thickness. It has three pairs of minute legs, but otherwise it is decidedly maggot-like. Its body is wrinkled, and is beset with a few long hairs. In its pupal state, it rests for a few weeks in a round burrow, which is closed externally by the unbroken membrane of the pea. The winter is passed in the adult state, either within or without the pea, but usually within.

I venture to outline a plan of an experimental campaign against the weevil, and I would like the members present to discuss it as to its feasibility and probable value. The plan i based on the idea that if the entire pea-crop of a section is threshed and treated with carbon bisulphide immediately after it is harvested, the weevils in that section will be practically ex terminated. I suggest, therefore, that a corps of men be appointed to treat the peas that are grown on every farm in a group of two or three townships. The pea-growers should be asked to assist in the work by providing the necessary barrels or tight bins for proper fumigation. To each member of the corps, there could be allotted all the farms on one or two concessions. Every farm would then be visited, and the peas fumigated properly. It might be necessary in some instances to fumigate the peas twice if there was any doubt as to the thoroughness of the first treatment.

The same plan could be followed out the second season. If the weevils are still abundant the third season, the treatment would be considered a failure, providing no weevilly peas had been introduced during the period of experimentation.

REPORT ON INJURIOUS INSECTS IN 1902.

Division No. 4.—Niagara District.—By Geo. E. Fisher.

Not being schooled in the science of entomology you will readily understand that I naturally shrink from accepting office in this society and reporting from the standpoint of an entomologist. My indebtedness to entomologists for assistance in prosecuting the San José scale investigation, a desire to reciprocate, and being assured by Prof. Webster and particularly by Dr. Fletcher that they themselves are only students and that I am abundantly qualified to act in this capacity, are my apology for attempting to do so.

The opinion seems to prevail that in continually moving about the country in my official capacity I enjoy exceptional opportunities for observation and should know a great deal. While it may not seem altogether unfair to expect considerable of me in this way, the particular work in which I am engaged has so continually demanded my full time that the opportunity for thorough and careful investigation outside of matters pertaining to the San José scale is not nearly so satisfactory as when at home I went leisurely about my own orchards and, with necessary appliances always at hand, worked out such questions.

My practice has been not to accept any statement I could not verify in the field and in my judgment he who demonstrates beyond question one subject in a whole season has accomplished much more than another who has given but superficial attention to a greater number.

Notwithstanding the almost entire absence of such weather as makes ideal conditions for insects, in many instances they were present in usual quantity. The cabbage worm, striped cucumber beetle and squash bug, asparagus and potato beetles are spoken of by gardeners as having been troublesome. The potato beetle made a record, for when the vines succumbed to blight, in their efforts for self preservation the beetles attacked almost everything else, tomatoes and particularly egg plants were protected with the greatest difficulty. There were instances of tomato plants being eaten off in large quantity, by potato bugs which attacked them below the surface of the ground, before the potatoes were up in the spring. The asparagus beetle is spread over the whole of the Niagara District, and where left to itself seriously injures the crop. There are several methods of controlling it, and those which are perhaps the most successful and most generally adopted are very simple. The insect prefers the more spindling shoots which are allowed to stand and are destroyed as soon as they become considerably infested. Little chicks catch and eat the beetles, and if moved about in portable coops a single brood will protect an area of quite large extent, when cutting is discontinued the plantations are sprayed with paris green or arsenic. A gentleman at Queenston suggests a solution of saltpetre, one pound in ten gallons of water, for the suppression of cucumber and squash beetles. Others are using whale oil soap one pound in four gallons and find that it is safe for very tender plants and besides relieving the vines of insect pests so invigorates their growth that its use is economical for this purpose alone.

Canker-Worm.

Canker-worm (Fig. 2) was not so generally plentiful this season as last, but was still numerous in certain sections, where orchards were stripped as usual. Little rain fell during the larval period, which afforded a much better opportunity for spraying this year than last, when the almost continuous rain washed off the poison as fast as it was put on. In 1901, so unsatisfactory were the results from trying to kill Canker-worm by spraying, that in the fall a few growers resorted to the sticky bandage process. Even with the weather conditions favorable, spraying a large number of trees is a heavy undertaking, but those of 1901 showed that Canker-worm cannot always be controlled by spraying, though the pumps be kept going and the best of material used. In my own orchards, we had not been successful in the spring, and in the fall made an experiment of sufficient extent to fully test this method. Beginning Nov. 1st, 2,000 apple and 6,000 plum and cherry, all bearing and mostly full-grown trees, were treated. Pear and peach were not attacked, though a few years ago a neighbor had serious trouble from Canker-worm in his pear orchard. At the above date, the weather being rather cold, pure castor oil and a good quality of resin were used in the pro-

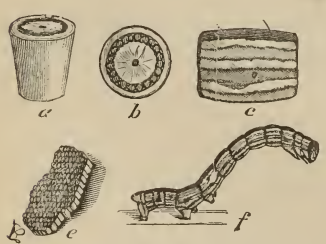


Fig. 2. Fall Canker-worm. *a* and *b*, eggs seen sideways and from above; *c*, markings on segment of caterpillar; *e*, mass of eggs; *f*, caterpillar.

portion of equal parts by weight ; in warmer weather five parts of resin to three of oil would be required. A space of six inches or more at a convenient height was scraped on rough-barked apples and the surface made as smooth as possible. The mixture while warm was applied to the bark with a brush, a strip around the tree two inches wide, which spread to four. The heavy bark of the apples soon absorbed this first application, which was promptly renewed. In the course of the season it was found necessary to treat the apples three times and the plums twice. A few moths were moving when the treating was commenced, and some of these no doubt had already reached the branches. As the season advanced and thousands upon thousands of the sluggish egg-laden moths became entangled in the wax, the situation was extremely interesting. On one small plum one hundred and fifty moths were counted, and on some of the larger apples the number of moths captured, both male and female, was too many to count. (Fig. 3.) During the spring a very close watch was kept, and as there was no movement, I have concluded that the infestation was wholly of the fall variety. As the males were made prisoners if their wings but touched the wax, there was little and probably no copulation, and Dr. Fletcher has explained that the eggs are likely to be fertilized only in passing the ovary. However this may be, so far as we could observe no eggs hatched, but remained in the body of the parent still held fast by the wax. Some who used this method collected and burned the dead females, but in our case there seemed no necessity. My interest in this matter intensified as the season for spraying came and went with this innumerable host of closely-held captives on the trunks of the trees and no larvæ in the top to spray. The men say there were not as many worms in the entire orchard this year as were on some individual trees last year. This way of treating Canker-worm is not new, but is certainly not generally understood. Mr. O. T. Springer, of Burlington, who has practised this method successfully for years, assisted me with valuable suggestions.

Fig. 3. Fall Canker-worm. *a*, male moth ; *b*, female moth.

Pear Psylla.

Early in September my attention was called to an attack of Pear Psylla in an orchard belonging to Mr. Joseph Tweddle, of Fruitland. A block of 125 eight or ten-year-old pear trees was involved. The varieties affected are those in common cultivation, the Bartletts suffering most. Nearly the whole of the block was swarming with wasps, attracted by honey-dew that was dripping from the foliage. The wood was covered with a black fungus which had developed in honey-dew exuded by nymphs attacking the wood.

At the time of my first visit the foliage was largely deserted and the nymphs were concentrated on the wood, particularly the young growth, and the energy of the trees was apparently so reduced as to seriously affect next season's crop, no matter what treatment is given. Some years ago Mr. Freeman, of Freeman, lost an orchard of nearly four hundred large dwarf Duchess from Psylla. He tried to destroy the insects with kerosene emulsion, but used it of too little strength, which had no effect whatever. At home we always have some Psylla, but it is never there in sufficient quantity to necessitate treatment.

In the worst affected portions of Mr. Tweddle's orchard the foliage was so reduced as to make treatment easy, and I advised an application of crude petroleum emulsion, 1 in 10, which would kill nearly all of the nymphs and stop the drain on the trees. We subsequently treated a couple of the trees with the emulsion ourselves, and the effect was even better than I anticipated. This, followed by a thorough treatment with lime and sulphur in winter, will subdue the pest. As the eggs are deposited very early in spring, the winter treatment should not be delayed too long.

White Rose-scale.

This insect has taken to our Raspberry plantations and seems to be widely spread. In fields situated east of Grimsby, it was found in good form both at the beginning and end of April. On the 10th of May it was rapidly increasing in size and by the 20th nearing maturity, but down to this date no eggs had been observed. On May 31st eggs were plentiful and on June 7th were found to be hatching; on the 23rd June eggs were still plentiful, hatching and larvæ fixing on the old canes; at this date the scales were present in all stages of development. These fields were not seen again till September 22nd when eggs were more plentiful than at any previous examination, lice running and fixing on both old and new wood and there were growing scales in all stages particularly on the old canes. The same conditions prevailed on the 25th of October except that the new canes were then heavily infested.

It appears from these investigations that while this scale resembles scurfy barklouse in appearance it differs from it in being multibrooded and in passing the winter alive. I intend making a careful search for eggs at the end of the season to determine whether or not there are eggs in good condition at that time, as the opinion is held that some of the eggs winter over. On September 22nd there were very few scales on the young wood in comparison with the old and not many of these were of advanced growth. If the old canes be removed and destroyed immediately after fruiting much of the spreading will be prevented as it is no doubt later in the season, when larvæ are more plentiful, that most spreading occurs. This precaution followed by a thorough treatment before growth starts in the spring with a suitable wash such as soap, crude oil or lime and sulphur will in my judgment meet the difficulty.

San Jose Scale (Figs. 4 and 5).

Owing to the cold late spring the larvæ of the San José scale did not appear till a week or ten days after the usual time, but notwithstanding this and the unfavorable weather which

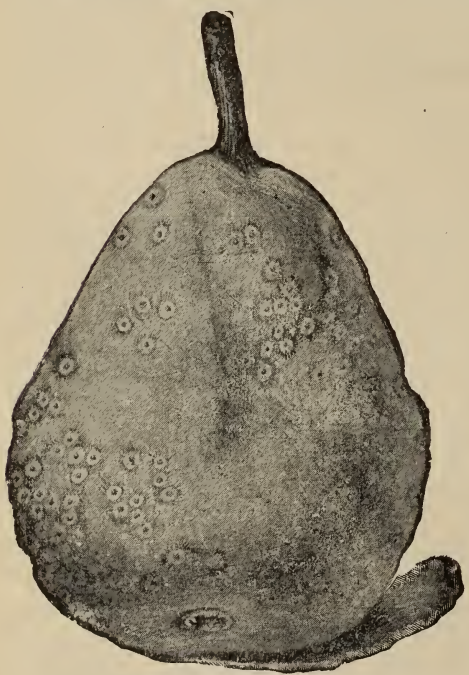


Fig. 4.—Pear infested with San Jose scale.

Fig. 5.—Portion of a branch infested with the San Jose scale.

followed, reproduction was rapid and the pest was discovered in many orchards where it had not previously been found. In many instances trees that were but slightly infested in the spring are encrusted now and likely to be ruined before the end of the season.

Formerly the practice was to mark for special winter treatment any trees that were badly attacked in summer, but this was not satisfactory as such trees frequently became much weakened and sometimes died before the winter's frosts closed the scale's season.

Recognizing the necessity for prompt summer treatment in such cases much pains was taken to procure an effectual remedy suitable for summer use which would destroy the scale without injuriously affecting the trees. In a long series of experiments emulsions made from kerosene and crude petroleum proved the most satisfactory and are really very useful. The varying results so commonly reported from the use of kerosene are largely due to differences in preparing the emulsions and of the condition of the weather when the applications were made. They should be applied only on warm, dry, bright, airy days, and it would appear that the hotter and dryer the weather is the better will be the result in killing the scale and the safer to the trees. Spraying done on trees in leaf is necessarily imperfect for the foliage prevents the spray reaching every part of the wood, particularly the twigs. For spraying infested trees in leaf we prefer a rather coarse nozzle which sends its spray through the foliage to the wood much better than a fine nozzle. The oils resist re-attack so well that even if there be considerable breeding after the treatment is given it will not matter, for the majority of the young scales which fix will die and the tree will not be badly affected again during the season. Either kerosene or crude petroleum may be satisfactorily applied with a combination pump and diluted with water to almost any per-centage, but to use them with an ordinary pump it is necessary to make an emulsion. Kerosene emulsion 1 in 6 is a suitable strength for hardy foliage and 1 in 7 for peach and other tender foliage. That is one gallon of kerosene in a total quantity of seven gallons of emulsion. Crude oil emulsion 1 in 10 is a suitable strength for hardy foliage. This gives one quarter of a pound of soap to the gallon of emulsion and ten per cent. of oil which is all most foliage will resist. Kerosene is preferable for peach trees. I would spray only badly affected trees in summer and follow this with a thorough spraying of the entire orchard with lime and sulphur in the winter or spring.

Our experiments clearly demonstrate that lime and sulphur is altogether the most effective remedy we now have. It is also the cheapest and the safest. It is easily applied and we hope by utilizing steam from ordinary threshing engines for cooking to make it more easily procured than any other spray. A larger proportion of lime and sulphur than is necessary in California is recommended for our climate. One pound of lime and one-half pound of sulphur to the gallon of wash giving the best satisfaction in our experiments. We found no advantage from the addition of salt, in fact the best results were obtained where no salt was used, and as it seriously corroded the pump we do not recommend it.

It will be interesting to this meeting to know how this remedy appears to work out, and as frequent examinations were carefully made, I may speak with considerable confidence. There were so many living, healthy, developing females remaining that in the early examinations we pronounced the treatment a failure. When the breeding season came we were greatly surprised at finding no larvæ on treated trees and the little yellow lice simply swarming on trees that were not treated. The microscope showed the mature females on untreated trees to be packed with young, while the large, fresh, oily females on treated trees were empty, barren and entirely without any appearance of young about them. The proportion of males in the over-wintered brood is largely in excess of the females and this is nature's provision for complete fertilization in the spring which no doubt is indispensable. The males being on the surface and exposed perished from the treatment, and many of the females protected under layers of encrusted scales escaped, but as there was no copulation there was no breeding.

A most gratifying feature of our work is that it shows clearly that the scale may be easily controlled and the vigor of an orchard maintained independent of surroundings. An orchard exposed to reinfestation is of course at a disadvantage, but even this will not prevent holding the scale well in check if regular annual treatments are given.

And now that these results are secured, fruit growers and particularly those in infested sections, will appreciate the Minister's persistent effort in their behalf, and we trust such thorough use of the remedies will be made as will speedily bring the pest well under control.

Dr. FLETCHER : Said that he was glad to be able to confirm the results obtained by Mr. Fisher in the case of the San José scale.

He had just been through the scene of these experiments with Mr. Fisher and Mr. Gibson, and saw these very trees that were treated with lime and sulphur, and they were just as healthy as trees need to be. The scale was very abundant at the beginning of the season, but now there are only a very small number of living scales there, which shows that this remedy is very effective. The treatment does not cost more than it is worth, and the application of it is useful in more ways than one, because it destroys many other injurious insects, and we have in it a remedy which comes next to the Bordeaux mixture. Lime, sulphur and salt is one of the very best fungicides we know of and when we find that it is one of the best and cheapest applications for destroying the San José scale, and at the same time will remove many other diseases that affect the tree, we should appreciate the efforts of the men who have given us this remedy.

Until the San José scale was introduced into Ontario, our greatest loss was from the brown rot of the plum, and the black spot of the apple. Mr. Evans has a specimen that he is going to show to the meeting, which will illustrate how reports come back from European markets of the fruit we ship. The farmers ship them in comparatively good condition, they only see a small amount of spot upon the apple. This sample will show you what condition these apples are in when they reach the European markets. What does this mean, it means that the fruit growers have not taken the proper care to properly treat their trees ; these apples were shipped in comparatively proper condition ; but the shipment was delayed for three weeks and this is the condition in which the apples were found. [Apples were exhibited which were so spotted and pitted with rot as to be absolutely unmarketable, and yet they were shipped three weeks before in an apparently sound condition.]

Prof. LOCHHEAD : I can assure you there is no person more pleased than I am, at the favourable results of Mr. Fisher's experiments.

Any person who has had anything to do with the San José scale knows the destruction it creates. The question is often put to the Entomologist, what are you here for if you can't get rid of the scale ?

Mr. Fisher was with me at the Pittsburg meeting of Economic Entomologists and I can assure the members here, that we are ahead of the United States as far as the treatment of San José scale is concerned. Although they reported the results of the lime and sulphur treatment, there was a good deal of divergence of opinion at that meeting.

Mr. FISHER : There seems to be some difficulty in cooking this mixture properly. The lime and sulphur preparation requires a great deal of cooking. Two hours are absolutely necessary and three hours are better than two. I am not a chemist and I cannot explain the trouble from a scientific stand point. Our practice has been to put a quantity of water in a kettle and bring it to a boil, we then put the lime into the boiling water, and as soon as we got it slaked, we threw in the sulphur. The slaking of the lime seems to have a good effect in reducing the sulphur. This is cooked for two hours. When the sulphur is first introduced into the lime, the mixture is of a light silvery color and it remains about the same color during the first hour and a half, then it begins to shade away to a dark deep amber, and some that we cooked longer became a greenish color and had quite a green cast. If the mixture is properly made you cannot wash it off the trees, nor can you wash it off your hands, if you get any on.

When it becomes cold the lime and sulphur appear to crystallize and we have water and crystals, but we cannot stir it up neither can we restore it to life by cooking, and it will not stick when we put it on the trees. The preparation must therefore be applied while hot.

The CHAIRMAN: After it is in condition to apply to the trees, how long before it crystallizes?

Mr. FISHER: As soon as it gets cold; it would probably take half a day to cool. There is no trouble in getting it on after it is prepared, if you are not interrupted.

Mr. W. E. SAUNDERS: As regards the chemical nature of this compound, it might be of interest to state that when the lime and sulphur are combined together, they make sulphide of calcium, and sulphide of calcium freshly made is soluble. It has been in use in the drug business for a long time as a remedy for skin diseases, and I have found that in the strength which we make it, which results in a bright brick-red solution, it does not crystallize. I should think that the crystals occur from making the solution too dense. We have a solution in stock now, that has been made for perhaps three months or six months and it is still of a deep orange-red color; it contains sulphide of calcium and probably some sulphur. This solution we have bottled up and it is in good condition to-day. When it is exposed to the air it forms upon the surface a flake of a mixture of sulphur and sulphide of calcium. Decomposition, no doubt, will go on to a more rapid extent as it is exposed longer to the air. I should think that by putting this material in barrels, filling them right to the top, and putting the plug in the bung, it could be kept for weeks. If you have more sulphur than the solution can take up, it might possibly take it up while hot and throw it down when cold. If it had an excess of either one it might leave the residue in the bottom.

Mr. FISHER: We have very little sediment; the mixture appears to be perfect We did have a lighter wash, but it left the sulphur exposed, so that it would be blown away by the wind or washed off by the rain, whereas by using a pound of lime and half a pound of sulphur to the gallon of wash, it left the sulphur covered. The sulphur seems to be deposited between the lime and the bark of the tree.

Prof. LOCHHEAD: I had a talk with a chemist at the Pittsburg meeting and he stated that when you boil sulphur and lime together, you get various kinds of sulphide of calcium There are sulphides of a high and a low degree, and these differ very remarkably.

Prof. JAMES: This is one of those things where the practice is of far greater value than the theory. We all know that the various forms sulphur assumes depend entirely upon the temperature to which it is heated. The use of the lime and sulphur mixture for the treatment of the San José scale in the eastern part of California has presented a very interesting feature to me. Perhaps most of you know that in the early days this favorite stand-by, or method, used in California was used here, but we were told by the American Entomologists that it was not at all applicable to the eastern part of the continent. It is quite evident now that our American friends came to a conclusion too rapidly, because when Mr. Fisher's department used that treatment he wrote to a large number of the Entomologists on the other side, and in their replies they admitted that their previous conclusions were hardly correct. Mr. Fisher has practically shown them the way in this matter, and I think we can safely say that his experiments are in advance of anything that has been previously done in the Eastern States, or the Eastern half of the Continent. The only way in which they can be said to have gone beyond us is in the very important work done at the Department of Washington, in sending to China and Japan for the natural parasites of the insect. It seems that after trying many experiments, we have got out into the light and are now where we have some safe and sure footing with regard to this insect.

Dr. FLETCHER: With regard to what Prof. Lochhead has said, that this work was shown o be of great importance at the Pittsburg convention, the suggestion has been made that our

work was as good as any in the United States. We can say that it is better than anything that has been done hitherto, and more than that, it is far more extensive than anything that has ever been done in the United States During the last four years Mr. Fisher has been working continuously throughout the summer. The best work done in the United States has been done by an Entomologist who has a class to teach and other work to do, whereas, Mr. Fisher has given his whole attention to the work and we have these good results.

If a thing is worth doing and it will pay to do it, our farmers will do it. Seventeen years ago there was not a spraying machine in Canada, and now there are more than a million, because the people have been shown that it pays to use them. And so it will be with the treatment for the San José scale.

Dr. Fletcher then moved, seconded by Dr. Bethune, "that the Entomological Society of Ontario have watched carefully the efforts of the Hon. the Minister of Agriculture and his Officers to discover a practical remedy for the San José scale ever since its first appearance in Canada, and the Society now feel that they can justly, and they do hereby, tender their congratulations to the Minister for the excellent results which have been obtained through the discovery of a practical remedy for this most destructive insect."—*Carried unanimously.*

The CHAIRMAN : It is very great gratification I am sure to us all that a member of our Society, and one of its Directors should have accomplished the very good work that he has done ; we also feel that an immense deal of credit is due to the Minister of Agriculture for the thorough way in which he has caused these investigations and experiments to be conducted in the face of a great deal of opposition. We feel grateful to him for what he has done, and also to his officers for their excellent work.

EVENING MEETING.

A public meeting of the Society, to which the members of the London Horticultural Society were specially invited, was held on Wednesday evening, October 29th, in a lecture room of the Normal School, by kind permission of Principal Merchant. At 8 o'clock the meeting was called to order by the President, the Rev. Dr. Fyles, who said :

Ladies and gentlemen we are happy to meet you again to talk of the beautiful objects in which the Society is interested, and to tell you of some facts concerning them. I beg to request Prof. James to take the chair this evening.

Prof. James : Mr. President, ladies and gentlemen, I accept very readily and very willingly the invitation of the Entomological Society to occupy the chair on this occasion ; partly because of the high appreciation I hold of their work, and partly also because we of the Department of Agriculture who are more intimately related to that work, get from them so much assistance in connection with our own work. We have been holding a session this afternoon, and have been discussing two questions in particular. They are of very great moment to the people of this Province. We have been discussing very small things indeed. Things so small that in order to be detected, in some cases at least, they must be put under a powerful microscope. These small things mean a great deal in connection with the development of this country ; they are the Scale insect that affects our fruit trees and the Weevil that destroys our pea crop. If the Society had done nothing else in connection with their meeting, but to prepare for publication the information that will be collected, then they will not have met in vain.

It is not many years since Entomology was looked down upon. It is only within the last few years that it has received that attention which it deserves, and I am afraid that even yet Entomology in most of its departments is not receiving the recognition it fully deserves. We

are finding more and more enemies to our crops, and as they come before us we turn to the specialists, those who have made a special study of Entomology, and apply to them for help and assistance, and as these men put into practice the results of their investigations, the people as a whole are coming to the conclusion that after all these men are not merely men of theories but are men of practice, and I think we shall find in connection with this Entomological Society that theory and practice are working hand in hand as effectively as in connection with any other society organized for the general welfare of this Province.

Entomology is a subject which is not only of very great consequence to me, as these two crops I have mentioned will give evidence, but it is a subject of very great interest. It came out in discussion this afternoon that the pea crop of this Province during this past year was worth from four to seven million dollars less than it was about ten years ago. This falling off in production is to be attributed to the destructive work of a minute insect. If our entomologists can give us a simple remedy whereby the ravages of this insect can be overcome, you can understand how very practical their work must be.

We have not a very long programme to lay before you this evening, but I think that you will find that what we have to give you will be full of interest.

I have now very much pleasure in introducing to you the Rev. Dr. Fyles of Quebec.

Dr. Fyles then read his presidential address and illustrated it with a series of beautiful diagrams, the work of his own hand.

INSECT LIFE.

By Rev. Thomas W. Fyles, D.C L., F.L.S.—President.

The old Roman poet, Lucretius, made known, in lofty strains, his ideas upon Natural Things. His poetry was better than his philosophy. He held the opinion that the soul of man was diffused in atoms throughout the body. He argued that if, on the death of the body, any of these soul atoms remained in it, the soul could not properly be accounted immortal, because it suffered diminution. But, he continued, if the soul left the body with all its parts entire, how do you account for the boneless, bloodless creatures that are found in, and upon, the carcass? He seemed to think that the soul particles could embody themselves anew in different ways. If Lucretius had been an Entomologist, and had known the life histories of the Silphidæ and Muscidæ he would not have entertained opinions so absurd.

The great question of Life baffled him, as it has baffled many a philosopher since.

The boys, at the school I attended as a child, pointed out to me a celebrated surgeon, a lecturer on Anatomy, who, they said, was endeavoring to find out the nature, and the seat, of life. We regarded him with awe; but he never made the discovery—he died, and his place knew him no more.

Distinct from the highest meaning of the word Life, the Theological meaning, which we understand in our Saviour's declaration, "They would not come unto Me that they might have life," the word is used in various senses. It is used to denote :—

I. Vitality—the power by which we live and move and have our being.

II. The period between birth and death.

III. Energy, vigour; as in, He is full of life.

IV. The condition and habits of life; as high life, low life.

V. A multitude of beings; as the city teemed with life.

VI. A life history.

There are other meanings, but these will suffice for our present purpose.

With the term Insect Life we are very familiar. The late Prof. Riley conducted under it, as a title, a publication which is highly valued, as a very treasury of Entomological information. Let us, in our consideration of Insect Life, transfer to it the meanings above enumerated.

I. And first as to the vital power. Of this it may be said that, as in the case of man, so in that of the inferior creatures, no physiologist has ever been able to make plain to us its nature and its seat. We speak of certain organs as vital organs ; and we are able to trace the respiratory, digestive, nervous, muscular and reproductive systems ; but the grand power that brings all into play remains a mystery. It came from God ; and, when He taketh away the breath of His creatures, they die and return again to their dust.

What is the first and ordinary indication by which we judge that an insect is alive ? It is *its ability to move.*

We notice on a Basswood an appearance as of a triangle of small twigs, some brown, some green. We examine it closely and perceive that we have an object before us with a head, and a trunk, and jointed limbs. Is it alive ? The creature stretches out a limb, and we know that it is alive. It is *Diapheromera femorata,* Say. Fig. 6.

Again we see on a twig a small creature that in build resembles a Guinea-fowl with head and neck extended. It is brown and hard, and might, you think, be taken for a thorn. Suddenly it springs out of sight. You might say

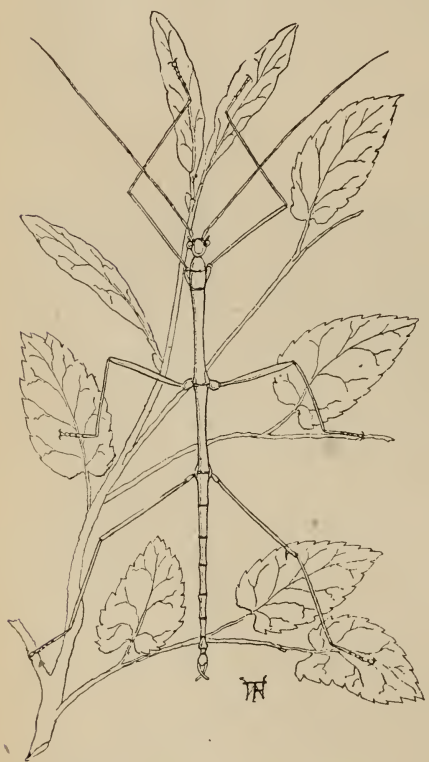


Fig. 6. Walking-stick insect (original).

Fig. 7. Leaf-hopper, much magnified (original).

of it, as old John Willett said of May-pole Hugh, " You look, and there he is : you look again, and there he isn't ! "

Or again you see a piece of bark, as you suppose, projecting slightly from the boll of a tree. It is brown and ridged, and has marks as if, at some time, a small twig on either

side had been broken off. You give it a poke, and it swerves; and some small feet are protruded; and you perceive that it is a living moth (*Calocampa curvimacula*, Morris)

And once more, you notice a seeming patch of lichen on a birch-tree. You approach to examine it; when suddenly, from beneath the deceptive fore-wings, a pair of gorgeous scarlet secondaries are displayed; and the creature flies off to a place of security. It is *Catocala parta* Guen. Fig. 8.

Fig. 8. Catocala parta (Red Underwing Moth).

How rapid the nervous action—how great the muscular force, that can carry the frog-hopper out of reach, that can display, and set in motion, so effectively, the ample wings of the moth!

There is a beetle (*Limulodes paradoxus*, Matth.) so small that it looks like the dot that we place over the letter *i*; yet it is gifted with nervous and muscular forces according to its need; and we can—

——"trace in nature's most minute design
The signature and stamp of power divine,
Contrivance intricate, express'd with ease,
Where unassisted sight no beauty sees,
The shapely limb and lubricated joint,
Within the small dimensions of a point,
Muscle and nerve miraculously spun,
His mighty work, who speaks and it is done,
The invisible in things scarce seen reveal'd,
To whom an atom is an ample field." *

In the progression of caterpillars a remarkable phenomenon may be witnessed. If a semi-translucent caterpillar be placed, when in motion, against the light—as upon a window pane—there will be observed a backward muscular action, within the body, which takes the appearance of a succession of wavelets passing from segment to segment, from the head to the farther extremity. It is owing to the nerve power passing from ganglion to ganglion and acting, in order, upon the muscles that set the legs in motion and cause the real advance — the backward flow causes the forward movement. When an Iulus is in motion, you see each pair of its numerous legs move forward in succession with the utmost regularity. (Fig 9.)

Fig. 9. Iulus multistriatus.

Respiration, and the reception, digestion and assimilation of food are as necessary to the life of the insect as they are to the life of man: and the insect is provided with organs admirably suited to carry on these functions, and with others according to its need.

II. We may call the period of the insect's existence its *Life*.

Insect life in this sense is made up of four successive stages—the *egg*, the *larval*, the *pupal* and the *imago* stages.

Some kinds of insects pass through all these rapidly, as for example, the House Fly. With it, the egg stage lasts only twenty-four hours.

* Cowper. *Retirement.*

The following table, which I have made up from the last five completed volumes of the *Canadian Entomologist*, will give an idea of the usual length of the egg stage of insects :—

Colias interior, 6 or 7 days, Lyman, Vol. XXIX., No. 11.
Epirranthus obfirmaria, 13 days, Fyles, Vol. XXIX., No. 11.
Brephos infans, 8, 9, or 10 days, Brainerd, Vol. XXIX , No. 11.
Trigonophora periculosa, 10 days, Fyles, Vol. XXXI., No. 2.
Euprepia caja, 9 days, Gibson, Vol. XXXII., No. 11.
Arctia phalerata, 7 or 8 days, Gibson, Vol. XXXII., No. 12.
Xylina Bethunei, about 14 days, Lyman, Vol XXXIII., No. 1.
Phlyctænia ferrugalis, 14 days, Fletcher & Gibson, Vol. XXXIII., No. 5.
Arctia virguncula, 7 or 8 days, Gibson, Vol. XXXIII., No. 12.

The most remarkable egg period that has come under my notice is that of *Pamphila Manitoba*. The egg stage of this insect lasts for eight months. In the year 1894, on the 8th day of August, I witnessed the laying of a batch of the eggs. On the 20th day of April, in the following year, I saw the tiny larvæ bite their way to freedom from the shells in which they had lived so long. The other stages of the insect's life were completed within four months—in less than half the period of the egg stage.

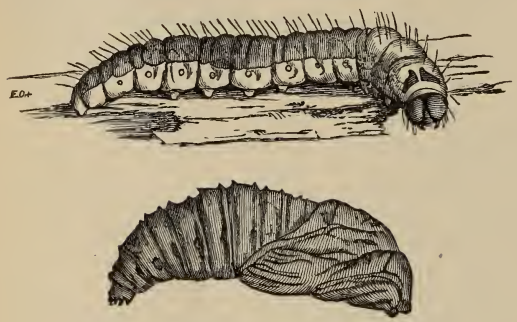


Fig. 10. Caterpillar and Chrysalis of a Cossus.

The larval period also varies in different species. It is the insect's feeding time. In the case of a Bombyx, it is the time when sufficient nutriment must eb assimilated, to sustain the insect through all its after existence. Some larvæ are quickly "full fed," and go directly after into chrysalis. Others spend the Winter in a state of torpidity, and complete their growth in the Spring. Such, for instance, are the larvæ of *Melitæa Harrisii* Scudder. These are gregarious in the Fall, and may be seen apparently tangled up in dirty-looking webs upon the heads of the White Aster. When disturbed they strike an attitude, and seem to be all legs. In the Spring they scatter, and feed up on the young shoots of the plant. The butterflies from them appear in June. Their life is completed within a twelvemonth.

But with the Cossidæ the larval stage is greatly prolonged. Packard has given illustrations of *Cossus Centerensis*, Lintner, in which the appearance of the larva is shown after a growth of four months, of a year and four months, of two years and four months, and of three years, when the caterpillar was ready to pupate. (Fig. 10.)

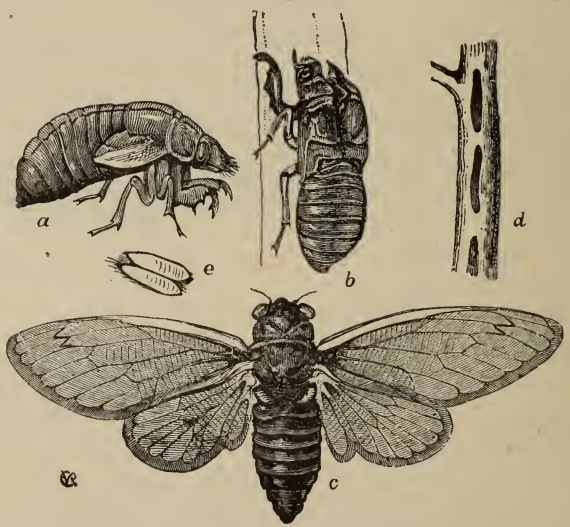


Fig. 11. Cicada septendecim. *a*, larva ; *b*, pupa case ; *c*, perfect form ; *d*, eggs deposited in a twig.

But the most extraordinary prolongation of insect life is that of *Cicada septendecim*, Linneus (Fig. 11). This creature, as its name implies, is seventeen years in attaining perfection. In length of life it stands alone amongst insects.

III. The energy of many species of insects is surprising—they are full of life. In some cases, as in that of the mosquito, they are—as the little girl said of a troublesome puppy—"*too much alive.*"

On the 22nd of June of this year, I was staying at the beautiful country house of the Honourable Richard Turner, on the Island of Orleans. I looked from my bedroom window early in the morning—it was a bright, sunny morning—and lo, the air was full of light gauzy forms sporting around the trees on the lawn and over the tops of them. There were myriads of the creatures ; and all day long they kept up their mazy dance, seldom alighting to rest. They belonged to the species *Ephemera simulans*, Walker The wings of this species are spotted with brown, and are strengthened with an exquisite net-work of "nerves." The long waving tails of the insects add grace to their movements. (Fig. 12).

If I may, I will here mention an episode, that was narrated to me by the much esteemed Editor of our magazine, Dr. Bethune. Some years ago, an alarm of fire was raised in the town in which he then resided The fire-engines were called out and there was a great commotion From the roof of a large warehouse, near the water, volumes of

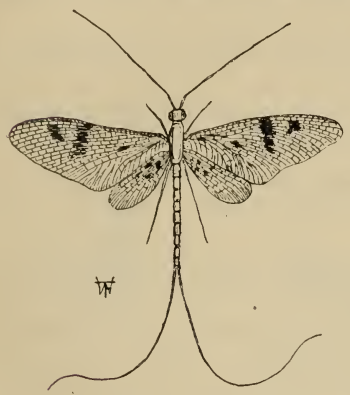
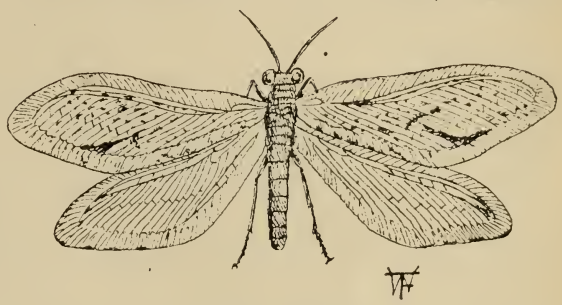


Fig. 12. (Original.)



Fig, 13. (Original.)

seeming smoke and heated air were rising and eddying. On reaching the building the firemen found that they had been misled, or, as the boys would say "sold." The appearance that had alarmed the town was caused by innumerable specimens of *Polystichotes punctatus*, Fab, rising from, and sporting over, the roof. (Fig. 13.)

Often during the time I lived in the Eastern Townships, when driving home in the calm summer evenings, I noticed above the top of some giant monarch of the forest, a mysterious moving column just discernible against the pale after glow of the sunset. The appearances were due to assemblies of insects, taking their pleasure in the heights.

Who has not noticed the dash with which the bee comes suddenly out of the blue and alights upon the foot-board of the hive, as if, like the clown in the pantomine he would say, "Here we are again !"

That energetic little fellow the Flea, *Pulex irritans*, Linneus, can leap thirty times its own height.

Who has not admired the persistence with which the bot-fly, *Gastrophilus equi*, Linneus, keeps up with the trotting horse and hovers around its legs, till opportunities occur of attaching its eggs to them.

It is the cold breath of approaching winter that robs the insect world of its energy, that takes the life out of it. Apropos of this, "The Duchess" in her story entitled "Her Last Throw" has a little piece of quiet fun. One of her characters, Fay, is speaking :—

"Her voice annoys me. It is so slow—so *drawlly*. It is irritating. It is lifeless. She talks as though she were a fly in October."

"Captain Severn laughs rather constrainedly.

"Oh! And is it in October flies talk? says he. How interesting! After all, the one subject never *quite* mastered is natural history. It is always *full* of surprises."

If flies do not *talk*, they have some mysterious mode of communicating with their kind. One evening, when I resided in England, returning to my home I noticed a number of large handsome moths fluttering around an out-building. I looked about and saw others, coming from all quarters, and as far as the eye could see. I recognized them as males of the species *Lasiocampa quercus*. Presently it occurred to me that a female of the species might have come from a cocoon in my insect breeding cage. I opened the door of the out-building, and—in flocked the moths. So intent were they upon paying their respects to the lady moth, who was really within, that they flew into my hands as I undid the gauze covering of the cage. What called them? A voice unheard by man—a subtle effluvium—or emanations yet more strange? We know not; but they came from far and near, full of life and energy. The female chose her mate; and the rest fluttered disconsolately away, or fell inertly to the ground.

IV. The term life is applied to the habits and mode of living. We say, what a strange life to lead!

The Broad-leaved Aster (*Aster macrophyllus* L.) grows in patches of considerable size in the woods around Levis. In the month of June of this year I noticed that many of the large ground leaves of the plant were folded over, from both sides, and crinkled. On opening one of them I found that a larva had turned the leaf into a cool and pleasant tent for itself, and was feeding upon the parenchyma of the leaf.

This larva was about nine lines in length, and was of a pale green, with dorsal, sub-dorsal and side lines of darker green. The head and second segment were jet black and glossy. The fore-part of the third segment was dull brown—on the after part of it were four conspicuous white patches. At intervals, along the sub-dorsal lines, and elsewhere on the body, were round jet black dots. The spiracles were black. The under side of the larva was pale green. The claspers and anal segment were marked with black.

On June 25th the larva span a capsule-like, white cocoon, open at one end, for the exit of the moth. Its plan was to place itself on the under side of a fresh leaf, upon the midrib; then to affix its threads at a certain distance on either side of the rib, and to draw so much of the leaf as lay between, into a fold or crease. Within this it formed its cocoon.

The moths appeared on July 10th. The insect measured when displayed ten and a half lines across. Its body was four lines in length, and its antennæ three lines. The palpi were dark brown, turned back usually. The basal part of them was spindle-shaped; the terminal point was smaller, long and pointed.

The fore-wings were brown, clouded with darker brown towards the hind margin. They had a sub-terminal line of paler brown spots bordered with black. Beyond the centre of the wings was a pale brown horse-shoe like mark, not very distinct.

The secondaries were grey with a lighter well-marked sub-terminal line, and a grey fringe. The body was tufted at the extremity. The tarsi were ringed with white.

Professor Fernald tells me that the moth belongs to the genus *Trichotophe*, Clem. He does not know the species. I think it probable, therefore, that it is unnamed; and I venture to give it the provisional name of *Trichotophe Levissella*. Its life is a curious one.

I have raised from this species the parasite *Hemiteles mueronatus*, Prov.

The mode of life of a Tortoise Beetle that has lately made its appearance in the neighborhood of Quebec is a remarkable one. The larva feeds on the burdock and the thistle. It moulds its exuviæ and dejecta into a screen which it supports over its body by means of its forked tail—thus disguising itself from its enemies, and sheltering itself from the hot sun. When it goes into pupa it cements itself to the leaf. The pupa is brown and drab, and, round

the abdomen, is set with white branched spines. The perfect insect is a pretty pea-green, shield-shaped beetle. I have described it in the *Canadian Entomologist* for this month.

The Syrphus flies (Fig. 14) lead a remarkable life. Their larvæ come from eggs laid upon plants on which aphides abound. They are blunt at one end and tapering at the other, and they have powers of extension and retraction (Fig. 15). They drive their sharp mouth organs into the aphides and suck them dry—as a boy might suck an orange—rejecting the skins. They spend the pupal period of their existence in curious hunched-up cases. The flies are handsome. They sustain their life upon the nectar of flowers, and they may be seen upon the heads of yarrow as late as the beginning of October. There are several species of them.

One day in September I was examining the blossoms of the Turtle-head (*Chelone glabra*), and admiring the beautiful gothic arches formed by the curved stamens and the flocculent anthers. I noticed that the pistil of the blossom extended over these and was bent down in front of them so that it would come in contact with intruding insects and be charged with pollen that they conveyed. I looked round to see what insect would venture to open that Turtle-mouth and tread that arched way. A movement in one of the blossoms arrested my attention and I saw that there was an insect within. So busily engaged in the recesses of the flower was this spoiler that I was able to pluck the blossom and put it and its occupant into a box that I had ready.

Fig. 14.—Syrphus fly.

Fig. 15.—Syrphus fly larva sucking out the vital fluids of an aphis.

Fig 16 —Lace-winged fly.

Fig. 17.—Lace-winged fly, eggs and larva.

On reaching home I found that the fly was *Syrphus Americana*, Wied. The Syrphus fly is a beneficial insect—it leads a useful life.

V. We say that the plant is teeming with life, meaning that numerous living things infest it.

At Montmorency, on the 30th of July, I noticed something peculiar in the plants of *Œnothera biennis*, L. that abound there. Instead of growing in a graceful spike, the flower-buds were crowded in a flattened mass. I plucked a number of the heads and examined them at leisure. They were alive with aphides, and preying upon these were larvæ of the Lace-wing fly (*Meleoma Slossonæ*, Banks) (Figs. 16 and 17) and larvæ of four kinds of Syrphus flies, viz., *S. arcuatus*, Fallen, *S. Americanus*, Wied., *Platychirus quadratus*, Say, and *Sphœrophoria cylindrica*, Say. I also found in them caterpillars of the noctuid *Alaria florida*, Guenèe, and of a beautiful little Tortrix that is new to me. From the aphides I obtained some minute Proctotrupids.

Another plant that abounds with insect life is the Golden Rod (*Solidago Canadensis*, L.). At the summit of the flower-head works the larva of *Pedisca Scudderana*, Clem. In the stem are found the hollow galls of *Gellechia gallo-solidaginis*, Riley, and the pithy galls of *Trypeta solidaginis*, Fitch. In the leaves are the disks caused by the fly called by Osten Sacken, *Cecidomyia carbonifera*. These three last named species are liable to the attacks of parasites. Among the blossoms of the plant lurks the Hemipteron *Phymota erosa*, Linn. awaiting its prey; and numbers of butterflies, moths, bees and flies resort to the plant—it abounds with life.

One of the most remarkable assemblies of insect life that I have witnessed was on the walls of an electric power-house at Cote St. Paul, Montreal. The building was close to the

Lachine canal and near the aqueduct. Low down in front of the building was an arc light. Attracted by this was an innumerable company of Neuroptera. Both the variety of species and the number of each kind were surprising. It was a calm, soft evening, a very gala time for the Neuroptera. In the assembly were the beautifully striped *Macronema zebratum*, Hagen, the elegant *Setodes exquisetor*, Walker, with its golden spotted border, and the diaphanous *Chloroperla bilineata*, Say.

VI. By the word life we sometimes understand a life history.

Scattered through the pages of the *Canadian Entomologist* will be found many life-histories of various kinds of insects. They may not, by the general reader, be deemed as valuable as "Plutarch's Lives," or "Walton's Lives"; but to entomologists they are deeply interesting; and we gladly welcome every addition to their number.

Among the most wonderful of the insect life histories I have read, are those of *Hormaphis hamamelidis*, Fitch, and *Hamamelistes spinosus*, Shimer. They appear in "Technical Series, No. 9, U.S. Department of Agriculture," and are written by Mr. Pergande. The creatures whose lives are recorded are two species of plant-lice inhabiting both the witch-hazel and the birch.

Mr. Pergande tells us that,—"The study of the life history of these, after numerous failures and disappointments, *covering a space of twenty-two years of patient labour*" was at length brought to a successful conclusion. I will speak only of the first named insect.

It lays its eggs in October upon the branches and twigs of the witch-hazel. They produce stem-mothers, which in colour are of a dull black, and are set with white, iridescent waxy rods. Around each of these stem-mothers a gall is formed within which it lives. It changes its skin three times before attaining its growth. It then brings forth its progeny (numbering 100 or 120) within the gall. These are the *migrants*. They grow rapidly, changing their skins four times. At the last change they become winged. They leave the gall at the end of May and seek, and settle upon, the black birch. They are of a dark purplish colour and have colourless or slightly dusky wings.

Each migrant deposits about fifty larvæ upon the under side of the birch leaves. The larvæ change their skins three times, and then present an extraordinary appearance. They are almost round and flat, and have a fringe of cylindrical waxy rods. Their body colour is dusky brown, or black; and, in the fringe, the lowest third of each rod is white, and the other two-thirds glassy and iridescent. The insects at this stage are closely cemented to the leaf. After two generations more, and about the end of August, comes the sixth generation or *return migrants* which undergo four changes—becoming pupæ at the fourth. These pupæ produce the winged insects that return to the witch-hazel. The migration continues throughout September. From these return migrants comes a brood of wingless males and females, the latter of which deposit their eggs upon the witch-hazel twigs in October, as was at first stated.

We have dwelt upon insect life in the different meanings in which the term is used. I trust that your interest in the subject will not end with this night's proceedings. All around us, and all the time, there are natural objects and workings of nature deserving of our close attention. "For everything there is a purpose, and in everything there is a meaning, if only we have the eyes to see it, and the hearts to understand it." The Entomological Society of Ontario was intended to be, and *is*, a guide to nature studies. If any gentleman present be not a member of the Society, I invite him to join it. In entomological pursuits he will learn lessons of God's power and goodness that will strengthen his higher life; he will acquire information that will be of interest and service to him all his life long. His presence at our meetings will give new life to our proceedings. He will find new interests and pleasures that will banish *ennui* from the life he leads; and in the end, if he has proved a useful member of the Society, the editor of the day will, I doubt not, *write his life-history for the pages of the "Canadian Entomologist"!!*

PROF. JAMES: Ladies and gentlemen, we always look for a paper of much interest from Dr. Fyles, and he has kept up the good reputation he has already achieved in this Society by his paper this evening. I have always taken a great interest in the Society and never fail to read anything the Doctor has written. I remember some years ago reading some reminiscences of the life of Philip H. Gosse, a celebrated entomologist who lived in that part of Canada from which the Doctor comes. I consider his paper on the insects of the Bible one of the most instructive papers I have ever read; and others upon the insects of Shakespeare and of our modern poets most interesting and attractive. The Doctor is always able to add a literary finish to his work on entomology. He tells us to-night in one place that natural history is full of surprises, and this reminds me of a little incident I read in a New York paper. Cooper, the novelist, in one of his stories described a young man driving along the road who came to a house, pulled up his horse, jumped down from the rig and tied his horse to a locust. The supposition is, of course, that a locust tree was meant, when, however, the French translator came to this passage he evidently was stuck by the word "locust." He turned to his dictionary and found only one meaning, and that was the locust or grasshopper (*Sauterelle*), and he makes Cooper's young man tie his horse to a grasshopper! This rather staggered the translator, and he thought it necessary to add a foot-note, which ran as follows: "In America the grasshopper grows to a very large size, so they stuff them and add a few weights to hold them down and place them in front of their houses to use them as tie-posts"! The natural history of America certainly is full of surprises.

SOME COMMON BUTTERFLIES, AND SOME NOTED BUTTERFLY HUNTERS.

BY WM. LOCHHEAD, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

The younger students of insects, and those of us who are actively engaged in the warfare against injurious insects, can hardly realize the conditions under which the older entomologists worked; and I make bold to say that we will never know how much we owe to them. We are indeed fortunate in our day and generation. We have ready access to large collections correctly named and arranged through no effort of ours. We have scores of splendidly illustrated volumes, each of which can be bought for a trifle and placed on the shelves of our own library. We have numbers of specialists who can help us out of the many small difficulties which often arise. All of these privileges were denied to the workers of a generation ago, and we marvel at the amount of good work done under obstacles which would now be termed well nigh insurmountable.

It is my purpose this evening to tell you something about some of our great collectors, including some of those stout-hearted men who worked unremittingly without hope of money reward, and more than that, without the sympathetic encouragement of the people whom they were trying to help. They were looked upon as harmless "bug-hunters", and they were allowed to live, because the community believed that it took all kinds of people to make a world. But times have changed. Entomologists are now looked upon as persons who are doing a necessary and a valuable work for the country. Governments spend money on their support, College chairs are endowed that students may receive instruction in Entomology, people are beginning to clamor for a better knowledge of insect-life, and the parents of school children are demanding the introduction of Nature Study into our schools.

I wish to state at the outset that Entomology knows no national boundaries, for the entomologists of all countries form one grand brotherhood of workers. Naturally, then, I shall not confine my remarks to our Canadian band. I shall introduce to you many co-workers from the United States, co-workers whom we always delight to honor, for to them we owe much.

With the aid of the electric lantern, I hope to make quite real both the persons and the insects about which I shall speak. I regret that, through oversight on my part, lantern slides of some of our prominent collectors were not prepared.

The first face shown on the screen is one quite familiar to a London audience. The name of Dr. Bethune is well known in scientific circles throughout Canada, the United States, and Europe. He has been Editor of the "Canadian Entomologist" for upwards of 22 years, and the credit of its present high standing is due almost entirely to his brilliant work. Dr. Bethune was a contributor of valuable papers on insect-life nearly 40 years ago. He is one of the few surviving charter members of the Entomological Society which was organized in 1863. From 1865 to 1873, Dr. Bethune was Editor of the Entomological department of the Hon. Geo. Brown's "Canada Farmer", and for nearly 40 years he has contributed articles to the agricultural papers on subjects of economic importance.

The second face is also familiar to Londoners. Dr. Saunders and Dr. Bethune were a fine team of workers. He, too, is a charter member of the Entomological Society of Ontario, and until he became Director of the Dominion Experimental Farms was one of the leading authorities on Entomological subjects. His work "Insects Injurious to Fruits," published in 1883, is still the best thumbed book on the shelves of the working Economic Entomologist.

The third face is also familiar to Londoners. Mr. J. M. Denton was one of the most earnest collectors of our Society. Readers of the Annual Reports of the Entomological Society recognize how much he helped to make those Reports so valuable.

The fourth face is that of our worthy President,—Rev. Dr. Fyles of Quebec. He and Mr. Lyman of Montreal whose picture follows have done much in stirring up the enthusiasm of lovers of insects in our sister province, and both have done work of real scientific merit.

Our sixth face is that of Mr. Harrington of Ottawa, and is probably not so well known as the preceding, since his duties at Ottawa have prevented his attendance at our annual meetings for four or five years. Mr. Harrington is one of the leading authorities in America on Hymenoptera and Coleoptera. He is one of our younger men, so that much may yet be expected of him.

The seventh face is one well known from the Atlantic to the Pacific. I do not care to say much about Dr. Fletcher in his presence, suffice it to say that his heart and head are as large as his body, and that is saying a great deal. Long may he live to fill the position which he now adorns!

The last Canadian to whom I shall refer is the Abbé Provancher of Laval University, Quebec. In 1869, this indefatigable worker, without the aid of reference libraries or access to reference collections, began the "Naturaliste Canadien" and continued this magazine up to 1891, completing 20 volumes. In the meantime, in 1874, he began his "Faune Entomologique du Canada," a series of volumes devoted to descriptions of Canadian Insects. The first volume, completed in 1877, is devoted to Coleoptera. In 1878-79-80, he issued supplements to this volume. In 1883, he completed a second volume which was devoted to the Orthoptera, Neuroptera and Hymenoptera; and a little later he published additions to his Hymenoptera. In 1890, he completed his third volume devoted to the Hemiptera. He died in 1892. I regret that I am unable to present a likeness of this able French Canadian Naturalist.

Now, I turn to our co-workers in the United States. The first is T. Wm. Harris, who lived from 1795 to 1856. This man was the first paid American Entomologist, and his publications date from 1823. These were followed by a long succession of interesting and original articles dealing chiefly with the injurious Insects of New England. He published a Report entitled "Insects Injurious to Vegetation" in 1841, this being known now as "A Treatise Upon Insects Injurious to Vegetation." As Dr. Howard remarks: "This book is to-day as valuable as when first written, more than 50 years ago." In the early part of his life, Harris

worked practically alone ; but, in 1854, Dr. Asa Fitch was appointed Entomologist for th State of New York. Dr. Fitch was born in 1809 and died in 1879. He published 14 reports, in all of which are observations and work of a valuable character.

The next picture is that of Townend Glover, who might be called the first entomologist of the Federal Government at Washington. His first report dates from 1854. For the 10 years between 1856 to 1866, Fitch and Glover were the only Economic Entomologists of great note in America.

The next face is that of Benj. D. Walsh, an Englishman by birth, who was a contemporary of Fitch and Glover, but began later than the previous two to write articles along economic lines. In 1868, Walsh was appointed State Entomologist for the State of Illinois. He is said to have been a very interesting speaker, and one who could hold an audience of farmers for hours at a time when he dealt with entomological subjects.

The next face is that of C. V. Riley, who also came from England,—one of the most famous economic entomologists the world has ever produced. In 1868, Riley was appointed entomologist for the State of Missouri. He published 9 annual reports covering the whole field of economic entomology. In 1878, on Glover's death, Riley was appointed entomologist of the United States Department of Agriculture. With the exception of two years, when Prof. Comstock was entomologist, Dr. Riley had charge of the Government work up to June 1894, when he was succeeded by the present entomologist, Dr. L. O. Howard.

Dr. Howard is a leader among entomologists ; and, as chief of his department, has been a great success. He has the faculty of gathering around him a strong corps of assistants, and these he encourages to do much original investigation by giving them full credit for all the work they do. Dr. Howard is a prolific writer—his latest important publication being "The Insect Book," an illustrated manual of popular entomology.

Our next picture is Dr. J. B. Smith of New Jersey in his office and laboratory. He is another of our best known entomologists. In 1895, he published a college text-book called "Economic Entomology," a valuable guide to the insects which are of economic value. Dr. Smith is a specialist in the Noctuid family of moths.

The next is Dr. W. J. Holland of the Carnegie Museum, Pittsburg. His specialty is the Lepidoptera, and his most recent work is the "Butterfly Book" which should be in every school library. It is a marvel of cheapness and profusely illustrated with coloured plates.

Next comes W. H. Edwards, the great Lepidopterist. His grand work on the butterflies of North America is a monumental one, filling three large quarto volumes with exquisite coloured illustrations.

The next picture is that of Prof. Comstock of Cornell University. Although an investigator of great originality, his strongest claim on the brotherhood of entomologists is the inspiring influence which he has exerted on the many students who flock to his class-room and laboratory. I may say truly that about two-thirds of all the entomologists in America to-day have been in his laboratory and have come under his influence. His published works are known to every student. They have done much to systematize the study of insects, and to make it possible for the young collector to make headway.

Next comes one of our famous women who have popularized the study of insects. Mrs. Comstock is a meet companion and helpmate for the Professor. Besides being a student of insects, she is an illustrator of insect life and has prepared a large proportion of the illustrations in her husband's books. For the past two years, she has been devoting her attention to the extension of Nature Study in New York State.

The next woman is the late Miss Ormerod of England. She has done more than any other person in Great Britain to build up economic entomology. Her reports published a her own expense, are almost invaluable, and her Manuals are classics.

The last picture is that of Prof. Webster, whom most of our members know well. For

many years, he attended our annual gathering, and assisted us in our discussions ; he moreover helped us when we were fighting the San José scale. Having received an appointment in Illinois, he is now unable to be with us, much to our mutual regret.

Now we come to the consideration of some of our common butterflies and moths. (Colored illustrations of the following were presented by means of the lantern) ; Papilio turnus ; Vanessa antiopa ; Pieris rapae ; Anosia archippus ; Eudamus tityrus ; Samia cecropia ; Hyperchiria io ; Phlegethontius celeus ; Everyx myron ; Deilephila lineata ; Tropæa luna ; Œdemasia concinna ; Orgyia leucostigma ; Bombyx mori ; Cutworms ; Clothes' Moths ; Hyphantria cunea ; Acronycta ; Prionoxystus robiniae ; Halisidota ; and Sannina exitiosa.

In most cases, all the four stages egg, caterpillar, pupa, and imago were shown. Such forms as Pieris, Orgyia, Bombyx, Cutworms, Clothes' Moths Hyphantria and Sannina, which are of economic importance, were dwelt upon more at length.

At the conclusion of Prof. Lochhead's lecture, Dr. Fletcher rose and said : I am sure everyone present has been much pleased with the entertainment we have had this evening ; Dr. Fyles's delightful address, full as it was of so many ideas of interest, must have pleased everybody. Prof. Lochhead's illustrations with his remarks will, I have no doubt, teach us a great deal about insects, and I have much pleasure in moving a vote of thanks to Dr. Fyles and to Prof. Lochhead.

The motion was duly seconded and carried unaminously.

Dr. Bethune : Before we separate I should very much like to propose a vote of thanks to the chairman for the very able manner in which he has presided here to-night, and for coming from Toronto to be with us, also for his interesting remarks at the beginning and at other times during the proceedings ; and I should like to add to this vote of thanks the name of Mr. Principal Merchant, who has kindly allowed us the use of this lecture room, and of Mr. Dearness for the able way in which he has taken charge of the lantern.

The motion was seconded and unaminously adopted.

Mr. Dearness made a suitable reply on behalf of himself and Mr. Merchant, and the meeting adjourned.

SECOND DAY'S SESSION.

Thursday, October 30th, 1902.

The Entomological Society resumed its meetings at 11 o'clock, a. m., the President, Rev. Dr. Fyles, occupying the chair. The Directors' Reports on the insects of the year were first called for ; at the close of the reading of each there followed a general discussion on the insects referred to and much valuable information was given. Specimens were also exhibited in illustration of the subjects treated of, many of which were presented to the Society's collections. The reports of the Council and officers for the past year were read and adopted ; the meeting then proceeded to the election of Officers, which resulted as shown on page 2. The reports of the Branches and Sections were read and approved.

In the afternoon the Society met at 2.30 o'clock and the chair was taken by Prof. Lochhead, the newly elected President. After the reading of Reports was completed, papers were read by Dr. Fletcher, Prof. Lochhead, Messrs. Moffat, Lyman, Stevenson, Norris, Gibson and others, and were in many cases fully discussed. The majority of the papers are published in the following pages, but a few, being of a technical character, are to appear in the "Canadian Entomologist," the monthly organ of the Society ; among the latter should be mentioned papers by Dr. Fletcher and his assistant Mr. Arthur Gibson on "The Life-history of the Variable Cutworm, *Mamestra Atlantica*"; by Mr. Gibson on the Canadian species of the genus *Apantesis* (*Arctia*) with special reference to the larvæ ;" and "the Life-history of *Crocigrapha Normani*."

A large number of rare and interesting specimens were exhibited by Dr. Fletcher, Dr. Fyles, Mr. A. Gibson, Mr. C. H. Young, Mr H. H. Lyman, Prof. Lochhead, Mr. J. D Evans, Mr. G. Chagnon and Mr. A. E. Norris.

The following exhibits were made by Dr Fletcher and Mr. Arthur Gibson :

A beautiful series of *Smerinthus ophthalmicus* reared from eggs received from Mr. J. W. Cockle, of Kaslo, B. C. Most of the specimens were of a beautiful fawn colour, although the female which laid the eggs was of a slaty grey tint.

A series of *Nemeophila petrosa* from eggs collected at Banff by Dr. Fletcher, and to compare with these a series of the form known as *Nemeophila Selwynii*, Hy. Edwards, from Nepigon. Dr. Fletcher stated that although the Rocky Mountain form was extremely variable, one specimen being actually almost undistinguishable from *N. Selwynii*, the species taken at Nepigon was extremely constant in markings. Of hundreds taken during the last ten years he had never been able to catch, or rear, one which approached the western form in the amount of markings. The only difference noticeable between extreme examples of these two forms, which seems constant, is the presence, at the base of the costa of the western form, of an orange mark of varying length.

Life histories of the following species, showing larvæ in all stages, pupæ and moths :

Crocigrapha Normani, Mamestra grandis, Mamestra atlantica.

Two new strawberry pests from Vancouver Island, *Petrophora truncata* and *Scopelosoma tristigmata* were also shown in their different stages.

Hemileuca maia, var. *lucina*, from Mr. Criddle, Aweme, Man.

Coenonympha inornata taken at Ottawa this year for the first time by Mr. A. E Richard.

Erebia disa from Banff, Alta.

A series of *Erebia epipsodea* showing great variation in the undersides.

Lycæna pseudargiolus, var. *nigrescens*, a new variety from Mr. Cockle, of Kaslo, B. C.

Lycæna pseudargiolus, var, *argentata*, a new variety from Manitoba (E. F. Heath).

Plusia formosa, from Mr. W. McIntosh, St. John, N. B.

Semiophora elimata, from Mr. W. McIntosh, St. John, N. B.

Phyciodes Hanhami, a new species from Manitoba somewhat resembling *P. nycteis* on the underside.

The brown-tail Moth, (*Euproctis chrysorrhoea*) a perfect male, the first specimen recorded from Canada, which was taken by Mr. W. McIntosh, at St. John, N. B.

Chrysophanus dorcas, male and female, a species taken on the Georgian Bay, at Nepigon and at Rounthwaite, Man. which Dr. Fletcher believes to be the true *C. dorcas*, of Kirby.

A fine specimen of *Euprepia caja*, var. *Utahensis*, bred from larva received from Mr. E. P. Venables, Vernon, B. C.

Mr. Gibson in illustration of his paper on Canadian species of the genus Apantesis (Arctia) exhibited a fine series of *phalerata* and *nais*, with larvæ in different stages, as well also of specimens of *vittata*, *Anna*, *Williamsii*, with the var. *determinata*, *ornata*, with the var. *achaia*, *phyllira*, *rectilinea*, *Celix*, *figurata*, *michabo*, *Nevadensis* and *complicata*. Besides these he showed three specimens of a species which Dr. Dyar thinks may possibly be *Quenselii*, var. *turbans*, described from Mongolia, and which is new to North America. These were collected at Calgary, N. W. T. by Mr. T. N. Willing, and in a general way somewhat resemble small specimens of *virgunculu*.

Rev. Dr. Bethune exhibited the type specimen from which Dr. Saunders described *A. Celia* which is now believed to be a good species.

Votes of thanks were passed to the following :

Mr. C. H. Young, Ottawa, for a donation of specimens for the Cabinets, including inflated larvæ of 6 species of noctuid larvæ.

Mr. A. E. Norris, Montreal, for sending for exhibition a collection of lantern slides taken by Mr. A. H. Holden and beautifully coloured by Mr. Norris, and also for sending for exhibition a collection of insects to illustrate his paper on the Insects of the year at Montreal.

Mr. G. Chagnon, Montreal, for a pair of the new species of Dipteron, *Tephronota Canadensis* lately described.

Dr. Fletcher, for a pair of *Chionobas Macounii* for the Society's Cabinet.

Mr H. H. Lyman, Montreal, for a specimen of *Argynnis Chariclea.*

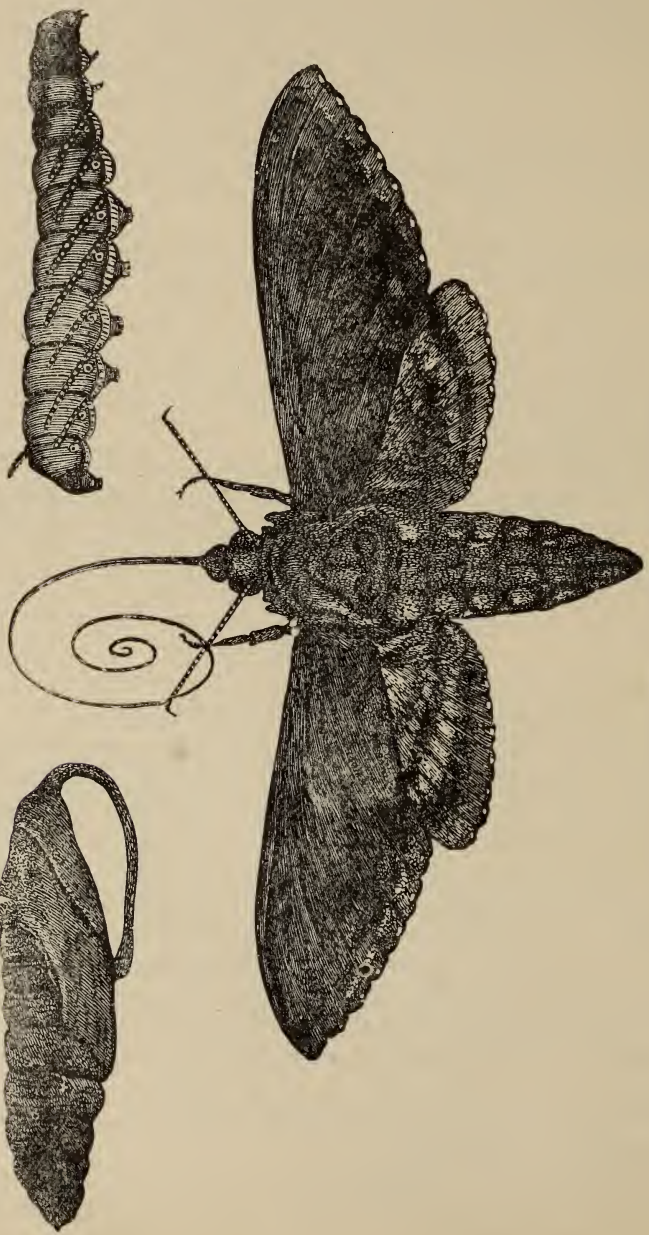


Fig. 19. Protoparce celeus: Caterpillar, Chrysalis and Moth.

REPORTS ON INSECTS OF THE YEAR.

Division No. 1.—Ottawa District. C. H. Young, Hurdman's Bridge.

The season of 1902 in the Ottawa district has been a very poor one for the collector. The writer, outside of some success he had at Meech's Lake, Que., during a six week's stay, took very few acceptable things.

The very cold and wet season, especially in May and June, doubtless was the cause of such a poor year. In August, which month I spent at Meech's Lake, however, I was fortunate enough to capture a good number of interesting species, some mention of which I will make afterwards.

The most noticeable injurious insect of the season around Ottawa was doubtless the Birch Skeletonizer (*Bucculatrix Canadensisella*) which was so abundant last year, and which, the present season, seemed to do just as much damage to birches of all kinds. It was this year accompanied, however, by numbers of a large, grayish green aphid, and the damage was specially noticeable towards the end of August.

Garden crops were attacked to some extent in this district. The Onion Maggot was very troublesome in some places and caused considerable loss.

Asparagus plants in my garden were rather seriously attacked by the larvæ of *Peridroma occulta*, one of the large noctuid moths. This caterpillar when mature is a large cutworm, and is very voracious, feeding at night, and hiding in the earth at the foot of the plant during the day. Towards the end of September a neighbour of mine brought me some specimens of the Tomato worm (*Protoparce celeus*), Fig. 19, saying that they were doing damage to the foliage of his tomato plants. I immediately went over to his place and in two rows, one about a hundred feet long, the other about fifty, I collected 59 specimens of this caterpillar. On the 1st July I noticed three insects resting on the stem, of a leaf of vegetable marrow, and on collecting them was surprised to see that they were genuine specimens of the Squash Bug, Fig. 20. Dr. Fletcher in his report for 1901, says, "This bug is very rare indeed at Ottawa: Twenty years ago, two specimens were taken here by Mr. W. H. Harrington and none were seen since, although looked for carefully, until the past season, when a few specimens were taken." Dr. Fletcher recommends:

Fig. 20. Squash-bug.

(1.) "Hand-picking, early in the season, of the old bugs when they first resort to the plants, and also of the easily seen egg clusters. This requires an inspection of the vines every day or two. The young bugs may be easily destroyed with a spray of kerosene emulsion, or of whale-oil soap.

Fig. 21. Mamestra picta: *a*, Zebra caterpillar; *b*, Moth.

(2.) Trapping,—This consists of placing at intervals through the plantation, shingles or pieces of board, beneath which the bugs gather for shelter. By examining these every morning, many may be captured. In a season when the bugs have been abundant, all vines should be burnt as soon as the crop has been gathered. In this way, many of the insects in all stages of development will be destroyed."

The Caterpillars of the White Cabbage butterfly were not so numerous as last year but caused, however, some harm in turnip and rape fields, as did also the Zebra caterpillar (*Mamestra picta*) Fig. 21, which was

fairly abundant. Early in the year hundreds of cut-worms of *Noctua fennica* were present in clover fields but I have not heard of their having done serious damage.

During the season considerable attention has been given to studying life histories, particularly of lepidoptera. Many specimens have been reared and some additions made to our knowledge of common species.—Some of the results of this work are submitted herewith showing the larvæ, pupæ, and perfect insects and in some cases parasites also of :—

Hydrœcia cataphracta .....In burdock. (*Lappa major.*)
Gluphisia trilineata .....On Aspen. (*Populus tremuloides.*)
Edema albifrons.....On Oak.
Lycomorpha pholus.....On lichen on rocks.
Eudryas grata..... .....On grape vines.
Metzeria lappella .....Seeds of Burdock.
Euplexia lucipara.....Ferns of all kinds.
Peridroma occulta .....Injuring asparagus.
Mamestra legitima.....On asparagus and clover.
Papilio asterias.....On parsnip, celery and carrot.
Sphinx eremitus.....On Mentha and Monarda.
Notodonta stragula.....On hazel nut.
Leucania albilinea.....On grass and clover.
Pyrameis huntera.....On Pearly Everlasting.
Calocampa curvimacula ... .On Apple.
Arctia virgo.....On Plantain, dandelion, etc.
Synchlora rubrifrontaria.....On *Quercus macrocarpa.*
Feniseca tarquinius..... On *Schizoneura tessellata.*
Ichthyura albosigma..... On Aspen. (*P. tremuloides.*)

The following species have also been reared.

Basilarchia disippus.....from egg.....On Willow.
Grapta progne ..... " .....On Wild Gooseberry.
Xylina Bethunei ..... " .....On Apple.
Xylina disposita ..... " .....On Apple.
Xylina Grotei .... " .....On Maple.
Ypsolophus pometellus..... On Apple.
Hyperchiria Io ..... On Aspen and basswood.
Mamestra picta ..... On Turnip
Noctua fennica .. .. On Clover.
Noctua collaris .... On Clover, grasses, etc.

I noticed in examining the collections of the Society last year that some of the specimens are faded or imperfect. I have therefore much pleasure in presenting the following which I trust may be found acceptable :

Larvæ of Mamestra picta, Calocampa curvimacula, Noctua fennica, Xylina Bethunei, Xylina disposita, Orgyia leucostigma, Datana ministra ; Moths of Eudryas unio, Lycomorpha pholus (2), Epirranthis obfirmaria (2), Mamestra lorea (2), Abrostola urentis, Alaria florida, Hadena verbascoides, Xylina pexata (2), Cirroedia pampina ; larvæ of Papilio asterias.

Division No. 2.—Bay of Quinte. By J. D. Evans, Trenton.

No cases of serious injury from noxious insects came under the writer's notice, although late in the season *Colias philodice* (Fig. 22) and *Pieris rapæ* (Fig. 23) were quite numerous, flitting about the clover fields containing the ripened second crop.

Much damage has been caused, however, to some orchard and farm crops from the unusual character of the season throughout this section; it having been generally speaking extremely wet and remarkably cool. The principal crops thus severely injured are the apple, clover, potato, corn and tomato. The first mentioned (apple) is very abundant, but the fruit is being destroyed by a fungus growth, which may not appear to be of much consequence when the apples are being packed but develops enormously in a short time and renders the fruit unfit for sale. A sample is herewith submitted of a test case, where a fruit packer put up a barrel of choice apples which had insignificant looking spots when packed; they were packed in the usual careful manner, placed on board of a steamboat and left under the usual conditions of transhipment on board for three weeks, at the expiration of that time they were opened up and found to be covered with the large scabs which appear on the samples exhibited. [The sample apples shown were so damaged as to be perfectly worthless.]

Fig. 22. Colias philodice. Colours: yellow and black.

Fig. 23. Pieris rapæ. Colours: white and black.

The potato crop is almost an entire failure owing to a blight which struck the vines when in bloom and developed into rot in the tubers.

A large proportion of the red clover hay was partially, and in cases wholly, spoiled in the curing owing to the continuous rains prevalent at that time. From a like cause coupled with the low temperature, corn and tomatoes, which are grown in large quantities for canning purposes were, generally speaking, a failure.

Division No. 3.—Toronto By E. M. Walker.

During the present year but few observations were made by the writer on the ravages of injurious insects, owing to a necessary absence from the city during a large part of the season,

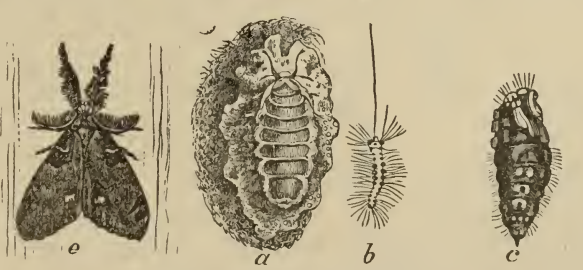


Fig. 24. Tussock Moth: *e* male moth; *a* female moth on cocoon; *b* young larva; *c* chrysalis.

and being fully occupied with other matters during the remainder. A few of the most prominent pests were noted, however, though doubtless many species of equal importance escaped observation.

Tent caterpillars (*Clisiocampa Americana*) were not specially bad this year. A few were seen on the wild black cherry early in the season but fruit trees on the whole have been comparatively free from them.

Another enemy of the apple, the Codling moth (*Carpocapsa pomonella*) committed considerable injury this season, and in one orchard, for example, on Davenport Road, evidences of its presence could be detected in about seventy-five per cent. of the apples.

The Tussock moth (*Orgyia leucostigma*) Figs. 24 and 25, is still by far the most formidable enemy of our shade trees, although it appears to be gradually diminishing in numbers and was distinctly less abundant than it has been during the past three or four years. Very few trees were observed that were completely stripped or nearly so, though in the lower part of the city there were a good many badly disfigured trees. Very little has yet been done to control its ravages.

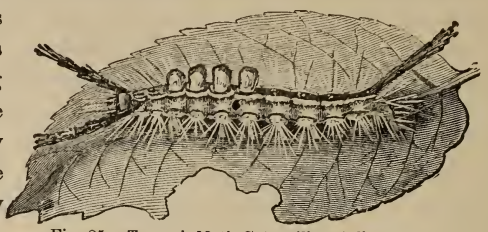


Fig. 25. Tussock Moth Caterpillar, full-grown.

On the above property there was a large plantation of red currant bushes, which, at the time they were seen by the writer (August 15) were almost completely stripped by the larvæ

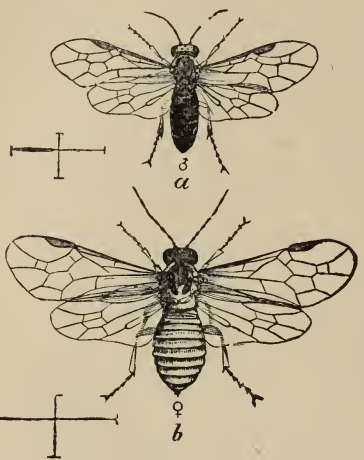


Fig. 26. Currant Saw-fly : *a* male ; *b* female.

Fig. 27. Currant Saw-fly caterpilars.

of the imported currant Saw-fly (*Nematus ventricosus*) Figs. 26, 27 and 28. They occurred in ultitudes and in various stages of development, and although the currant bushes were nearly bare of foliage, an adjacent patch of gooseberries was almost entirely free from the pest. Notwithstanding the condition of the foliage the fruit was abundant and of large size.

About the middle of May a large number of Pin cherry trees (*Prunus Pennsylvanica*) in High Park were found to be badly attacked by the Cherry Aphis (*Myzus cerasi*) the leaves at the ends of the branches being very much crumpled and disfigured. Subsequently they were found plentifully on the wild black cherry and also on the cultivated cherry.

Fig. 28. Currant Saw-fly : leaf showing eggs and holes eaten by the young larvæ.

The Cabbage Butterfly (*Pieris rapae*) has been exceedingly abundant this summer and has caused a great deal of damage to cabbages and allied vegetables in this locality. On August 15, while inspecting a large market garden north of the city, the writer observed great numbers of the larvæ in all stages on a large bed of cabbages. They were to be found practically on every head, and many plants were quite unmarketable. An adjacent bed of cauliflowers was but little affected, though a few caterpillars were found on some of the heads. In another bed of cabbages only a few hundred yards distant from the one just referred to, the caterpillars were much fewer in numbers though plentiful enough.

The only other serious pest noticed attacking garden vegetables was the Potato Beetle (*Doryphora 10-lineata*, Say), which occurred in distressingly large numbers on potatoes, though tomatoes as far as the writer observed were pretty free from them.

An insect injurious to shrubs and shade-trees which seems to be on the increase lately is *Ormenis pruinosa*, a large stoutly-built leafhopper resembling a small bluish grey moth. I first noticed them in large numbers in 1901 on some shrubs which were planted in the spring of the same year. This year they were everywhere and showed themselves to be possessed of by no means a restricted appetite. While most abundant on the Virginia creeper and grape-vine they were common on many other shrubs and trees, etc., such as the elm, maple, bass-wood, gooseberry, almond, Tartarian honeysuckle and rhubarb. The larvæ are whitish creatures not much like the adults in appearance, and have the habit of arranging themselves in irregular rows along the smaller branches and twigs, the whole aggregation being partly enveloped in a white flocculent material. The full-grown insects were first observed towards the end of July and remained until the beginning of October. Late in September they could be seen resting on the trunks of almost every shade tree except horse chestnuts, upon which they were very scarce and were probably accidental.

Among the insects which were abundant last year but have not been troublesome this season the Birch Bucculatrix (*Bucculatrix Canadensisella*) is noteworthy. The trees have been quite healthy the whole of this year, though in May I noticed that some of them were rather badly infested with a large species of aphid. Butterflies on the whole have been scarce according to the statements of local collectors, and two of our most destructive grasshoppers *Melanoplus atlanis* and *Camnula pellucida* were not nearly so numerous as usual, probably owing to the wet season, since both species thrive best in hot dry weather.

Division No. 5—London District. By J. A. Balkwill.

I am very happy to report that we have not had any insect visitations of a serious nature in this district during the past season.

Last winter my attention was called to some larvæ which were doing considerable injury to hay in barns in a part of London Township. They were so plentiful that I collected over 30 of them from a small handful of hay, and Mr. Moffat kindly identified them as the Dry Clover Moth (*Asopia costalis*), Fig. 29. By spinning their webs over the stems of the hay, they made it so unpleasant that horses and cattle did not care to eat it, and it thus caused a serious loss to those in whose barns it was found.

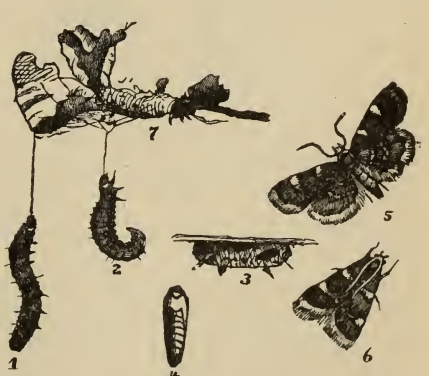


Fig. 29. Clover Moths, Caterpillars and Chrysalis.

Fig. 30. 12-Spotted Asparagus Beetle (greatly magnified).

In August, during our Horticultural Society's Flower Show, Mr. Butler, St. George Street, London, asked me if I knew a beetle that attacked the asparagus; from his description I suspected that it was new, and therefore asked him to bring me some of them, which he did the next day. On shewing them to Dr. Bethune, who is always willing to oblige, he identified them as the Asparagus beetle *Crioceris 12-punctata* (Fig. 30). This, I think, is the first record of this insect for the London district.

The Codling Moth has not been as much in evidence this season as formerly, no doubt caused by the cold, wet weather, and this, I think, is the reason that insects in general have not been so plentiful as usual, mosquitoes excepted.

The Datana, which did so much injury to Black Walnut and Hickory trees last year, appeared again this season, but in very much smaller numbers, and the damage was very light.

The Buffalo Carpet Beetle (Fig. 31) has become a serious pest in this district, and causes great loss in carpets and other woollen articles. To give an idea of how plentiful they are, I may mention that on one bush of Spiræa in 5 days I collected over 100 beetles.

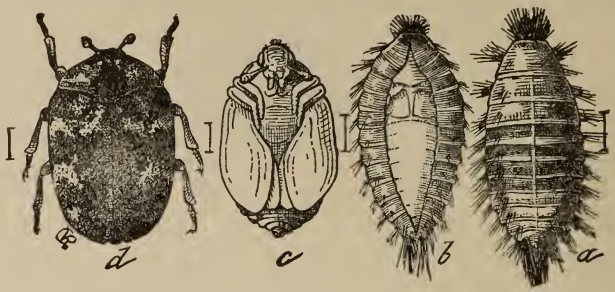


Fig. 31. Buffalo Beetle. *a*, larva (destructive stage) ; *b*, pupa within larval skin ; *c*, pupa ; *d*, beetle—all much magnified.

In the discussion which followed the reading of the Directors' reports, Prof. Lochhead remarked upon the progress of the Asparagus beetles. *Crioceris 12-punctata* (Fig. 30) had taken the lead of the other species, *C. asparagi* (Fig. 32), in their westward movement, while in the neighboring States the opposite was the case. Last year they had reached Guelph, the former species being much the more abundant, and now it alone had arrived at London. Dr. Fletcher stated that in the Niagara District both species were equally abundant, and he thought it remarkable that the 12-spotted beetle should have moved faster than the other. The asparagus rust he found very injurious last year at Ottawa, but this year there was very little of it. Mr. Balkwill had observed the same thing in gardens in London, where much injury had been caused by rust last year it was not noticeable this summer ; he also stated that the Codling Moth was very little in evidence in this neighborhood. Mr. Fisher asked how it was that the Codling Moth was so rare in the District referred to. Mr. Balkwill said that he could not account for it, as the owners of orchards had done no spraying. Mr. Fisher thought that the diminution in the numbers of the insect must have been caused by the small crop of fruit last year, which deprived it of a sufficient supply of food, and therefore prevented a large number of the worms from attaining their maturity. He then asked what steps should be taken to control the Asparagus beetles. In reply it was stated that good results had followed from dusting the plants regularly with fresh lime when the larvæ were upon them.

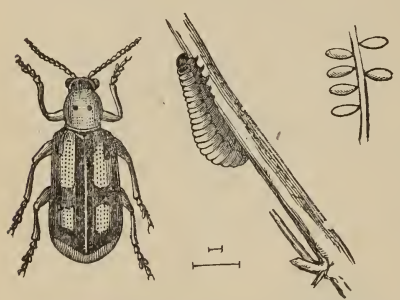


Fig. 32. Asparagus Beetle, larva and eggs.

Dr. Fletcher, in reference to the Codling Worm (Fig. 33) urged very strongly the importance of spraying during such a year as this, when their numbers were fewer than usual. We now had the enemy at its weakest, and could without much difficulty reduce its numbers to such an extent that it would take some time to become abundant again. Furthermore, good fruit brings a high price ; it pays well, therefore, to persevere in spraying. He considered that the reduction in the numbers of the insect was due to the cold, wet season, the small food supply and the extended use of spraying throughout the country. Among the enemies to this fruit, he mentioned the Apple-Weevil (*Anthonomus quadrigibbus*), Fig. 34, which he had found also in wild haws, and the Plum Curculio, which often attacks apples.

Mr. Fisher spoke of the best means of controlling the Codling moth ; he considered the bandage system the most effective of all, but the bandages must be removed at least every ten days and the bark beneath them scraped. If this is not done, the bandage proves the most

convenient and safest place for the worm to change into a chrysalis, and thus far more harm than good is done. He strongly recommended three things—first, spray with Paris green during the first week after the blossoms have fallen, later than that is of no use ; second, bandage the trees and remove regularly ; third, keep hogs in the orchard to eat up the fallen fruit and thus destroy the worms contained in it.

Dr. Fletcher said that spraying, properly done, saved seventy-five per cent. of the fruit. East of Toronto there was only one brood of the Codling moth in the year and therefore bandaging the trees was of no use, but west of Toronto there were two broods per annum, the second being much the worst, and there bandaging produced excellent results. The bandages should be passed through a clothes-wringer which could be carried in a wheelbarrow from tree to tree, or they might be dipped into scalding water. The worms, however, will not all be found in the bandages, for about half of them burrow into the bark ; these can be got rid of by scraping with a wire brush which effectually tears them out of their burrows. He considered burlap or sacking the best material for the bandage and straw the very worst, because it is so hard to put on and makes such a litter in the orchard. One or two thicknesses of burlap, five or six inches in width, tied in the middle with a string, makes a satisfactory bandage. Hogs were very useful in the orchard to devour the fallen fruit. The moth

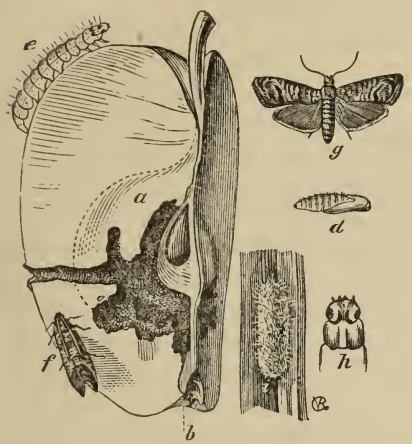


Fig. 33. Quarter of an Apple shewing the work of the Codling Worm ; the insect in all stages.

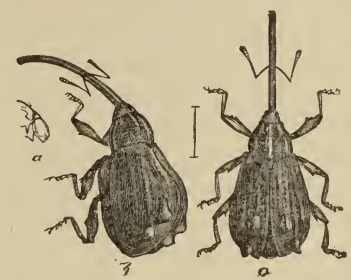


Fig. 34. Apple-Weevil (greatly magnified).

did not lay her eggs till the fruit was about the size of a pea and continued laying till it was as large as a hickory nut ; during this period spraying should be done.

Mr. Fisher said that the calyx (at the tip of the young fruit) closes about a week after the blossom falls, and therefore it is necessary to spray early.

Prof. Lochhead found the Haseltine trap-lanterns perfectly worthless as regards the destruction of the Codling moth. They caught as many beneficial as injurious insects, but no Codling moths. " The Expansive Tree-protector" is all right in principle, as it is a bandage, but he found in nearly every instance that it was doing harm to the tree. The poisonous substance with which the felting is soaked was not effective ; the Codling larvæ were lively and active in it, also spiders and other insects which took advantage of the shelter. He had also found larvæ crawling over the sticky substance which was supposed to be a complete barrier against them. The worst feature about it is that it is said to expand automatically with the growth of the tree ; he found that it failed to do so, but gradually cut right into the wood through the bark and in time girdled the tree ; this could only be prevented by frequently opening and moving it. Sacking or burlap was ever so much better, as well as cheaper and simpler. He was surprised to find how remarkably active the agents have been in selling these " protectors" ; they were to be seen in orchards all over the country.

Mr. Evans said that in his trap-lantern (described in the last Annual Report) he had caught a great variety of insects, but no Codling moths. They are evidently not attracted by light

Mr. Walter Smith related his experience with bandages, and said that the main cause of failure in their use is that people will not take the trouble to remove them regularly and then they become excellent hiding places for the worms.

Mr. Fisher found it a good plan to drive two nails into the tree and leave them there ; the string of the bandages could be twisted around them and released when the bandages were taken off in much less time than was required for tying and untying.

Mr. Balkwill spoke of the scarcity of clover seed this year, and wished to know whether this could be attributed to the destruction of the crop by the clover-seed weevil (*Phytonomus punctatus*) ; his own opinion was that the scanty supply of seed was due to the character of the season. The weather had been continuously cold and wet, so that the blossoms did not open and consequently the flowers were not fertilized.

Dr. Fletcher said that he had found the weevil abundant in British Columbia this year. Dr. Bethune stated that last year it was very numerous in London but this year he had not seen a single specimen.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its report for the year 1901-2.

The thirty-eighth annual meeting of the Society was held in London in November, 1901, and was well attended by members from a distance as well as those resident in the city. It was also favoured with the presence of the Hon. J. Dryden, Minister of Agriculture for Ontario, and Mr. G. C. Creelman, Superintendent of the Farmers' Institutes of Ontario. During the first afternoon a conference was held to discuss the progress, present aspect and future outlook of the San José scale in Ontario. In the evening a public meeting was held in the Normal School ; the chair was taken by the Hon. J. Dryden, who delivered the opening address. The Rev. Dr. Fyles then read his presidential address on "The Importance of Entomological Studies to the Community at Large," and illustrated his remarks with beautiful coloured diagrams, the work of his own hand. Dr. Fletcher followed with an address on "The Value of Nature Study in Education," and concluded with an exhibition of lantern slides of plants, insects and other natural objects of interest. The following day was occupied with the reading of papers and the reports of the officers, branches and sections of the Society.

The thirty-second Annual Report on economic and general Entomology was presented to the Minister of Agriculture for Ontario in February last and was printed and distributed in the beginning of May. It contained 128 pages and was illustrated with three maps and fifty-eight figures in the text, a photogravure portrait of the late Miss Eleanor A. Ormerod and a very beautiful full-page plate of thirty-three varying specimens of *Hyphantria cunea* kindly contributed by Mr. Henry H. Lyman in illustration of his paper on "The North American Fall Web-worms." Besides the account of the conference on the San José scale and the proceedings at the annual meeting, the Report contained papers on the injurious insects of the year by Messrs. Young, Evans, Johnston, Lochhead and Moffat ; "The Painted Lady Butterfly" and the "Entomological Record for 1901," a new feature which is to be continued annually, by Dr. Fletcher ; "The trend of Insect diffusion in North America," the "Imported Willow and Poplar Curculio," and "The Common Cheese-mite living in Sporotrichum globuliferum," by Prof. F. M. Webster ; papers by Prof. Lochhead on the "Hibernation of Insects" and "Nature study Lessons on Mosquitoes" ; by Mr. Moffat on "Anosia Archippus does not Hibernate" ; by Mr. Evans, on "Collecting at Light" ; Mr. Winn, on captures made at "The Milk-weed at Dusk" ; Mr. Walker, on "A Collecting Trip in South-Western Ontario" ; Mr. Gibson, on "A Day at the Mer Bleue." Dr. Fyles contributed a paper on "Crickets,"

and Mr. J. B. Williams, on "The Food of the Grass Snake." The volume closed with a report from the North-West (Canada) Entomological Society and obituary notices of the late Miss Ormerod and Mr. Otto Lugger.

The *Canadian Entomologist* has been regularly issued at the beginning of each month. The 33rd volume was completed in December last ; it consisted of 348 pages, illustrated with five full-page plates and eleven figures from original drawings. The contributors number sixty-two and represent Canada, the United States, England, Germany, Luxembourg and India. Of the 34th volume ten numbers have thus far been published ; those for November and December will be duly issued at the beginning of their respective months.

During the greater part of the year meetings for the study of Entomology have been held on Tuesday evenings, followed during the summer months when the weather was favourable by collecting excursions on Saturday afternoons. The Geological Section has met regularly on Thursday evenings ; the Ornithological once a month on Fridays ; the Microscopical on alternate Saturdays during the winter and the Botanical during the summer and autumn. The reports of these Sections, giving a record of their proceedings, will be read at this meeting and be published in the next Annual Report of the Society.

The good work of the Society has been much extended by the delivery of popular lectures by several of the members. Dr. James Fletcher has given a large number on insects, noxious weeds and nature study in various places in Ontario, Quebec, the Maritime Provinces, Manitoba, the North-West Territories and British Columbia, in fact from one end of the Dominion to the other. Dr. Bethune has lectured, chiefly to school children and horticultural societies, in London and a number of towns not far distant, on noxious, interesting and beneficial insects. Mr. W. E. Saunders has addressed teachers and other assemblies in Montreal, Ottawa, London and elsewhere, on "The Birds of Canada." The Rev. Dr. Fyles has given popular lectures on Entomology in Quebec and Levis, P. Que. ; and Prof. Lochhead has delivered lectures on entomological subjects in Guelph, Port Elgin, Owen Sound, Beeton, Woodstock and Hamilton.

All of which is respectfully submitted.

THOMAS W. FYLES, President.

REPORT OF THE MONTREAL BRANCH.

The 241st regular and 29th annual meeting of the Montreal Branch of the Entomological Society of Ontario was held in the library of the Natural History Society, University street, on Tuesday evening, May 13th, 1902.

Owing to the absence of the President, due to illness, Mr. Charles Stevenson, Vice-President, occupied the chair.

The minutes of the last meeting were read, and minutes of last annual meeting taken a read and confirmed.

The Vice-President on behalf of the Council read the following report :

REPORT OF THE COUNCIL.

The Council takes pleasure in presenting the following report of the Society's work during the seasons 1901 to 1902 :

Nine regular meeting have been held, the average attendance being seven.

Several field days were held, the principal ones being as follows :—

Point aux Trembles	1st June.
St. Martin Junction	15th "
Outremont	22nd "
St. Hilaire	1st July.

The following papers were read :

The Dissemination of Disease by Dipterous Insects	Charles Stevenson.
Curious Effects of the Attack of an Asilus Fly on *Colias Philodice*	A. F. Winn.
Is *Telea polyphemus* double brooded somewhere ?	Charles Stevenson.
On the Family of Flies called the Syrphidæ	G. Chagnon.
Eggs of *Tolype velleda*	A. F. Winn.
On collecting and preserving micro-lepidoptera	H. H. Lyman.
The Milkweed at dusk	A. F. Winn.
A new *Gortyna* and notes on the Genus	H. H. Lyman.
Coloration of Insects	Graeme M. Stewart, Toronto.
The Asilidæ or Robber Flies	G. Chagnon.
The North American Fall Web-worms	H. H. Lyman.
An Assam Danais and its mimics	Charles Stevenson.
An Hermaphrodite Lycæna	A. F. Winn.
An Introduction to the order Hemiptera	G. A. Moore.
Notes on *Eurosta solidaginis* Fitch	G. Chagnon.
Notes on *Lycæna Scudderii*	H. H. Lyman.
Lepidopterous Irisation	Charles Stevenson.
Remarks chiefly on Hydrœcias	A. F. Winn.

Our staff of members remains practically the same as last year.

Mr. A. E. Norris has kindly offered us room in his place of business to locate there our cabinet and collection. We must all offer to this gentlemen our sincere thanks for the kind assistance he has given us in this way.

Through the generous contribution of several of our members, our collection now amounts to probably 500 or 600 species which practically fill up the dozen drawers we bought at the beginning of the year.

An innovation introduced this year was the filing of all papers read at our meetings so to be accessible for future reference.

The report of the Treasurer will now be submitted to you, and also that of our Curator and Librarian who will give you many details as to the exact condition of our collection of insects.

Submitted on behalf of the Council.

(Signed) G. CHAGNON,
President.

The Treasurer then submitted his report, showing a balance on hand of $47.52.

The Librarian and Curator then presented his reports showing that valuable contributions towards the collections of the Branch had been received ; from Mr. Winn 98 specimens of Lepidoptera and 134 specimens belonging to other orders, from Miss Emily L. Morton a very valuable donation of eight hybrids of her own rearing, from Mr. Chagnon 94 specimens of Diptera representing 51 species, from Mr. Norris 43 specimens of Lepidoptera, from Mr. Stevenson 20 specimens of butterflies, from Mr. Denny 13 specimens of butterflies. Mr. Beaulieu has promised a large number of specimens of Coleoptera and Mr. Lyman a number of Western Lepidoptera.

The library is still of very modest proportions but the following additions have been made: Howard's "Insect Book," by purchase; "The Crambidæ of North America," by C. H. Fernald, A.M., Ph.D., presented by the author; "Annotated Catalogue of the Butterflies of New Hampshire," by Wm. F. Fiske, presented by C. M. Weed through H. H. Lyman.

It was then moved by Mr. A. Griffin, seconded by Mr. A. F. Winn, that the reports be received and adopted. Carried.

The Secretary then read the Annual Address of the President, after which the election of officers for the ensuing year took place with the following result: President, Charles Stevenson; Vice-President, A. E. Norris; Librarian and Curator, A. E. Norris; Secretary and Treasurer, G. A. Moore; Council, Henry H. Lyman, G. Chagnon, D. Brainerd.

On motion of Mr. Lyman, seconded by Mr. Griffin, the night for meetings was changed from the second to the first Tuesday in the month, as in the early years of the Branch.

On motion of Mr. Lyman, seconded by Mr. Winn, $5.00 was voted for the purchase of early volumes of *The Canadian Entomologist* for the Branch Library.

Messrs. Stevenson, Chagnon and Winn were elected a Field Day Committee.

Mr. Lyman then presented 55 specimens of Lepidoptera, chiefly western, for the Branch Cabinet.

Mr. Lyman read a paper entitled "What is a Genus?"

Mr. Norris then exhibited, with the help of Mr. Griffin and the lantern of the Natural History Society, a collection of excellent coloured slides of Lepidoptera.

On the adjournment of the meeting the members were entertained with refreshments by Mr. Griffin.

G. A. Moore,
Secretary.

REPORT OF THE QUEBEC BRANCH.

President's Report.

The Quebec Branch of the Entomological Society of Ontario has entered upon the sixth year of its existence.

We still have a goodly number of members though several of our young people have entered business houses and can no longer give attention to entomology. Some of our members have moved to distant parts of the country and some have been taken away by death. We here record with sorrow the demise of Miss Bella Thompson. After a long illness, borne with much patience and resignation, she departed this life on the 22nd of June last. The friends of this lady have our deep sympathy.

The weather during the past season has been remarkably variable—too cold and wet for insect life to flourish. We had, however, a very enjoyable field day on the 9th July at the Island of Orleans. But few insect captures were made, but some pleasant hours were spent in the grounds of Mr. and Mrs. Morgan and those of the Hon. R. and Mrs. Turner. On this occasion we found the oak trees infested with the Snout-beetle *Balaninus nasicus*, Say.

A specimen of the rare wasp, *Vespa rufa*, Linneus, was taken on the island, and a nest of *Vespa Germanica*, Fabr, was discovered there.

Vespa arenaria, Fabr, was abundant in the woods round Fort No. 2, Levis, in August; and *Pamphila Manitoba*, Scudder, was seen in the same month and in the same locality.

A tortoise beetle new to the province has appeared at Levis this year. It feeds upon the burdock and the Canadian thistle Specimens of this insect have been sent to the British Museum for identification.

REPORT OF COUNCIL.

The Branch now includes 32 members (24 adults and 8 juniors.)

The treasurer's report is submitted, and will no doubt be found satisfactory.

The continued rainy weather of last summer prevented the members from having many field-days but a very enjoyable one was held on the Island of Orleans on the 9th July.

Our thanks are due to the authorities of Morrin College for having continued to allow us the use of their rooms for our meetings.

CRAWFORD LINDSAY,
Sec-Treas.

The following were elected officers :—President, Rev. Dr. Fyles ; Vice-president, Miss E. MacDonald ; Council, Hon. R. Turner, Rev. F. G. Scott, Mrs. R. Turner, Miss Bickell, Miss Freeman ; Secretary-Treasurer, Lt.-Col. Crawford Lindsay.

REPORT OF THE TORONTO BRANCH

Of the Entomological Society of Ontario for the year 1901-2, ending April 30, 1902. Read at the Annual Meeting, held in the Education Department Building, May 16th, 1902. Mr. E. M. Walker, vice-president, in the chair.

GENTLEMEN :

During the past year ten meetings have been held, and the following papers have been read before the Society :—

" A Collecting Trip in South-western Ontario " ....E. M. Walker.
" An Evening at the Milkweed " ....A. F. Winn.
" Butterfly Collecting in 1901" .....J. B. Williams.
" Some Interesting Lepidopterous Larval Habits" .....Arthur Gibson.
" The Canadian Stick Insect" ....J. B. Williams.
" On Crickets " .....E. M. Walker.

Two meetings were occupied with the " Exhibition of Specimens," and at the special meeting in November addresses were given by Mr. Arthur Gibson and Dr. Fletcher, of Ottawa, and by Mr. H. H. Lyman, of Montreal, these gentlemen having kindly arranged to be present on their way back from the London meetings. A number of the Natural History Society members came to this meeting, as well as those of our own Branch, and a very pleasant evening was spent in listening to and conversing with our three visitors.

We arranged for a Field Day to High Park on the 24th of May, 1901, but, unfortunately, the weather made any expedition of this kind impossible ; however, we subsequently went to High Park for the afternoon of June 22nd, and had an interesting and successful afternoon.

A number of additional drawers in the Education Department museum have been corked and glazed for the collection of insects that the Society is making for the Department, and we have now plenty of space to re-arrange the collection in a satisfactory manner, and provide room for all the orders.

The Orthoptera, Odonata and diurnal Lepidoptera have already been re-arranged.

We have subscribed for the " Journal of the New York Entomological Society," the " Entomological News" and the " Bulletins of the New York State Museum.".

The Branch presented a series of the very beautiful plates of scale insects, from Bulletin No. 46, to the Education Department museum, and Mr. Boyle, the Superintendent of the museum, has had them framed and hung up in one of the rooms.

Valuable papers on entomological subjects have also been received from the Central Experimental Farm at Ottawa, the United States Department of Agriculture at Washington, and from several other sources.

The attendance at our meetings is but small, and we have only added one new name to our membership during the year. Most societies of this kind, however, have their "ups and downs," and we must hope that by next year we shall be able to report that the attendance and membership are going up.

E. M. Walker, Vice-President.
J. B. Williams, Sec-Treasurer.

Toronto, May 16th, 1902.

The following officers were elected for the present year :—President, E. M. Walker ; Vice-President, G. M. Stewart ; Secretary-Treasurer, J. B. Williams ; Librarian and Curator, J. H. Webb ; Members of Council, Arthur Gibson, John Maughan, jr.

REPORT OF THE TREASURER.

Financial Statement of the Treasurer of the Entomological Society of Ontario for the year ending August 31st, 1902.

Receipts.		Expenditure.	
Balance from previous year	$ 483 05	Printing	$ 731 34
Members' fees	388 22	Expense, Annual Meeting & Reports	270 97
Government Grant	1,000 00	Salaries	375 00
Proceeds from sales, Pins, Cork, &c.	14 23	Rent	165 00
Proceeds from sales, Entomologist	130 25	Library	36 98
Advertising	28 43	Expense—sundry	66 03
Interest	15 32	Balance	414 18
Total	$2,059 50	Total	$2,059 50

Auditors : { W. H. Hamilton. J. A. Balkwill.

Treasurer : Jas. H. Bowman.

REPORT OF THE LIBRARIAN AND CURATOR.

For the Year Ending 31st of August, 1902.

38 volumes were added to the Library during the year, made up as follows :—

Twenty-one bound volumes of Government Reports, Proceedings and Transactions of Scientific Societies, Institutions, &c., the most important of which is, the 21st Annual Report of the U. S. Geological Survey for the Years 1899 & 1900, in seven large volumes, profusely illustrated, with maps, and accompanying them was, the Geological and Mineral Resources of the Copper River District, Alaska ; also, Reconnaïssances in Cape Nome and Norton Bay Regions, Alaska, 1901.

By purchase : The three first volumes of the Lepidoptera Phalænæ in the British Museum, with plates. By Sir George F. Hampson, Bart.

By exchange : The first two volumes of British Lepidoptera. By J. W. Tutt, F.E.S. Twelve volumes were bound, bringing the total number of volumes now on the Register up to 1,760.

41 books were issued to local members during the year.

Some valuable additions were made to the Society's native collection ; and several rare and interesting specimens were secured in this locality, whilst some indicate the spread of injurious species.

Respectfully submitted.

J. Alston Moffat.

REPORT OF THE BOTANICAL SECTION.

The Botanical Section met for organization on 31st May, when the following officers were elected for the year 1902 :—Chairman, Rev. Dr. Bethune ; Vice-Chairman, J. Dearness ; Secretary, J. A. Balkwill.

The attendance at the meetings, which were held every second week, was very good, and a considerable interest has been maintained during the season.

An outing to Thompson's bog was held on July 11th, but, owing to the wet weather, only a small number attended. The bog was overflowed with water, and many parts could not be visited. A number of interesting plants were brought home, but no new plants were discovered.

Mr. J. H. Bowman reported an outing by Rev. T. C. Scott and himself, when the following fungi were gathered, cooked and eaten : *Cantharellus cebarius, Russula heterophylla, Psaliota placomyces, Lycoperdon cyathiforme* ; also having seen a very large *Amanita muscaria*, with a number of dead insects near by, killed by eating the poisonous mushroom.

During the season a large number of plants were brought to the meetings, examined and identified.

J. A. Balkwill,
Secretary.

REPORT OF THE MICROSCOPICAL SECTION OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Microscopical Section of the Entomological Society of Ontario takes pleasure in presenting its twelfth annual report.

Since the last annual report five new members have been added to the membership roll of the Section, namely : Messrs. C. W. Horton, G. Escott, N. Beal, J. Tanton and C. Parsons.

The re-organization meeting was held on the Twenty-eighth of September, 1901, when the following officers were elected :—

Prof. Jas. H. Bowman.....Chairman.
Prof. J. Dearness.....Vice-Chairman.
Mr. E. A. Brown.....Secretary.
Profs. Bowman & Dearness and Mr. C. W. Horton.....Executive Committee.

During the past winter (the Microscopical Section resolves into the Botanical Section during the summer months) sixteen regular meetings were held, with an average of ten members, as well as visitors. At the request of the Students of the Western University, a number of the members of the section assisted in the programme at the annual Conversazione. In addition to the exhibition of a number of the slides in the Society's collection, Prof. Dearness demonstrated "Life in a Drop of Water" and "Circulation of Blood ;" Dr. Bethune exhibited a number of slides of Insects or their parts, while Prof. Bowman prepared Crystals on the spot and, by means of the polariscope, brought out their beautiful colors.

From time to time throughout the season papers were read or addresses given on the following subjects :—

Pond Life.....Prof. Bowman.
How Best to Mount Seeds for Microscopic Examination.....Prof. Dearness.
On the Theory of Colored Light Rays.....Prof. Bowman.
How Best to Mount Sections of Cloth.....Prof. Bowman.
On Sertularia.....E. A. Brown.

Microscopic Examination of Plant Hairs.....Prof. Bowman.
On the Wet Mounting of Pollen.....Prof. Dearness.
On the Dissimilarity of the Muscular Tissue of an Insect and a Higher Animal..Prof. Dearness.
Mono-bromide of Camphor Crystals and Methods of Making and Mounting....Prof. Bowman.
Notes on the Life History of Trichina Spiralis.....Prof. Dearness.
Practical Study of Branchippus, Cyclops and Cyprus.....Prof. Bowman.
Properties of the New Metal Radium.....Dr. Bethune.
The Respiration of Spirigæ.....Mr. R. W. Rennie.
On the Local Distribution of Riccia Natans.....Prof. Bowman.
On the Way in Which Riccia Natans Passes the Winter.....Mr. R. W. Rennie.

In addition to the above papers, the members exhibited many beautiful slides of crystals, sections of wood and insects.

At one of the meetings Mr. Law drew the attention of the Section to the difference in composition of specimens of sand from Santa Pensacola (Florida) and Sable Island. The granules of the former were sharply cut, of a whitish color, making beautiful polariscopic objects, while the latter were found to be composed of Silica stained by the action of some metallic oxide and presented a rounded appearance. Dr. C. Abbott, who for some time has been conducting experiments in Micro-photography, exhibited some interesting and instructive photographs, which go to show the advantages to be derived from the union of the Microscope and the Camera.

It is the earnest desire of each member that, during the near future, there may be a large increase in the ranks not only of this Section, but of all societies that have for their motive the advancement of science, for the field of observation and study is large, while as yet the laborers are comparatively few in number.

All which is respectfully submitted.

Jas. H. Bowman, Chairman. Edgar A. Brown, Secretary.

REPORT OF THE ORNITHOLOGICAL SECTION.

During the year just past the Ornithological Section has held nine regular meetings at which the attendance has averaged over six.

At these meetings many interesting subjects have been brought up and discussed and many valuable notes recorded. One bird new to Canada was reported, viz. the White-eyed Vireo, by W. D. Hobson, Woodstock ; and two others, the King Rail and the American Scoter, which are new to the County of Middlesex, were also noted.

Two Mammals new to this district were also recorded by Mr. Robert Elliott: an undetermined Lemming and the Pine Mouse. Specimens of these were shown at one of the meetings and they were stated by Mr. Elliott to be common, though no one else had succeeded in taking any.

Three families of birds, the Vireos, Swallows and Warblers, have been studied at the meetings and twelve papers have been read ; two of these were published in "The Auk" and most of the others have been or will be published in "The Ottawa Naturalist." These papers were as follows :

"The Bobolink's love for its home"; "The Prairie Horned Lark nesting in New Brunswick"; and "a Hybrid between the Sheep and the Deer," by Wm. H. Moore, Scotch Lake, N. B.

"The American Scoter in Middlesex County ;" "Nesting habits of the Ipswich Sparrow" ; "The spots on the eggs of the Great Blue Heron ;" "Early Nesting in 1902," by W. E. Saunders, London.

"The Cardinal an established resident of Ontario," and "Cubic contents of the eggs of the Buteos." by J. E. Keays, London.

"Recollections of the Passenger Pigeon," by Dr. Bethune, London,

"The Parula Warbler and its variety," by Robert Elliott, Bryanston.

"The White-eyed Vireo at Woodstock," by W. D. Hobson, Woodstock.

Work has been continued on the list of the birds of Middlesex, which is not yet completed, and the migrations of birds have been studied during their progress as usual.

Since our last report was made, addresses and lectures have been delivered by our members as follows : to audiences in Sarnia, Toronto and Brantford ; before the Field Naturalists' Clubs of Ottawa and Guelph ; and in London to one assembly of Teachers, two Farmers' meetings and four Church associations.

All which is respectfully submitted.

W. E. Saunders,
Secretary.

Mr. Saunders exhibited specimens of the Lemming referred to in the foregoing report and also of several species of Mice. Prof. Lochhead remarked that the Ornithological Section was performing a very good work, especially by the popular lectures on Birds that were given by some of the members. He noticed that a great interest had been thus awakened at Guelph and would he was sure be long maintained.

REPORT OF THE GEOLOGICAL SECTION.

The Section continued its weekly meetings as heretofore, studies of geological specimens and addresses on geological subjects furnished instruction for the members of the section. A new and most successful feature of the year's studies was a monthly meeting for blow pipe analysis of various minerals. This department was in charge of Messrs. Dempster and Smith. Dr. W. J. Stevenson also gave a most instructive lecture on the tests for a number of minerals by wet assaying. Visits were made to places of interest, as has been the custom in past years. Dr. Woolverton visited the neighborhood of the Sandhills of the Sauble, and discovered a new outcrop of the Hamilton series in that vicinity. Mr. Percival visited the glacial markings on Kelley's Island. Mr Smith the Rainy River and other North West Ontario districts. Besides these reports made by our own members, interesting descriptions of Temiscaming district were given by Mr. Geo. Taylor, and the Atlin, British Columbia by a resident mine owner of that northern region.

Dr. Woolverton kept the table supplied with numerous interesting specimens to illustrate the papers read.

Articles on geological subjects were read by different members of the section.

Dr. Woolverton's report on the Sandhills of the Sauble summarized was as follows. The sands blown from the beach form hills of a considerable height. The width of district covered by these dunes is about 2 miles. On the edge of the sand ridges a fossil bed of the Hamilton period was observed ; numerous specimen of *Zaphrentis prolifica* were visible.

Mr. Percival's report on the Glacial markings of Kelley's Island.

Kelley's Island is situated in Lake Erie off the north coast of Ohio. The glacial groove is situated at the north end of the island in the limestone rocks of the district. The portion of the groove preserved is 33 ft. across and apparently 17 ft. deep. The groove presents a series of corrugations merging into each other by beautiful curves. The whole appearance is that of Corinthian columns lying prostrate side by side. On what is known as "Inscription Rock"

are sculptures made evidently by the Indians in times long past. The figures denote historical events of deep interest, relating to the conquest of the island by the Iroquois. These sculptures, found on the south side of the Island, were deeply engraved and though now rapidly weathering away, are yet easily traceable.

Mr. Smith's Report on The Eagle Lake Mining Region.

The Eagle Lake District is reached by C. P. R. from Fort William and lies some forty miles east of Rat Portage. Eagle Lake, about where the group of mines and prospects comprising the mining division are located, is some 90 miles in length and ranges from 1 to 13 miles wide. The course of the lake is very tortuous and many islands are met with. The scenery presented by the sheets of pure blue water, granite bluffs and evergreen blanketed hills is of a degree of picturesqueness not soon to be forgotten.

The distributing point of the lake is at Vermilion Bay, a small C. P. R. by-station consisting of half a dozen buildings and shacks. There is another C. P. R. station known as Eagle River on a river of that name tributary to the lake. At the north end of the lake proper a Hudson Bay post is located. A few trappers, prospectors and Indians are the only other representatives of human kind in that great region. The Provincial Department of Crown Lands has surveyed the country sufficiently to make known in a general way the configuration of the lake, but the details of the topography and geology of the land about it are still generally unknown.

It is agreed among students of the subject that what is now known as the "Height of Land" extending through Quebec, Northern Ontario and Keewatin in the form of a horse-shoe reached an altitude rivally that of the Appalachian system which gives shape and position to the eastern half of this continent. Owing to changes of rainfall and temperature, a great tract which centres about the Height of Land came under a thick cap of snow and ice which, in its movements, ground down the hills, filled the valleys and scooped hollows which filling with water became lakes. This theory, which has been very briefly and inadequately put, accounts for the larger features as well as for many of the minor phenomena which characterize our great Northland.

It is the theory of the writer that Eagle Lake owes its existence to a branch of the great Keewatin Glacier, which formed west of Hudson's Bay and several hundred miles due north of the lake.

A careful study of the map indicates that the branch referred to passed in a general south-easterly direction sending lateral divisions to the north-east and south-east. The northern shores of the lake are generally destitute of soil which may be accounted for by the comparatively recent retirement of the glaciers and to water erosion facilitated by the heavy rainfall and the undulating character of land.

A number of rocks picked up by the writer were found to consist of specimens of basic gray granite, red granite, talcose hornblende schists of a green color and black trap.

The gray granite was found 100 feet from the surface. It was overlaid by the red variety which in turn gave place to the green schist. The eruptive rock was found on an island facing the granite and schist outcrop. The formation of the granite in the outcrop was anticlinal *i. e.* tipped upwards from the lake, while the schist layers above appeared to dip in the reverse direction. The basic granite shows clear indications of decomposition in exposed parts where the felspar is broken down into kaolin giving the rocks a whitish cast.

At many points are to be seen the outcrops of quartz veins found either as stringers or as a single vein (which may be two or three feet wide.) When the quartz is in stringers the filling matter is green schist, similar to that before mentioned. The quartz carries small per-centages of mineral *i. e.* magnetite or black sand, copper and iron pyrites, zinc blende and

native gold and silver. By pulverizing the quartz in a mortar and panning, the operator will frequently obtain colors (or minute specks of pure flour gold) in these veins. From a number of them there have been taken near the surface splendid specimens of free gold; some small samples, running as high as fifteen or twenty dollars in gold values, of this kind do not, however appear to obtain at the greater depths.

When the gold is found in a network of fine stringers a disproportionate body of barren matter must be excavated at great expense in order to procure the rock carrying gold. Two miners working in a tunnel are able to take out about a ton per day.

When the quartz-vein is compact, the prospector looks for values on the side adjacent to the foot wall. Assuming the average value per ton to be the same in each case it is obvious that the latter class of prospect could be operated much more economically than the stringer-quartz prospect. In the former the barren material may be left untouched except in so far as its removal may be necessary in the construction of passages. The pay ore may be kept freer of extraneous material involving less cost in transporting and milling. The labor of sorting is also eliminated.

The majority of the prospect mines of the region are as yet prospect claims only. They have for the most part been staked by miners and prospectors of the district who have not the funds wherewith to carry on their work continuously until conclusive results are reached.

If the district is ever to produce gold in paying quantities, capital must be invested there but subject to conditions. If a mine is capitalized to a greater extent than is reasonably necessary to pay expenses for the period during which it is decided to work it, there is usually a great temptation on the part of directors and managers to spend the company funds too lavishly. In the second place if the mine ever pays, its earnings must be divided among a greater number of shares than would be the case if the capital had been less, thus giving smaller dividends. Then the management of such mines must be put in the hands of capable and experienced men, who know all branches of their work thoroughly. Again, operations should at first be carried on on an exceedingly modest scale in order that, if no result obtains, the loss may be at a minimum. Investors may thus feel their way to greater expenditures of money. Most of the prospects contain only a very low grade of ore, so that all machinery introduced should be on that basis.

Summing up it appears to be only necessary for companies forming or about to form with the object of exploiting the region to capitalize moderately, engage trained and efficient men as foremen and superintendents, and to operate on a wholly conservative basis. The district may then become a regular contributor to the gold output of this country.

All which is respectfully submitted

George B. Kirk,
Chairman.

REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

(Through the Rev. C. J. S. Bethune, D. C. L., Delegate.)

The Entomological Society of Ontario has now completed its thirty-eighth year and continues to perform good work of a practical and scientific character. Its membership maintains a steady growth and there is a frequent demand for complete sets of its publications from various parts of the world. Its monthly magazine and annual reports contain the records of so much original research and investigation that they have become essential to the equipment of every tudent in this department of natural science.

During the greater part of the year regular meetings have been held in the Society's room

at London. On Tuesday evenings several young men have met for the systematic study of insects under the guidance of Dr. Bethune and Mr. Moffat; on Thursdays the Geological Section has continued, with unabated enthusiasm, to discuss the rocks and minerals of the surrounding country; on alternate Saturdays the Microscopical Section has met throughout the winter to investigate the hidden things of nature and study the beautiful forms which cannot be seen with the unaided eye. Once a month, on Fridays, the Ornithological Section, has gathered together at the house of Mr. W. E. Saunders; the numerous papers by its members, published in the *Ottawa Naturalist*, testify to the energy and zeal with which they have devoted themselves to the study of bird life. During the summer the Botanical Section took the place of the Microscopical and held many interesting meetings. One field excursion only was made to Komoka, a favourite collecting ground near London; it was thoroughly enjoyed by the few botanists and entomologists who attended.

The Branches of the Society at Montreal and Quebec, the former of which has flourished for twenty-eight years, report that they have had a very satisfactory season, regular meetings have been held and many excellent and interesting papers were presented; a few field days have also been found very enjoyable and have helped much in stimulating the ardour of those who attend them. The Toronto Branch, like that at Quebec, is now five years old, but it has not received nearly so much encouragement and support as its twin-sister in the lower Province. Why the "Queen City of the West" should furnish so few entomologist is difficult to understand; it has the advantage of many distinguished seats of learning, several extensive libraries, a number of scientific Professors, and a rich and easily accessible country for exploration. Notwithstanding their limited numbers, the members of the Branch have held frequent meetings, at which several excellent papers were read, and have made good progress in the formation of a collection of insects for the Ontario Department of Education.

A noteworthy feature of the Society's work is the delivery of popular lectures by competent members. Dr. James Fletcher has given a large number on insects, noxious weeds and nature study, in various places in Ontario, Manitoba, the North West Territories and British Columbia; Dr. Bethune has lectured, chiefly to school children and Horticultural Societies, in London and a number of towns not far distant, on noxious, interesting and beneficial insects; and Mr. W. E. Saunders has addressed teachers and other assemblies in Montreal, Ottawa and other places as well as in London, on the Birds of Canada. These lectures have been well attended and listened to with great interest, and will evidently do much to awaken and stimulate a love for natural history and a desire to know more about the wonders in plant and animal life that everywhere surround us.

The thirty-eighth annual meeting of the Society was held in London in November last, and was attended by the Hon. J. Dryden, Minister of Agriculture for Ontario, and a number of members from different places. The proceedings opened with a discussion on the San José scale, its ravages in Ontario and the best methods of keeping if under control; much useful information was given by Mr. G. E. Fisher, Provincial Inspector of Scale insects, Dr. Fletcher the Dominion Entomologist and Professor Webster, State Entomologist of Ohio. An evening meeting, to which the public were invited, was held in the Normal School building; the Hon. J. Dryden took the chair and gave the opening address, in the course of which he said that the Entomological Society was one of the best as well as the oldest of the associations aided by the Government of Ontario, that "we need its accurate work and we have been greatly aided and helped by it during all the nearly forty years of its existence, and no doubt shall continue to be helped by it during the years to come". The Rev Dr. Fyles, of Quebec, the President of the Society, gave an address on "The importance of Entomological Studies to the community at large", illustrating his remarks with a beautifully executed series of diagrams, the work of his own hand. He was followed by Dr. Fletcher, who spoke on "The value of nature study in

Education" and concluded with an exhibition of lantern slides of plants, insects and other natural objects. During the remaining session a number of valuable practical and scientific papers were read, these are published, together with the reports of the Officers, Branches and Sections of the Society, in the 32nd Annual Report recently issued by the Ontario Department of Agriculture.

This volume of 128 pages is illustrated with two plates, a portrait of the late Miss Eleanor A. Ormerod, and a series of figures of the Moth *Hyphantria cunea*, three maps and fifty-eight wood cuts in the text. The principal articles are papers on the Insects of the year 1901 by the Directors, Messrs. Young, Evans and Johnston, and by Professor Lochhead and Mr. J. A. Moffat. "The Painted Lady Butterfly (*Pyrameis Cardui*)" and the "Entomological Record," a new and highly important feature, which is to be continued annually, by Dr. James Fletcher. "The North American Fall Web worms," illustrated by the beautiful plate already referred to, by Mr. Henry H. Lyman. "The trend of Insect diffusion in North America", the "Imported Willow and Poplar Curculio," and a singular case of a Cheese mite living in the culture intended for the destruction of the Chinch-bug, by Professor F. M. Webster. Two useful papers by Prof. Lochhead on the "Hibernation of Insects" and "Nature Study Lessons on the Mosquito". A paper by Mr. J. Alston Moffat setting forth his reasons for believing that the Archippus butterfly, whose habits he has studied for many years, does not hibernate. Interesting papers on collecting and field work: by Mr. Evans on the attractive powers of an electric lamp; Mr. Winn on his wonderful captures at a clump of milk-weed at dusk; Mr. Walker on "A collecting trip in South-western Ontario," and Mr. Gibson on "A day at the Mer Bleue." Dr. Fyles contributes a paper on "Crickets"; Mr. Stevenson on "Commercial Entomology", and Mr. Williams on "The Food of the Grass Snake," which he finds to be Cut-worms. The volume closes with a report from the North-west (Canada) Entomological Society, by Mr. Gregson; and obituary notices of the late Miss Ormerod and Mr. Otto Lugger, by the Editor.

"The Canadian Entomologist," the monthly magazine of the Society, is now in its 34th year of publication. The volume for 1901 contains 348 pages, and is illustrated with five full page plates and eleven figures from original drawings. The contributors number sixty-two, and represent Canada, the United States, England, Germany, Luxembourg and India. The principal articles may be classified as follows; Descriptions of new genera, species and varieties in Lepidoptera by Messrs. H. H. Lyman, A. G. Weeks, A. Busck and Dr. Wm. Barnes; Orthoptera by Dr. S. H. Scudder, Prof. A. P. Morse and Mr. A. N. Caudell; Hemiptera by Mr. E. D. Ball and Prof. H. Osborn; Diptera by Prof. T. D. A. Cockerell, Messrs. C. Robertson and D. W. Coquillett; Coleoptera by Prof. H. F. Wickham and Mr. H. C. Fall; Hymenoptera by Messrs. E. S. G. Titus, W. H. Ashmead, T. D. A. Cockerell and C. Robertson; Neuroptera by Mr. N. Banks; and Homoptera (Hemiptera) by Messrs. G. B. King and T. D. A. Cockerell. Eleven new genera and sub genera are described and 123 new species and varieties.

Papers on Classification and Systematic Entomology: Ontario Acrididæ by Mr. F. M. Walker; lists of Lepidoptera from Alberta by Mr. Wolley Dod, from Southern Manitoba by Mr. E. F. Heath; the Moths of Manitoba by Mr. A. W. Hanham and the Butterflies of Nebraska by Mr. M. Cary; Cicadidæ by Dr. A. D. McGillivray; the Genera and species of Coccidæ by Professor Cockerell; the Genus Catocala by Professor G. H. French and Mr. O. C. Poling; Spilosoma congrua by Mr. H. H. Lyman; Generic names in Orthoptera by Mr. J. A. G. Rehn; discussions of Lepidoptera by Dr. H. G. Dyar, Prof. J. B. Smith and Prof. J. R. Grote; Staphylinidæ by Dr. E. Wasmann; Coccidæ by Mr. G. B. King; Collecting Notes on Kansas Coleoptera by Mr. W. Knaus; American Bees by the Rev. T. B. Morice and Professor Cockerell; The Genus Osmia by Mr. E. S. G Titus; the Respiration of Aleurodes by Prof. C. W. Woodworth; the Xiphidiini of the Pacific Coast by Prof. A. P. Morse; Note on Bæus by Mr. W. H. Harrington.

Life histories of the following insects are given ; Xylina Bethunei by Mr. Lyman ; several species of Hydræcia by Mr. H. Bird : the Green-house Leaf-tyer by Dr. Fletcher and Mr. A. Gibson ; the fall Canker-worm by Mr. D. E. Hinds ; several species of Catocala by Messrs. G. M. and E. A. Dodge ; Nannothemis bella by Mr. R. Weith and Prof. J. G. Needham ; and Arctia virguncula by Mr. Arthur Gibson.

In Economic Entomology there are important papers by Mr. E. D. Sanderson on Plant-lice affecting Peas, Clover and Lettuce ; Diptera bred from Cow mannre by Dr. L. O. Howard ; the Exportation and Importation of Beneficial Insects by Prof. F. M. Webster ; the Insect Fauna of Human Excrement (a review) by Dr. J. Fletcher. Also a paper on the effects of Scorpion venom by Mr. O. W. Barrett.

NOTES ON THE SEASON OF 1902. (WESTERN QUEBEC.)*

By Charles Stevenson, Montreal.

The season commenced early with every prospect of a good time for the Insect-hunter, but the meteorological conditions soon became of such a nature that there was little sport for the Lepidopterist. The temperature was low with high winds and perpetual rains. However, on the 22nd June, when at Piedmont in the Laurentian Hills, I had the pleasure of adding a new species of butterfly to the Quebec list, which was identified by Mr. H. H. Lyman as *Coenonympha inornata* Edw. The day was anything but favorable for collecting, as there was no sunshine and several showers. But on a plateau at a high elevation behind "La Montagne," I caught five perfect specimens in twenty minutes time. On returning to the station I found that Mr. A. E. Norris who had gone off in another direction had caught a weather-beaten specimen. This insect has been recorded in Newfoundland, Labrador, Sault Ste. Marie and Lake Winnipeg in Canada, Montana and Minnesota in the United States. Dr. W. J. Holland, who possesses a large series of this species, says that the Newfoundland type is distinctly darker than those in the Northwest. Four of my captures are pale and one dark. By this capture in the Laurentians it seems probable that its range extends across the continent on the high grounds unfrequented by the Entomologist, and as these regions open up it may prove to be found fairly abundant from Labrador by the Laurentians, along the north shore of the Ottawa on to Lake Winnipeg and into the United States.

At the same place and date while grubbing among rotten stumps I found an interesting looking larva which was successfully reared to maturity, producing a fine specimen of a click-beetle, rare to us, *Pityobius anguinus* Lec. This calls to mind the capture of a very large Eyed-elater, *Alaus oculatus* Linn (Fig. 35) on the slopes of Mount Royal on the somewhat early date of the 18th May, resting on the trunk of a fallen tree.

Fig. 35.

When the Natural History Society visited Piedmont on the 7th June, a day of rain and drizzle, a few of us enthusiasts braved the elements and I was fortunate enough to get a syrphid fly new to the very fine collection of Mr. G. Chagnon and a moth *Mamestra latex*, Gn. new to mine.

A specimen of the Hag-moth *Phobetron pithecium* A. & S. was obtained in sweepings on Mont Beloeil at St. Hilaire on the 9th July.

In the Coleoptera my last captures were :

Galerita janus, Fab., 25th May, Rigaud, Que.

Callida punctata, Lec., 9th July, St. Hilaire, Que.

Cychrus viduus, Dej., 11th July, St. Hilaire, Que.

* Read before the Montreal Branch of the Entomological Society of Ontario.

One specimen was found by Mr. G. Chagnon and two by myself, the reward of an afternoon's scraping among dead leaves and rubbish.

Saperda mutica Say., 19th July, Chambly Co., Que.

Neoclytus erythrocephalus Fab., 11th July, St. Hilaire.

Long-horns were very scarce throughout the season with the exception of *Typocerus velutinus* Oliv., which was quite plentiful.

Platydema ruficorne Sturm, was very abundant in Laval Co. on the 11th May, when Mr. Chagnon and myself obtained over 150 specimens between us in a quarter of an hour.

Two weevils that live on water plants *Lixus rubellus* Rand, and *Lixellus filiformis* Lec., were captured while boating on the lake at Mont Beloeil, St. Hilaire, on the 9th July.

While rearing some *Csmoderma eremicola* larvæ I found that the attractive "Nimble fly," *Zelia vertebrata* Say., is its parasite.

The beautiful Crane-fly *Bittacomorpha clavipes* Fab., was very abundant along the banks of a stream running through the village of St. Hilaire, on the 11th July.

Specimens of the "micropterous" variety of the Chinch-bug *Blissus leucopterus* Say., were found at Rigaud on the 24th May and on Montreal Island during July.

Lepidopterous larvæ were somewhat scarce, especially such ones as the Tent-caterpillars *Clisiocampa americana* Fab., and the Tentless *C. disstria* Hbn. At St. Hilaire the water hemlock borers *Gortyna marginidens*, were plentiful, but those of the burdock *G. rutila*, usually so common on Montreal Island, were fewer than in former years, and Cut-worms have not been prominent. But the Tussock-moth caterpillar is spreading among the shade trees of Montreal to a dangerous extent, and it is to be hoped that the citizens will awaken to the fact, before it is too late.

NOTES ON THE SEASON OF 1902.

By J. Alston Moffat, London, Ont.

To the collector of natural history specimens, the weather is of the first importance ; and in no other of the departments of natural history is the collector made to realize the close dependence there exists between the weather and success, than in botany and entomology, whilst entomology seems to be the more sensitive to adverse influences of the two. Hence, a cool, wet summer, although it will produce luxuriant vegetation generally, may, nevertheless, place Paris Green and Bordeaux mixture at a discount.

Perhaps never in the history of his career, has that antiquated subject of reference, "the oldest inhabitant," so completely failed to recall from the dim and distant past, a summer to correspond with that of 1902 in this locality, for uniform coolness and frequent rains, and its natural compensation, a general reduction in the number of insect pests. To the Entomological collector the season may be pronounced a complete failure. During a ramble in quest of specimens, he might see the landscape adorned with flowers, and yet find no butterflies there to give animation to the scene. But as has often been observed amidst a general scarcity, some unusually good finds have been made.

Four years ago Mr. Bice secured a specimen of that rare Sphingid *Deidamia inscripta*, Harr, which he generously donated to the society's collection, the only representative of the species yet there ; but early this season he took another in his own house, whilst yet another was taken by Mr. J. Tanton in a different part of the city—a notable incident in so rare a species. Mr. Bice also took a fresh specimen in perfect condition, of that attractive *Sphingid* which is rarely met with here, *Ampelophaga versicolor*, Harr.

That large and attractive southern butterfly, *Papilio cresphontes*, Cram. Fig. 36, was more frequently seen and larger numbers of it taken than for many years back ; which seems rather strange, considering the character of the season.

That singular looking *Hemipteron Ploiaria brevipennis*, Say. *Emesa longipes*, Fab., whose appearance suggests a componnd between the Mantis and Walking-stick ; has been more fre-

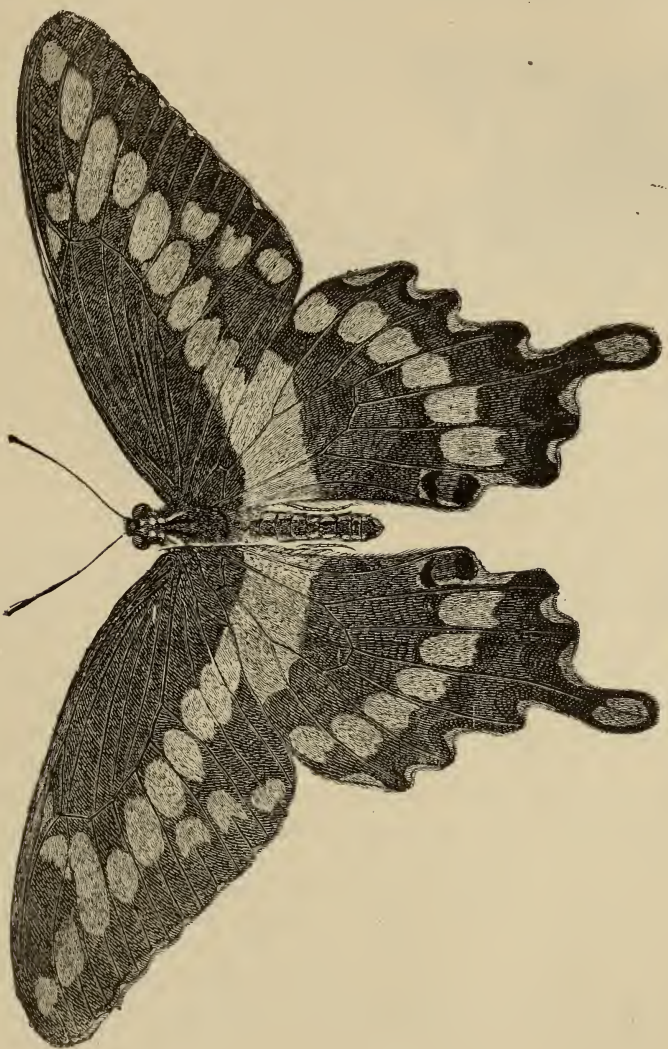


Fig. 36. Papilio cresphontes ; colours, black and yellow.

quently observed, and more interest taken in it, and enquiries made about it than ever before, some fine specimens of it having been brought to me for determination.

As an illustration of the spreading of injurious species, Mr. C. P. Butler of London, Ont., reported his finding in large numbers *Crioceris 12-punctatus*, Linn., on his asparagus the early part of August. This is the first observation of it reported in this locality ; and so far as observation went, it was then confined exclusively to his neighborhood. Mr. Butler kindly provided the society with a liberal supply of specimens for its collection. There are two species of injurious asparagus beetles, *Crioceris asparagi*, Linn,, and *C. 12-punctatus*, Linn., and they differ considerably in their appearance, and to some extent in their habits. *Crioceris asparagi*

has been on the Canadian list, as having been known to be taken in Canada for fourteen years or more, but it has not yet been reported as having been seen in this city or vicinity, whilst *C. 12-punctatus* will soon prove itself to be the more abundant and destructive species of the two.

Mr. E. M. Walker's observations on the spreading of *Pieris protodice* (Fig. 37) eastward, given in the Thirty-second Annual Report of the Entomological Society of Ontario, page 87, aroused my interest in that butterfly, and I requested the collectors in London to be on the look-out for it; but it was not observed here by any of them. The season was unfavorable for *rapae* (Fig. 23), as it was not nearly so plentiful as in ordinary years, and it may well be regarded as yet more unfavorable for *protodice*, which has been designated "The Southern Cabbage Butterfly." In 1895 *protodice* was reported as plentiful at Windsor, Ont. It was also seen at London where a few specimens of it had been taken the previous year. Since then it has not been observed in London. No further notice of its movements has been taken, so far as I have observed, until Mr. Walker reported it as plentiful at Leamington, Chatham and Sarnia. Which seems to indicate that it is recovering lost ground eastward, but that its appearance at London in 1894 and 1895 should be regarded as a sporadic outbreak, rather than as a permanent advance. The only fresh captured specimen of *protodice* that I have seen this year came from Leamington.

Fig. 37. Pieris protodice; colours, white and black.

Desiring to locate its present boundary eastward, I made a trip to Glencoe. which is about half way between Chatham and London on the Grand Trunk Railway, but found only *rapae* there. So it has not yet got thirty miles east of Chatham; and if it is gradually extending eastward it will be several years yet before it reaches London along that line. But I am under the impression that it will increase more rapidly along Lake Erie shore than it will inland, and my intention was to visit Port Stanley in order to see if it had reached that locality, but a favorable opportunity did not present itself.

If *Pieries protodice* is actually recovering lost ground, how slowly it is spreading eastward as compared with the rapid advance of *P. rapae* westward upon its first introduction into the country. First taken at Quebec city in 1863, and considered likely to have been landed there from Europe three years earlier, it reached Montreal in 1867. Belleville and Trenton in 1872. Port Hope, Toronto and Dundas in 1873. Paris and London in 1875, occuping western Ontario and extending into Michigan in 1876. Thus in thirteen years time it spread from the City of Quebec to the Detroit river. And the marvellous thing about it was that as *rapae* advanced *protodice* disappeared, not leaving a trace of its previous existence in the locality. Now it has taken six years for *protodice* to get from Windsor to Chatham, and then it has not got the whole ground to itself, but only getting to be in the majority. Clearly indicating that *protodice* is meeting with a resistance of some kind to the reoccupying of its lost ground, which *rapae* did not encounter in its progress westward.

This is an occurrence of the most profound interest to every student of biology, and well worthy of their closest attention and consideration. And in it may yet be found a key to the solution of some of the most obscure and difficult problems of the day, in their relation to the science of life in natural history.

A FEW NOTES ON DANAIS ARCHIPPUS.

By H. H. Lyman, Montreal.

Were it not for its commonness, I think that this butterfly would be considered, as suggested by the common name proposed by Dr. Scudder, the Monarch of North American butterflies.

It is so large, so strong of wing, and its colours are so rich that its pre-eminence is very marked, and it is so abundant, and so widely distributed that it must be familiar to even the most casual observer of nature. (Fig. 38.)

(Fig. 38.)

As boys, my brothers and I gave it the name of the "Large Striped Butterfly," *Limenitis Disippus* being the "Small Striped Butterfly," and these names had certainly the merit of being descriptive.

But while this butterfly is so common and so easily reared, there is, perhaps, no butterfly about whose life history naturalists have disputed more keenly, and notwithstanding all the arguments and the evidence gathered, the facts have never been made sufficiently clear to preclude further dispute. This shows what a fascinating study is Entomology. There is always something still to be learned about even the commonest species, and everyone, no matter how limited his or her means and time may be, can always add to our knowledge, if only the effort be made in the right way.

The points about which the dispute has chiefly raged are three :

1st. Does it hibernate ?

2nd. How many broods are there ?

3rd. How long do the individuals usually live ?

Mr. Wm. H. Edwards has contended that the life history of this butterfly differs in no essential particulars from that of other hibernating species ; that in Virginia there are four broods, the butterflies of only the last hibernating, and appearing on the wing early the next spring, mentioning the last of March as the time of first appearance, eggs being laid last of April or beginning of May, the 2nd May being mentioned, and the first brood from the hibernators appearing at the end of May.

The late Dr. Riley wrote, "They commence depositing eggs in the latitude of St. Louis during the fore part of May . . . . Butterflies from these eggs begin to appear about the middle of June."

Dr. Scudder claims that in the north (Query : What is "the north" ? and where does it begin in coming up from "the south" ?) the species is only single brooded, that the country is

annually colonized by immigrants from the south which lay eggs up to the middle of August; that the butterflies never mate the first season; that some attempt hibernation, but that while hibernation may be successful in a few localities in southern New England, usually every hibernator north of the annual isotherm of 40° perishes; that large numbers migrate south, and pass the winter in an active state, that the butterflies live for more than a year, and mingle on the wing with their progeny of the succeeding season, from which it has been suggested that its common name should be "the Tramp" or "the Patriarch."

Mr. Moffat, in the interesting papers which he has contributed to our Annual Reports, accepts Dr. Scudder's theories, and even adds to them. He appears to claim that all butterflies observed ovipositing in the north have come from the "south," but believes that there are several broods in the south, and that each of these broods is controlled by the same strong desire to travel northward, and that there are thus successive waves of immigrants which lay eggs and produce fresh butterflies, and that these successive waves account for the egg layings from "about the first of June and before," till such late layings as produced the butterfly which Mr. Moffat had emerge on the 6th of November, but Mr. Moffat wisely declines to attempt to draw the line between north and south for this butterfly.

There is one point, however, which is not made clear, and that is whether Mr. Moffat believes that the butterflies which emerge in July from eggs laid by the first arrivals in Ontario continue on the wing in the locality where produced, or also emigrate to still more northern latitudes, and if the latter, whether these having come from the "south" mate and oviposit in these more northern regions.

My own experience of this butterfly extends over many years, but I have probably not given it the same careful study that Mr. Moffat and others have done. I have, however, approached the subject with an unprejudiced mind, and have always been open to conviction, but at the same time confess that by natural disposition I am inclined to look with suspicion upon any theory which attributes abnormal causes to observed phenomena.

The facts, so far as I have observed them, are that in the early summer worn and discoloured females appear on the wing, and are seen ovipositing. These worn and discoloured specimens soon disappear, and no such specimens have ever been seen by me after about the middle of July. What becomes of them? Do they die here after laying their eggs, or do they press on to the "north"?

On many occasions I have first seen these immigrants at the end of June or 1st July. At Au Sable Chasm, on 1st July, 1895, I saw the species for the first time that year, and secured two eggs which I saw laid, and a butterfly reared from one of these eggs emerged 31st July. Doubtless they sometimes arrive earlier. Mr. Winn has seen them earlier. I do not remember to have done so in the neighbourhood of Montreal, prior to 1899, and have frequently searched the Milk Weeds in June for eggs or larvæ without success.

Once only I found a larva nearly full grown, on the mountain, which must have come from an egg laid about the middle of June, but in 1899, on the annual excursion of the Natural History Society of Montreal to Montfort, on 10th June, this butterfly was seen flying, and Mr. Norris found an egg and gave it to me. This egg hatched about the 11th, pupation occurred on the 29th, and the butterfly emerged on the 10th July.

On 1st July of that same year, on an outing of the Montreal branch to Chateauguay Basin, I took a pair in coitu. The male was bright, but the female worn and discoloured. I kept them alive in a cage with the food plant, and secured one or two eggs, and a butterfly reared from one of them emerged on the 4th August.

In 1896 I went down to Portland, Me., on 29th August, and during a ramble on the 30th found a larva of the species nearly full grown, which pupated on 7th September. Allowing the usual time for the larval period, the egg could hardly have been laid before the 15th

August. But what butterfly laid it? Certainly not one of the worn and discoloured spring immigrants. No one, I am sure, ever saw one of them laying eggs as late as the middle of August. What reason is there against supposing that it was laid by a butterfly which emerged about the end of July or beginning of August from an egg laid by an immigrant the last of June or beginning of July?

I accept the colonization theory, but I see no reason to accept the extraordinary hypothesis that this species practises celibacy for a year from its birth.

In regard to the autumnal gatherings, which I regret to say I have never observed, Mr. Moffat's belief seems to require our acceptance of an intelligence scarcely less than human. He speaks of the working of their "minds," claims that a rendezvous is selected, but whether by a representative "committee on place of meeting" duly elected for the purpose, or is named by some Napoleon or Lars Porsena among them, we are not told, and that then messengers are sent forth east and west and north, if not south, to summon the array.

Such a belief is, to me at least, incredible. I have never seen one of these gatherings, but do not doubt that they frequently occur, but I think that if they occurred regularly every year, and that if annual flights to the south were also of yearly occurrence many more observations would have been made and recorded, on account of the size and conspicuous appearance of the species, but I see no reason to attribute anything semi-miraculous to these gatherings.

It is well known that in some years this butterfly occurs in much greater numbers than in others, and it would seem probable that marked swarms only occur in years of great abundance. That a southerly migration also sometimes takes place, may also be conceded but it is not necessary to suppose that scouts are sent out to gather the hosts.

The migration would begin at the furthest point north that the species extended to, and would begin earliest at that point. Naturally, as they flew south they would meet milder climatic conditions, and so be tempted to linger by the way, and to foregather with those inhabitating these regions. That the butterfly has a marked odour is well known, and it seems probable that the odour from these increasing swarms would be carried a considerable distance by the wind, and so tend to attract still more, either from east or west, to these gatherings, of which there are probably not one but many.

Because Dr. Thaxter has observed it wintering, like "the very best society," in the Gulf States, Mr. Moffat concludes that it does not hibernate anywhere, but surely this is too weighty a conclusion to draw from such slender premises.

The life history of this butterfly will never be settled by argument, but the main facts could easily be learned if a sufficient number of intelligent persons would devote a little time to observing the species, and jotting down their observations at the time, as nothing is so unsatisfactory as trusting to one s memory in regard to scientific facts. And to this end I would suggest the issuing by the Society of a leaflet, printed on stout foolscap paper, with one of our Annual Reports, of which a large number are printed and distributed, giving illustrations of the butterfly, caterpillar and chrysalis, and with a series of questions, carefully prepared to elicit information upon all the doubtful points in its life history. That the observers be requested to pin up the leaflet in a convenient place, and fill in their observations as soon as made, and then at the close of the season, when the last of these butterflies have disappeared, to sign and forward them to Dr. Fletcher, to whom they would go post free, and the results could then be tabulated by a committee of the Society.

In order to insure a general interest in the matter, it would be well for the Society, or individual members, to offer a series of say five prizes, ranging from $10.00 to $2.00 for the best and most complete reports sent in.

THE INSECTS OF THE SEASON.

By W. Lochhead, Ontario Agricultural College, Guelph.

The year 1902 was one of many surprises for the economic entomologist. Several insects which did serious damage in 1901, and which gave indications that their ravages would be even more serious in 1902, were conspicuous by their absence, or by their very diminished numbers. The Hessian Fly is an example. Again, other insects, which in the last few years were not considered serious, appeared in large numbers and did much damage. The Clover-seed Midge is an example. Other examples will be given in their appropriate place in the following notes.

The wet, cold season had its influence in checking the multiplication of some injurious forms, but in the case of others there was no appreciable check.

Insects Injurious to Farm Crops.

For reasons, which can be only partially explained, the Hessian Fly (*Cecidomyia destructor*) did very little damage in those regions where it was most abundant last year. While it is true that a much smaller acreage of wheat was sown last fall, and as a rule the sowing was done much later than usual, yet there remains some apparently unaccountable cause for the almost total absence of flies in those regions. The winter and fall were not unfavorable to insect life, if we can judge from the condition of most insects in spring. It is probable that the parasites were more abundant than were supposed, and that they were instrumental largely in killing most of the Hessian Flies.

In South Grey, however, the Hessian Fly did much damage this year, some fields of wheat being entirely broken down by the spring brood. There it appeared to attack certain varieties of wheat in preference to others. For example, the Early Arcadian was untouched, while the early Clawson, sown at the same time, and on the same kind of soil, and under other similar conditions, was seriously affected.

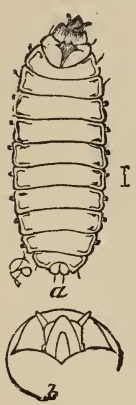


Fig 39.
The Clover-seed Midge: (*a*) larva highly magnified; *b*) head retracted, still more highly magnified. (Riley.)

The Pea-Weevil (*Bruchus pisi*) continued its ravages with undiminished vigour in the older sections, and spread to new areas where it had previously been unknown. It is evident that concerted action must be taken or else pea-growing will have to be abandoned. Already in some sections the latter policy has been adopted.

The Clover-seed Midge (*Cecidomyia leguminicola*) Figs. 39, 40 and 41, was abundant in the western portion of Ontario, and in many places completely destroyed all clover left for seed. Even that which was pastured up to June 20th was destroyed, according to some reports. Here, again, farmers must co-operate. All should cut or pasture their clover until the 20th of June.

In many respects, *Wireworms*, Figs. 42 and 43, may be considered one of the most injurious insects which attack farm crops. The extent of the ravages is difficult to compute, for in some localities they are almost absent, but in others they are very abundant.

On account of their habit of working below the surface of the ground, no reliable method has been devised for their destruction, or for the prevention of their attacks. In fields which have been kept for several years in sod, wireworms are almost certain to multiply. When the sod lands are broken up, the "worms" will be found in almost every stage of development. Some are very young and will require two or more years before becoming mature; some are a year old; some two years old,

and others nearly mature and perhaps entering the pupa stage. It is evident then that the breaking up of the land will destroy but a small number of all the wireworms in the soil. If the ploughing is done in the fall, and the land is kept well stirred until winter sets in, many pupae will be destroyed ; but the grubs will be but slightly injured. The roots of the grasses turned under may satisfy their appetite the following season, and the crops may not suffer much. In the second season, however, these supplies of food are exhausted, and the roots of the growing crops are called into requisition. Hence the common complaint that wireworms are often more destructive the second season after the sod is ploughed under. It behoves the farmer, therefore, to put in a crop which is specially immune, such as peas, or a hoed crop.

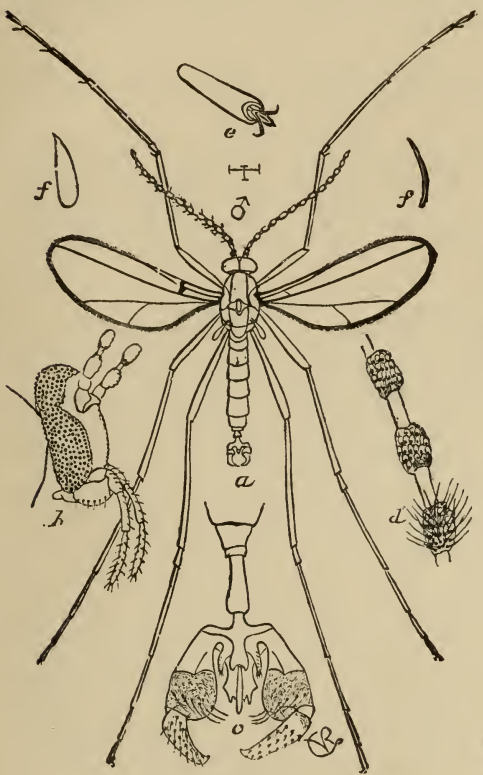


Fig. 40.

(*a*) The Male Midge, highly magnified; (*b*) head, further enlarged ; (*c*) clasping organs ; (*d*) joints of antennæ ; (*e*) claws ; (*f f*) forms of scales on body and wings. (Riley.)

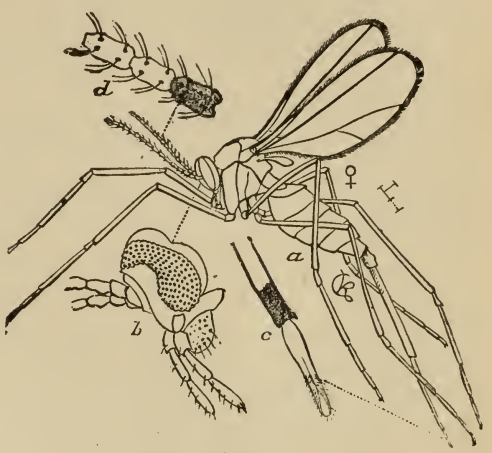


Fig. 41.

(*a*) The Female Midge, with her four-pointed ovipositor extended ; (*b*) head ; (*c*) tip of ovipositor ; (*d*) joints of antennæ ; all highly magnified. (Riley.)

Fig. 42.

Wireworms.

Fig. 43.

Click-beetle parent of Wireworms

The main preventive is a short rotation of crops, in which the fields are not allowed to remain longer than two seasons in grass.

Experiments and experience have both shown that there is no use attempting to kill the wire-worms by soaking the seeds in poisonous chemicals, or by putting poisonous substances on the lands in the hope that the insects will be killed.

Cutworms were quite abundant in many sections of the Province, and did considerable damage.

An interesting observation was made in Kent County where the cutworms were very numerous up to the end of May. Heavy rains occurred at this time, and many of the low, level fields were inundated. Thousands of dead cutworms were seen along the borders of the drowned fields.

Insects Injurious to Vegetable and Garden Crops.

The Colorado Potato Beetle (Doryphora decem-lineata) was not as injurious as in former years. It is probable that the wet season was responsible for the diminution in numbers.

The Squash Bug (Anasa tristis) Fig. 30, was also not so troublesome as in previous years; but the *Cucumber-Beetles* held their own and did much harm.

Blister Beetles were not so abundant as usual, probably due to the fact that *Grasshoppers* have not been numerous for the past two or three seasons.

Cutworms were reported from North Grey as cutting off young mangolds and cabbages.

The Turnip Aphis (Aphis brassicae) did little damage and was not noted in any reports which I received, but the *Cabbage-worm* (Pieris rapae) was quite destructive not only on turnips but also on cabbages and cauliflowers.

The Zebra Caterpillar (Mamestra picta) was quite common in most turnip and cabbage fields. (See Fig. 21.)

At Leamington in Essex County, the *Melon Plant Louse* (Aphis cucumeris) was very abundant in many of the large melon fields. They were kept in check by a careful application of tobacco solution. These insects are greenish-black, and infest the under surface of the leaves; consequently, the tobacco applications must be made to the under surfaces by means of an elbow on the rod near the nozzle.

Asparagus beetles were not so destructive this year as usual about St. Catharines.

The Tomato and Potato Flea-beetles (Epitrix cucumeris) were very abundant. It is of interest, economically, to note the relation of these flea-beetles to the *Early Potato Blight*, which was prevalent this past season. The edge of the holes eaten by the beetles soon became diseased, and examination showed the presence of spores of the *Early Blight* (Macrosporium solani). It is probable that the beetles are carriers of the disease from one leaf to another, and it is more than probable that the dead tissue surrounding the holes made by the beetles forms a suitable medium for the establishment of this semi-saprophytic fungus.

Early applications of Bordeaux and Paris Green are necessary for the control of the beetles as well as the fungus.

The Potato Stalk-Borer (Trichobaris 3-notata) Fig. 44, which committed such serious ravages in Pelee Island last year, appeared again this year, but in diminished numbers. Many potato-growers on the Island suffered greatly, but definite information as to the real extent of the injury done is wanting on account of the more serious damage done by the *Late Potato Blight* (Phytophthora infestans). The death of the stalk by the fungus may aid in killing the stalk-borer, since the larvæ may be prevented from reaching maturity. It is the duty of the potato-growers, however, to take the usual precautionary measures, viz., to burn the vines in the field in the fall, so as to kill the surviving adult beetles, which would otherwise hibernate in the dead stalks.

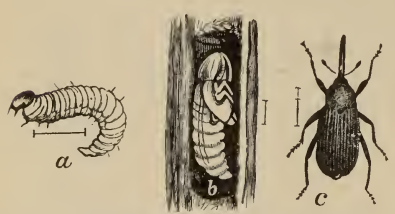


Fig. 44.—Potato Stalk-borer: *a*. grub; *b*. pupa; *c*. beetle, all much magnified.

Insects Injurious to Orchard Trees.

In spite of the unfavorable wet season, the San José scale increased in large numbers in the infested sections. The pernicious nature of the scale is now impressing itself strongly on the minds of the fruit-growers, and they are coming to the conclusion that the warnings of the entomologists, uttered seven or eight years ago, were warnings which should have been heeded then, and not now. The orchard men themselves must now bear the burden of controlling the

scale. Their task is far from being a hopeless one, however. Experience shows that there are several insecticides which may be used with good results. These are whale-oil soap, crude petroleum, and the lime and sulphur mixture. The last is by far the cheapest remedy, but the great objection to its general adoption is the difficulty of preparation. Two pounds of lime are boiled with one pound of sulphur in a kettle for two hours. Much requires to be known concerning the chemistry of the resulting mixture, for different sulphides of calcium are formed according to the time the mixture is boiled. It is probable that some one of these sulphides is more effective than the others.

The example of Saltfleet Township is to be commended when it passed a by-law whereby inspectors were appointed to make a careful examination of the orchards for San José scale, in view of preventing its spread. It is to be hoped that other municipalities will follow the example set by Saltfleet, so that a limit may be placed to the spread of the scale.

The Codling Moth (*Carpocapsa pomonella*), so far as my own observations extend, was not so injurious this year as last. The first brood appeared rather late, but the second brood was quite numerous. The wet season precluded careful spraying operations which may account for the large second brood.

A correspondent from South Grey reports that the Codling Moth was very injurious. He says: "It would not be exaggerating to say that *one-third* of the apple crop was destroyed by this pest."

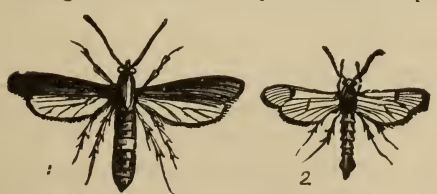
In my last year's Notes on the Injurious Insects of the Year, I called attention to the worthlessness of the Haseltine Moth Trap-lantern.

Recently another device for entrapping the Codling worms has been put on the market. It is known as the Expansive Tree Protector. It consists essentially of an expansive metallic collar, coated on its underside with a sticky substance, and a cloth band saturated with a poisonous liquid placed between the collar and the trunk of the tree. Although not in a position personally to test the device this year, I had an opportunity of inspecting many of them in different orchards. In nearly every case they failed to give satisfaction, and in some instances were positively harmful. In the first place, they are difficult to fit to the trunk of the tree; secondly, the sticky substance did not hold the caterpillars, and other forms of insect-life, or prevent them from crawling over it; thirdly, the poisonous band did not kill the insects which crawled beneath the collar; and fourthly, the bark of the tree immediately beneath the band was frequently seriously injured.

In my humble opinion, decided improvements in the construction of this device must be made before it becomes effective.

In Prince Edward County the Apple Maggot (*Trypeta pomonella*) was abundant. In some orchards more than half the fruit was injured by this maggot.

The work of this insect differs from that of the Codling-worm in that channels are eaten through the fruit in every direction. Spraying is of no value in combating this pest, and the remedy is one of prevention. The infested fallen fruit should be destroyed at once, so as to prevent the maturing of the flies. When the maggot is full grown it leaves the apple, and pupates on, or just below the surface of the ground.



F g. 45. Peach-tree borer, female moth; 2 male moth.

Peach-tree Borers (*Sannina exitiosa*) Fig. 45, were very numerous, especially in the Niagara district. Many young trees of this year's planting were injured.

The Plum Curculio (*Conotrachelus nenuphar*) was abundant in most sections of the Province.

The Bud-moth (*Tmetocera ocellana*) Fig. 46, and the Cigar-case Borer (*Coleophora Fletcherella*) were serious pests in many orchards the past season, and it is my opinion that the latter is becoming more injurious with each succeeding year. Last spring I saw an orchard in which every tree was badly infested. In some instances, the wintering cases literally covered portions of some of the smaller branches. It is true that the orchard referred to was a neglected one, so far as insects and fungi are concerned, but it is also true that both the Cigar-case Bearer and the Bud-moth are difficult to treat successfully. Both insects are well protected by their coverings, and experience shows that thoroughly careful spraying at the right time is required to kill them. Fortunately for the orchardist, both begin active work about the same time, hence both can be treated at the same time.

Fig. 46. Bud-moth and larva.

I feel that more demonstration spraying in the infested orchards is necessary before the fruit-growers will be convinced that these insects can be treated successfully. Seven or eight years ago it was shown that two or three applications of Paris green (4 ounces to the barrel) as soon as the cases became active in the spring, would hold the Case-bearers under control. Also, that kerosene emulsion, diluted with nine parts of water, applied at the same time was quite effective.

Aphids were unusually abundant in many orchards.

Insects Injurious to Shade Trees.

The protection of shade trees from the attacks of boring insects is becoming quite a serious problem in many of our towns and cities. It is becoming apparent that greater watchfulness is required. The watchman, however, should have some acquaintance with the habits of the insects to be watched, so that remedies may be taken at the right time. One of the duties of the watchman, however, should be the protection of our insectivorous birds, for we must rely to a great extent upon them for the destruction of the borers. The increase in number of borers in recent years, I think, can be traced to the wanton destruction of so many of our useful birds, and their protection at the present time is imperatively demanded.

A shade tree pest, new to me, has arrived within the last two or three years. The birches are the victims in this instance. I have watched their work in Guelph for two summers. I thought at first that the birches were dying from the physiological causes which produce *Stag-Head*, but I was wrong in my diagnosis. My attention was called this summer to dying birches in Hamilton, where an examination of the dead limbs revealed the presence of a borer. I was unable to get specimens of the adult, but the owner of the trees stated that he saw many of them in early summer. On account of their small size and their active habits, he was unable to make any captures.

From a study of their work, I was able to identify them as the Bronzy-birch Beetle (*Agrilus anxius*), one of the Buprestidae. This borer has been found working in London, Buffalo, Detroit, Ann Arbor and Chicago.

It would appear that the beetles begin work at the top and work downwards. For this reason, the tree begins to die first at the top. The burrows made by the grubs are very irregular, and have no definite direction. In most limbs which I examined I could trace their labyrinthine, net-work courses for considerable distance in the cortex and young wood, but often they would run directly into the wood, and emerge again at the surface. In one case, I found a straight tunnel in the heart-wood, but this occurred in a small twig not more than one-third of an inch in diameter.

The exit hole of the mature beetle is characteristic, I think. One side is straight, and the other is curved to conform to the shape of the beetle.

The effect of all this burrowing of many grubs in infested trees is to weaken the branches and to interrupt the supply of food and food-materials to the parts above. Some of the trees which were examined in Guelph and Hamilton, had their bark from top to bottom perforated with holes. Many of the larger limbs had raised ridges on the bark, which, when cut open, showed burrows beneath.

The life-history of this insect is about as follows : The adults emerge in May, and begin laying their eggs in crevices on the bark. The larvae hatch in June, and are not full grown when winter sets in. They remain torpid during the winter, and become full grown in April or early May. The pupa stage is of short duration, for the adults begin emerging in May, as already stated.

It is impossible at this stage in the study of the insect to indicate a definite line of remedial treatment. As the beetles are capable of flight, it is necessary that dying and dead trees should be cut down before the escape of the beetles in May to prevent the infection of neighboring healthy birches. Their natural enemies are unknown to me, with the exception of the woodpecker, which I have seen frequently on affected trees. It is likely that we will rely upon this bird to help us in controlling this new pest of the birch.

THE PAPER-MAKING WASPS OF THE PROVINCE OF QUEBEC.

By Rev. Thomas W. Fyles, D.C.L., F.L.S., Levis, Quebec.

Once upon a time, I was taken over a pulp-factory, and shown how billets of wood were converted into paper. The process seemed to me a natural outgrowth from one that I had witnessed, when a boy, among the descendants of Huguenots who settled at Dartford in Kent two hundred years ago. These men, in their little workshops, manufactured paper from cotton rags.

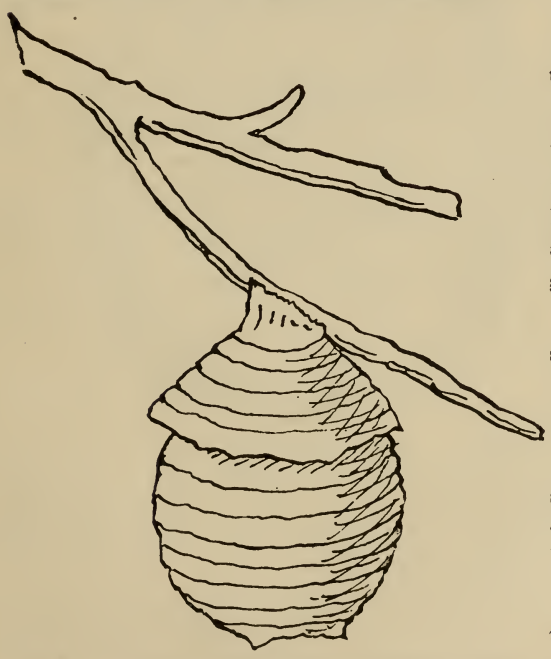


Fig. 47. Wasp's nest at an early stage of construction (original).

The fineness and tenacity of vegetable fibre have been ever since the creation ; and paper-makers (not always human) have existed, in successive generations, through all the ages since that great event.

"The thing that hath been is that that shall be, and that which is done is that which shall be done ; and there is no new thing under the sun."

"Is there anything whereof it may be said, this is new ? It hath been already of old time which was before us."—Ecc. I.. 9-10.

The nest of the Black Hornet (*Vespa maculata*, Fabricius) Figs. 47 and 48, is a wonderful structure, suggestive of a variety of things,—tents, umbrellas, capes, the papier-maché dwellings of the Japanese, compressed woodenware, etc.

It is often of great size. The Rev. J. B. Dobbage of Bourg Louis has one that measures round it, over top and bottom three feet two and three-quarter inches and, when taken round the middle, two feet nine and a half inches.

Our fences and out-buildings supply abundance of material for the busy workers tha construct such dwellings. In the wilderness they resort to trees rent by tempests, etc., for their supplies.

The old church at Hull, Province of Quebec, was built of wood. It had never been painted. One summer day, about thirty-seven years ago, when on a visit to Hull, I walked up to see the church. It stood on a rocky knoll and was surrounded by cedars—the French part of the town now covers the spot.

I thought to look in at the windows, but these were high up ; and I did not venture to climb, for busily employed about the building were hundreds of wasps, of different kinds. They were eroding the surface of the wood with their jaws—procuring the materials for the construction of their nests.

The material thus procured would be thoroughly masticated and mixed with a natural fluid or saliva, till it was of the right consistency. The wasps, on commencing their work, would deposit the prepared material and then bring it into shape with their mandibles, going over it again and again, pinching it till it was of a proper thinness.

The comb in the hornet's nest is very different from that in a hive of bees (Fig. 48). The bee's comb is of wax ; the hornet's of paper. The bee's comb is suspended in masses perpendicularly — the cells, two deep, being placed back to back and opening sideways. The hornet's comb is suspended in tiers horizontally, the topmost tier hanging by a stalk to the roof, and each of the others by a stalk affixed to the centre of the one above it. The cells are only one deep in each layer, and open below. In the beehive some of the cells are filled with honey and some contain young bees. In the hornet's nest all the comb is brood comb, the young being fed with nutriment prepared by the mandibles and maxillæ of their attendants. (Fig. 49).

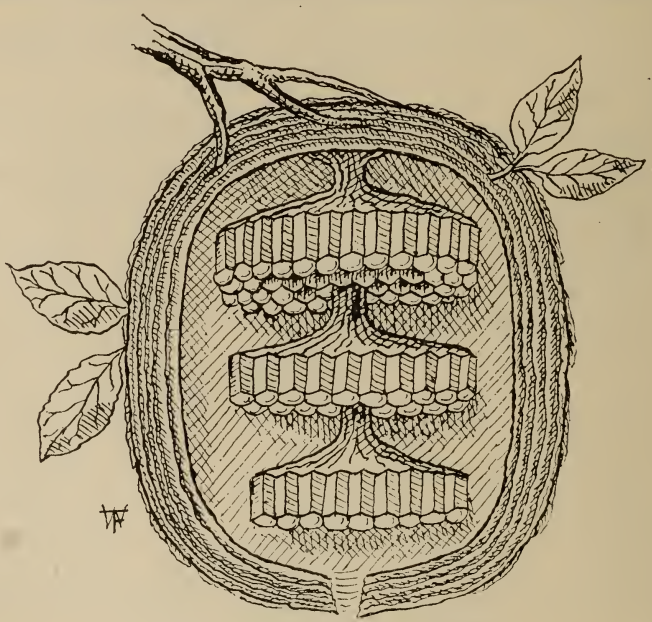


Fig. 48. Section of Hornet's nest (original).

The larvæ of the hornet, in their early days, are held in place by a glutinous fluid, and later, by pressure upon the sides of their cells. When they are about to change to pupæ, they spin a web over the entrance of their cells and close themselves in.

Fig. 49. Head of Wasp, showing mouth parts (original).

Mr S. Stone, in the *Entomologist's Weekly Intelligencer* for June 11th, 1859; (No. 141, page 84) thus described the process of feeding the larvæ in a wasp's nest :

" The process is an extremely interesting one. An attendant or nurse on retiring from a foraging excursion with a caterpillar it has found on a neighbouring hedge ; a piece of meat neatly rolled

up, that it had purloined from a butcher's shop or somebody's larder ; a specimen of the insect popularly known as 'daddy-long-legs,' shorn of its wings and other encumbrances, especially if the day be a windy one, for the purpose of lessening the difficulty of conveying such an unwieldly creature through a disturbed atmosphere—for wasps have powers as nearly as possible allied to reasoning ones, as has been observed upon other occasions as well as the one recorded above ; or perchance a winged ant caught in the act of migration, is met at the entrance to the nest by one, two, and sometimes three other attendants. These at once lend their aid in cutting up the 'prey,' which they not only reduce to the consistency of pulp by mastication, but to all appearance actually swallow. Having done this they separate, and taking different courses, commence feeding the larvæ which lie in their route. As they pass over a cell, the larva therein contained, if hungry, protrudes its head and applies its mouth to that of the attendant, who stops for a few seconds for the purpose of allowing it to sip its fill. This done, the latter moves on to another cell, where the process is repeated. If on the approach of the attendant a larva does not require food, instead of protruding its head it remains quiet, when the former passes on to another cell where its services may be required. In this way an attendant will feed perhaps twenty larvæ before the contents of its stomach, or whatever else may have served as a receptacle for the food it has been dispensing, is exhausted, when it again proceeds in quest of food, either leaving the nest to obtain it, or else taking part, in the manner already described, with one which has just returned from foraging."

It will be observed from the above account that the wasps feed their charges much as the dove feeds her young, by supplying them with partly digested food from its own crop.

Mr. Stone's observations upon the feeding of the wasp-larvæ confirm those made by Mr. Spence as recorded in Letter XI, *Kirby and Spences's Entomology*, and by Willoughby and Réaumur before him.

Vespa Germanica, Fabricius—like the European *Vespa vulgaris*, Linneus—makes its nest in a chamber in the ground, taking advantage of some natural hollow, or enlarging the run of some small animal. I found such a nest by the roadside on the Island of Orleans last summer.

Some years ago I took a nest of *Vespa media*, Olivier. I found it suspended from the ceiling of a coach-house belonging to my highly-esteemed friend, the late I. J. Gibb, Esq., of Como, P. Que. This nest was compact and smooth, and of the size of a cricket-ball. The entrance was in the middle of the under side, and was about half-an-inch in diameter.

The late P. H. Gosse in the *Canadian Naturalist*, page 269 describes the nest of *Vespa marginata*, Kirby. He says:—

"That is not a stone, although it looks so much like one, as you would find to your cost if you planted your foot on it. The mowers have cut as near as they durst approach to it, for it is a wasp's nest (*Vespa marginata*) and full of very irascible and formidable subjects, who are not to be assaulted with impunity. These large round nests are generally attached to a stone, often nearly covering it, and cannot easily be distinguished from it. They are made of a tough whitish paper, manufactured by the wasp, of the minute particles which she abrades from weather-beaten wood, and agglutinates with saliva, spread out into this form. This nest consists of several layers, convex above, and projecting at the edges to shoot off the rain from the comb within, which is made of the same substance, and contains young and pupæ. You may observe numbers of the wasps coming and going, and crawling busily about the nest, the entrance to which is beneath the edge."

Vespa marginata, Kirby = *Vespa consobrina*, Saussure = *Vespa arenaria*, Fabricius. See Cresson's HYMENOPTERA, page 290.

I found a nest of this species last season in the open woods near Fort Number 2, Levis. It was close to the ground, and was supported by some small stems of brush wood. I went one cold day in October to obtain it, but somebody had forestalled me.

Among the bees there are large females, small females or workers, and males or drones; so is it among the wasps; and the male wasps are stingless as the drones are. They may be distinguished from the females in this way :—

The male wasps have 13 joints in the antennæ.

The female wasps have only 12.

The male wasps have 7 abdominal segments.

The female wasps have only 6.

Bees, wasps and ants have the three kinds,—males, females and workers. It is customary amongst naturalists to distinguish these by the astronomical signs for Mars, Venus and Mercury. The sign of Mars is a shield and spear ♂. That of Venus is an apple with its stalk ♀ —in reference to the golden apple awarded to her, as the most beautiful of the three goddesses (Juno, Minerva and Venus), by Paris. That of Mercury, the *caduceus*, or staff with serpents intertwined ☿.

Hornets and wasps are not troublesome unless they are molested. They destroy vast numbers of flies and destructive larvæ, spiders, etc. But, strange to say, the wasps themselves fall victims to predacious flies (Asilidæ) which know how to pounce down upon them, and seize them, just so that they can neither use their jaws nor their stings.

The following is a table of the Quebec Paper-making Wasps :—

Family Vespidæ.

Genus *Vespa*, Linneus.

1. The Black Hornet, *Vespa maculata*, Fabricius.
2. The Margined Wasp, *Vespa arenaria*, Fabricius.
3. The German Wasp, *Vespa Germanica*, Fabricius.
4. The Diabolic Wasp, *Vespa diabolica*, Saussure.
5. Fernald's Wasp, *Vespa Fernaldi*, Lewis.
6. The Scalloped Wasp, *Vespa media*, Olivier.
7. The Red Wasp, *Vespa rufa*, Linneus.
8. The Common Wasp, *Vespa communis*, Saussure.
9. The Northern Wasp, *Vespa borealis*, Kirby.

Genus *Polistes*, Latreille.

1. The White-footed Polistes, *Polistes pallipes*, Lepell

Notes.

Fig. 50.—Vespa Maculata, the Black Hornet.

1. The Black Hornet (Fig. 50), is so named to distinguish it from the Yellow Hornet of Europe (*Vespa crabro*, Linneus). It is the largest and most formidable of our wasps. It is common and well-known.

2. *Vespa arenaria*, is known to the French Canadians by the term "Guêpe cousine." It is a handsome black wasp with narrow, white or yellow margins to the abdominal segments.

3. *Vespa Germanica* is a beautiful little wasp, and has much yellow about it. It may be easily recognized by the yellow bands on the first segment of the abdomen which form a loop, and enclose a triangular patch of black.

4. The female of the Diabolic Wasp is about six-tenths of an inch long. It is black with long yellow hairs. It has much yellow on the abdomen. Upon the first segment, the yellow

is narrow and interrupted. Upon the others, it is indented by the black, in the middle, and on either side of the indentation is a black dot. Saussure must surely have been severely stung by this wasp when he gave it its formidable name.

5. *Vespa Fernaldi* was identified for me in the Entomological Division of the Department of Agriculture, Washington. It is a pretty insect. In each of the abdominal segments the black intrudes upon the yellow by three indentations, of which the apical one is the largest.

6. In *Vespa media* all the segments of the abdomen are marked alike with three scallops protruding from the black band of every segment. The workers especially of this species have much brown hair about them.

7. *Vespa rufa.* Last summer I took a perfect female specimen of this beautiful and rare wasp. It was flying under the veranda of Mr. Morgan's country-house on the Island of Orleans. The insect is three-quarters of an inch long, and an inch and a quarter in expanse of wings. The antennæ was black without spots. The eyes are black and have an outer streak of white on the upper off side only. Between the antennæ is a white patch, indented above and below, and broader than deep. The white facial plate is angulated outwardly, and is divided, through all its length, by a broad black patch somewhat narrowed towards the bottom. The legs of the insect are pale yellow above and red underneath. The marks on the thorax are white. The segments of the abdomen are bordered with creamy white. The wings are somewhat smoky, but have an ochreous tinge, and the veins are sienna-coloured. The first abdominal segment of this wasp is of a rich chestnut or venetian red ; and on the second segment there is an interrupted patch on either side of the same colour. This segment is, with the exception of the border, wholly dark red on the under side. The tip of the last segment is red. The wasp is strikingly handsome. In the Provancher collection there is a worker of this species taken at Chicoutimi.

8. *Vespa communis* also was identified for me at Washington. It, more than any other of our Quebec wasps, resembles the *Vespa vulgaris* of Europe. I have taken it at Cowansville and at Quebec.

9. *Vespa borealis.* The wasp is described in Kirby's "Fauna Boreali-Americana: Insecta" page 265. The description may be found on page 129 of Dr. Bethune's useful compilation from Kirby's work, which was published by the Entomological Society of Ontario some years ago. Kirby states that the specimen he described was taken as far north as lat. 65°. A male specimen of this species that I took at Levis last summer has been identified for me by Mr. Ashmead of Washington.

Fig. 51.—Polistes pallipes ; *a*. the wasp ; *b*. portion of comb.

Polistes pallipes may be easily known from its slender and elegant form, its soft brown colouring, its white feet, and the two parallel longitudinal streaks on the after part of its thorax. (Fig. 51.)

I will now close my paper with a story told me by Mr. H. Brainerd of Montreal. It tells of an entirely effective, but *somewhat costly* method of getting rid of a wasp's nest.

The Hamilton Powder Company had a magazine at Dinorwic, Ontario. In it was stored four tons of dynamite. One day in last September two Irishmen were sent by the Hudson Bay Company, to take out a supply of the explosive. There was a wasps' nest under the eaves of the building, and an irritated wasp stung one of the men. He "got mad," and vowed he would "smoke the critters out," so he made a "smudge." Now the ground had become saturated with nitro-glycerine, and no sooner was a light applied to the smudge, than an

ominous flash alarmed the men, and they took to their heels. They had gone but a short distance when there was a fearful explosion and they were struck down senseless. On their recovery they told how the affair had happened.

The loss was—the building ; the dynamite, worth about $1,200 ; charges for broken glass, $140 ; and a smashed canoe ; *but no trace of the wasps' nest could be found.*

SOME INTERESTING HABITS OF LEPIDOPTEROUS LARVÆ.

By Arthur Gibson, Ottawa.*

The student of insects is continually being astonished and mystified by the wonderful things which are ever occurring in the entomological division of the animal kingdom. No matter what kind of insect study one may enter upon, nature never fails to present a varied, at times incomprehensible, series of interesting objects. In the lepidoptera there is no exception to the rule. While mysteries will continue to be, at the same time, owing to the rapidity with which the science is now developing, many of the facts which are, as yet, unexplainable, will doubtless in the near future be expounded, and knowledge which we are now badly in need of, be duly placed at our disposal. A study of the larvæ of our butterflies and moths will soon convince the student that there is much of interest as regards even the habits of the commonest species, many of which show remarkable traits.

As the title given this paper covers a wide field it is only the writer's intention to mention, in a general way, some of the interesting habits which have come under his notice. When asked for a short paper it occurred to me that if I could put together a few facts concerning the habits of some of these larvæ, my endeavor might not be without interest.

At the outset a short mention will be made of the feeding habits of these creatures. All have doubtless seen some caterpillars feeding, and know that the particular habits of each kind vary to a great extent, almost every species showing some peculiarity. While some caterpillars are extremely restricted in their choice of food, only feeding on one or two plants, others are quite indifferent and will eat almost anything, some species having been known to eat up everything in sight. A good common example of the former class is the Monarch Butterfly, *Danais archippus*, Fab., the larvæ of which are known to feed only on *Asclepias*, while in illustration of those which are general feeders, the Variegated Cutworm, *Peridroma saucia*, Hbn., might be cited. During July and August, 1900, the caterpillars of this species fairly swarmed in the Province of British Columbia and the States of Oregon and Washington, devouring plants of all kinds and causing a loss to grown crops of $168,000 in British Columbia alone, from which it has been estimated that a loss of $2,500,000 accrued in that year in the United States and Canada.

From an economic point of view an understanding of the feeding habits of larvæ is important. It is well known that if the grower of any marketable crop desires to obtain the fullest returns, a knowledge of his insect enemies will materially aid him, when his fruit trees, cereals, etc., are attacked by any of these pests. While some caterpillars are general feeders, most species, however, are particular in their choice of food In the event of a certain caterpillar occurring in large numbers upon any single kind of fruit tree, or crop, anxiety or loss and unnecessary work may be prevented if it be known to the producer that the species only feeds on the plants upon which it is first found, or those botanically related, and that it is not likely to spread to adjoining crops. Of course there are instances of certain caterpillars doing damage to plants upon which they were not previously known to feed, but such occurrences are unusual. Cutworms, for instance, which are the caterpillars of the Agrotid moths, as a

* Read before the Toronto Branch of the Entomological Society of Ontario.

rule only feed at night, generally confining their attacks to low plants, such as cabbages, cauliflowers, etc., so during serious outbreaks apprehension as to danger to near-by trees, or other crops, may, in many instances, be avoided.

Some species of larvæ have the habit of lying close together in serried ranks when feeding, and many of congregating when resting. Interesting examples of the former kind are *Procris Americana*, Harris, Fig. 52, *Attacus promethea*, Dru., and *Hyperchiria io*, Fab,, which, when in their younger stages, feed in a row, each larva beside the other, on the underside of a leaf. *Vanessa antiopa*, Linn., and the *Datanas* are examples of those which feed in colonies, a small branch having as many as fifty or more, close together, while on the remainder of the tree there may not be a single specimen. The two kinds of Tent Caterpillars furnish splendid examples of larvæ which congregate in masses when not feeding. Everyone has seen the tents of *Clisiocampa Americana*, Harr., the true tent caterpillar, containing large numbers of the larvæ, and most people have doubtless seen the large masses of the Forest Tent caterpillar, *Clisiocampa disstria*, Hbn., which does not make a tent, the larvæ when at rest congregating on a silken mat spun on the trunk of a tree or along one or two of the branches.

Fig. 52. Procris Americana larvæ feeding.

While many species of caterpillars have the habit of congregating in numbers, others are quite the opposite, and are solitary throughout the whole of their larval existence, not more than one, or at most two, specimens being found feeding on a single plant. A common interesting illustration of this is *Arzama obliquata*, G. & R. The larva of this species is a borer, feeding inside the main stem of the common Cat-tail, *Typha latifolia*, L., inside of which it also generally passes the pupal state. Specimens, however, when mature sometimes leave the Cat-tail and wander, or swim, to the shore or edge of the swamp to seek a suitable place to pupate,—under a rock, piece of fallen branch, or in an old stump under the bark or in the rotten wood. I have collected hundreds of specimens of this caterpillar in various localities and only rarely have found two specimens in the same plant. These larvæ when full grown measure nearly two and one-half inches long, and not possessing any attractive qualifications can hardly be termed beautiful caterpillars. Mr. Henry Bird, who has done such good work in *Hydroecia*, relates the interesting habit of *Hydroecia duovata*, one of his new species. In a letter to Dr. Fletcher he says that "thousands of plants (*Solidago sempervirens*, L.) may be examined without any sign of a borer. A dozen isolated ones in another neglected spot may contain twenty-four larvæ, not twenty-three, or twenty-five, but the two dozen to a nicety, for Mrs. Duovata can count up to two without any failure when depositing her ova." Among the butterfly larvæ those of *Pamphila metacomet*, Harr., and some other skippers, which Dr. Fletcher has specially studied, are solitary in habit. These caterpillars feed on various species of *Carex* and curiously enough furnish themselves with a cocoon-like structure, in which they live when not feeding. This interesting contrivance is placed between two of the larger leaves which are drawn together and fastened by means of silk. This habit of course provides great protection to the caterpillar, as it is only by separating almost everyone of the central leaves of a plant that their home can be found. It is altogether unlikely that many have seen these caterpillars in nature, as they require to be looked for very closely.

During the past two summers the foliage of birch trees of all kinds, was badly attacked by the larvæ of *Bucculatrix Canadensisella*, Cham. These small caterpillars occurred in vast numbers throughout Ontario, but were not noticed by the public until late in August when the trees assumed a seared appearance, and the leaves were dropping prematurely. These larvæ are popularly known as the Birch Skeletonizer, from the way they eat away the cellular tissue of the foliage, leaving only the fibrous skeleton, and are of considerable interest from the peculiar habit they have, which is quite unusual, of spinning on the leaves, before full grown, flat circular shelters, called pseudo-cocoons, whenever they are ready to moult. These little shelters, which of course are only large enough to contain the one larva, are only used by the caterpillars about a day or so before the process of casting their skin.

An interesting example of a caterpillar illustrating protective mimicry was observed last season by Dr. Fletcher and the writer. In May, 1901, larvæ of one of the noctuid moths, *Homohadena badistriga*, Grt., were found in some numbers on the yellow-flowered honeysuckle, *Lonicera hirsuta*, Eaton. Caterpillars in all stages were found, but strange to say no trace of eggs could be seen. Very small larvæ were collected about a quarter of an inch long, which must have been out of the egg only a day or so. Doubtless, as is often the case, the young caterpillar made its first meal of the shell from which it had emerged. It is probable that some eggs were still on the plant, but although searched for diligently, none could be discovered. When young the caterpillars feed on the foliage of the new shoots of the plant and generally hide inside the two clasping leaves which surround the cluster of flower buds at the tip. When mature they crawl down to the shady side of the old wood of the plant, upon which they rest when not feeding. At this time the general colour of the caterpillar is remarkably like that of the stem, or twig, upon which it is resting, and owing to this striking resemblance, it is thus protected from numerous enemies.

Many other larvæ owing to their colour being similar to that of the plant upon which they feed are likewise hidden from view, and unless searched for carefully, even when they are known to be present, are difficult to find. *Plusia œreoides*, Grt., which feeds on *Solidago Canadensis*, L., is another example of a corresponding similarity in coloration of the caterpillar to the green colour of the leaves and stem, protecting the species from natural enemies, such as birds, parasites, etc.

The larva of *Nerice bidentata*, Walk., feeds on the foliage of elm ; it is a rather curious caterpillar with sharp protuberances down the dorsum. This species feeds on the edge of a leaf, and owing to its colour being the same as that of the foliage, and its peculiar elevations on the dorsum corresponding with the outline of the leaf, it is thus protected considerably from being observed. A similar example of protective resemblance is found in the caterpillar of *Telea polyphemus*, Cram., which when feeding on the edge of an elm leaf from which it has eaten out a portion, is even better protected than the above by reason of its indented dorsal outline and the bright lateral stripes, which simulate the ribs of the leaf.

An interesting habit which certain of the Coliad larvæ have, is that of resting exactly in the same place, after feeding, along the mid rib of a leaf. When wandering off to feed they spin a path of fine silk as they walk. After they have eaten their meal they are thus able to return by following this silken road to the exact spot from which they first started. *Papilio turnus*, Linn., also has the habit of spinning a platform of silk across the upper side of a leaf upon which it rests when not feeding. (Fig. 53).

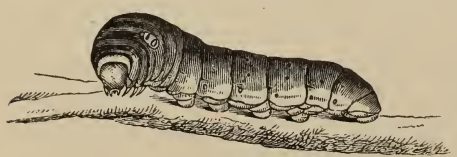


Fig. 53. Larva of Papilio turnus.

Doubtless every collector of insects, or student of natural history, has noticed the habit which many caterpillars have of drawing two or more leaves together by means of threads of

silk, in which they feed, or in which they rest when not feeding. Some larvae curl up a single leaf, fastening the sides with silk, and live inside the enclosure thus made until they have eaten nearly the whole leaf, when they go to another leaf, and so on until they reach maturity. The caterpillars of some of our common butterflies, such as *Vanessa Milbertii*, Gdt., *Pyrameis cardui*, Linn., etc., have this habit. The larvæ of the large skipper *Eudamus tityrus*, Fabr., which feed on the Locust-tree, *Robinia Pseudacacia*, L., and *Nisoniades lucilius*, Lint., on Aquilegias also live inside tents, which they make by drawing down a leaf to serve as a cover fastening the same to another leaf immediately under. One end of the leafy case is left open to enable the caterpillar to get out to feed.

Phlyctaenia ferrugalis, Hbn., which is an interesting species on account of its economic importance, has been called the Greenhouse Leaf-tyer, from the habit of the larvæ of drawing the leaves together, and tying them with silk. When this caterpillar is at rest it has the habit of curling round to the side of the body the head and first three, or four, segments. Many of the larvæ of the smaller species of moths fold, or roll over the edge of a leaf and seal down the whole of the turned edge with threads of silk. These small caterpillars live through all their larval stages inside the same enclosure, in which they also change to the chrysalis state. Everyone must have noticed the work of the common Basswood Leaf-roller, *Pantographa limata*, G. & R. This larva cuts a leaf half way across the middle, and then rolls the end portion into a tube, within which it lives.

Some caterpillars when at rest assume curious positions. Many geometrid larvæ have the habit of extending the whole body straight out into the air, the anal prolegs and feet firmly clutching the twig, or leaf, upon which they happen to be. They often remain in this position for a considerable length of time, without even slightly moving the body. In numerous instances the colour of the caterpillar, and the object upon which it is resting, is almost, if not quite the same, and the larva may appear as an additional twig, the casual observer being unable to differentiate between the living caterpillar and the object upon which it rests. The

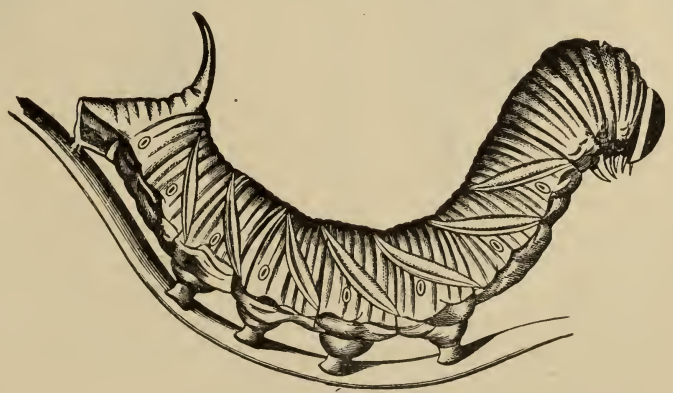


Fig. 54. Sphinx caterpillar.

larvæ of the Sphingidæ, or Hawk-moths, when resting have the habit of rearing the front of the body into the air, curling the head and first segment, down in a most stately manner (Fig. 54). They have been known to remain in this position perfectly motionless for hours. On account of this habit they are when thus resting supposed to resemble the Egyptian Sphinx, and owing to this resemblance the name Sphinx, and the family Sphingidæ is due.

The fruit of the raspberry is occasionally injured to some extent by the larvæ of the Raspberry Geometer, *Synchlora rubivora*, Riley, Fig. 55. This caterpillar is furnished on each segment with several short bristles, or spines, and has the habit of disguising itself, by at

taching to these spines, very small bits of vegetable matter, such as the anthers of flowers, tiny pieces of leaves, etc. Owing to this habit it usually escapes detection. The curious larva of *Harrisimemna trisignata*, Walk, attaches pieces of its cast skin etc. to some long hairs on the front segments. When at rest the thoracic feet are drawn up close to the body and the front segments raised, giving it a very uncaterpillar-like appearance.

Although presenting sometimes a rather formidable appearance, with the exception of one or two kinds which are provided with irritating hairs, caterpillars are quite harmless. Some of the Sphingidæ will jerk their heads from side to side and even snap their mandibles, but they are unable to bite anything thicker than

Fig. 55. Raspberry Geometer: *a* larva, natural size, on fruit; *b* segment, magnified, shewing hairs, etc.; *c* moth natural size; *d* pair of wings enlarged—colour pale green.

Fig. 56. Hyperchiria Io, caterpillar.

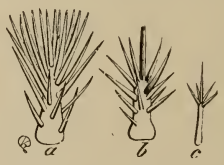


Fig. 57. Spines of Io, caterpillar, magnified

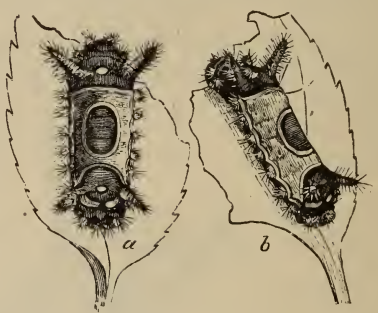


Fig. 58. Empretia stimulea caterpillars.

the edge of a leaf. The best known stinging larvæ are the pretty caterpillars of *Hyperchiria Io*, Fabr., (Fig. 56,) every point of whose mosslike covering is a poisoned dart, (Fig. 57,). Several of the slug caterpillars, as *Empretia stimulea*, Clem, are also able to leave unpleasant reminders when handled, (Fig. 58.) The hairs of the larvæ of the Brown-tailed moth *Euproctis chrysorrhea*, Linn, are likewise excessively irritating to the skin.

In conclusion the writer can only express the hope that this limited mention of some of these interesting habits may not be without some result, and that those who have never had the pleasure of watching the many habits of lepidopterous larvæ, may be led sometimes to take an interest in these creatures—the larval state of our butterflies and moths. Every species of caterpillar is worthy of study, and as so little is known of the preparatory stages of most of the lepidoptera, particularly of the moths, there is in this branch of study alone, a vast field for research. Many points doubtless of much value, even with regard to some of our common species which as larvæ, devastate our forest trees, fruit trees, and all kinds of crops, are yet to be discovered. Every little helps, and facts which may be considered worthless at the time often prove later on to be of great scientific value.

NOTES ON SEMIOPHORA YOUNGII, SMITH.

By Arthur Gibson, Ottawa.

In the report of the Dominion Entomologist for 1901, on page 251, mention is made of a new enemy to tamarac, or the American Larch (*Larix Americana*, Mx.) and the Black Spruce, (*Picea nigra*, Poir.), viz., *Semiophora Youngii*, Smith. This insect occurred in sufficient numbers in a large peat swamp near Ottawa to cause considerable destruction. A notice of this is also made in an account of "A Day at the Mer Bleue, Eastman's Springs, Ont." by the writer. (Rep. Ent. Soc. Ont. 1901.) During the past season further observations were made on the life-history of the species, but our knowledge of the habits of the insect is still far from complete.

On the 21st May, 1902, a trip was made to the Mer Bleue, by Mr. Young and the writer, but only a few larvæ, from half to three-quarters grown, could be found, and these were very local. At this point, owing to recent fires, the only trees on the swamp are small tamaracs and spruces from two to four feet high, and what larvæ we did find were all hiding in the wet moss at the base of the tamarac trees, a few inches below the surface. No specimens could be found near the spruce trees. A great many trees in other parts of the swamp were examined, but in only the one spot could specimens be found. In every case it was necessary to search in the moss at the base of the tree to find the larvæ as no noticeable injury to the foliage could be detected. The mature caterpillar is a handsome creature "about an inch and a half in length when full grown, of a rich velvety brown, with a ruddy or greenish tinge in different specimens, the dorsal area showing the richest colours, and bounded on each side by the white clear and threadlike lateral stripes; the dorsal stripe of the same intensity as the lateral stripes; the spiracles black and lying on the upper edge of a broad white substigmatal band, the lower surface much paler than the dorsal, the whole body finely mottled with small purplish brown spots. The centre of each segment on the dorsum is darker and more velvety than the intersegmental folds. The head is reddish brown finely mottled with lighter spots." (Fletcher.)

On the 18th September another visit was made to the locality in the hope of collecting some of the imagoes. At this time the moths of the Cranberry Looper, *Caterva catenaria*, Cram., were in great evidence—hundreds and hundreds of specimens in perfect condition. At almost every step four or five of these moths would arise from their resting places, and flutter away. Unfortunately, however, we were too late to secure good examples of the moths of *Semiophora Youngii*, Smith, but in all five specimens were taken, three by Mr. Young and two by the writer. These five specimens were in poor condition and were all collected at rest on small tamarac trees. Mr. Young put one of his specimens, a female, into a chip box, and secured some eggs, half of which he gave to the Division of Entomology. These were laid on the 19th Sept. and the young larvæ hatched out of doors on the 28th and 29th Sept. The following brief description was taken of Stage I—Head, brown. Body cylindrical, semi-translucent, pale greenish after feeding. Thoracic shield concolorous with head. Tubercles black and shiny. No markings on the body. The young larvæ loop when walking.

On the 16th Oct., in company with Dr. Fletcher and Mr. W. S. Odell, an enthusiastic microscopist, another trip was made to the Mer Bleue, and on this occasion two pupæ, of what we take to be *Semiophora Youngii*, Smith, were found by the writer, in the moss at the base of a small tree. One of these was dead, but the other contained a living, rather large hymenopterous parasite, almost fully formed, which could be distinctly seen moving inside. This pupa has been kept in a warm office ever since, but the parasite has not as yet emerged (1st Dec.) although still active inside the pupa.*

* Since the above was written the parasite has emerged, and Mr. Harrington tells me that it is a species of *Anomalon*, ot previously taken here and unknown to him.

The same day Dr. Fletcher collected a small noctuid larva about half an inch in length in the wet moss at the base of a small tamarac tree. This looks very much like the caterpillar of *Semiophora Youngii*, Smith. It is still alive and is hibernating out of doors.

INSECTS INJURIOUS TO ONTARIO CROPS IN 1902.

By Dr. James Fletcher, Dominion Entomologist.

The season of 1902 has been a rather unusual one in all parts of Canada. Exceptional rain fall has been recorded during the summer at almost all localities, and this has had a perceptible effect upon the abundance, or the reverse, of many of the well-known pests of the farm and garden, as well as upon the development of some of the staple crops. Late spring frosts were answerable for a considerable injury to grape and other fruit crops, including an affection of the leaves of apple trees generally referred to by correspondents under the term "yellowing of apple leaves," and also probably for a curious premature ripening of potatoes, which could not be referred to any of the known fungous diseases.

Cereal Crops.

In the Province of Ontario cereal crops were little injured by insects, the chief damage complained of being due to heavy rains. Rust was prevalent in many places, and complaints of lodging on account of heavy straw were frequent. Peas, which once formed such an important crop in Ontario, were little sown this season, owing particularly to the depredations of the Pea Weevil. The Pea Moth was less destructive than usual, and the Destructive Pea Aphis was only mentioned from a few localities, upon late peas and the grass pea. The grass pea, *Lathyrus sativus*, L., a pea-like plant belonging to the bean family, is not a true pea, but the seed resembles peas so much that it was hoped that, as this plant is entirely free from the attacks of the Pea Weevil, it might prove a valuable substitute for peas in those districts where the Pea Weevil is destructive. These hopes, however, during the past season have been disappointed, probably on account of the season ; the grass pea, being of tropical origin, seems to require more heat than we have had during the summer of 1902. The seeds ripened unevenly, and the plants continued growing and flowering right up to frost. Late in the season in some places it was attacked by the Pea Aphis. However, in some seasons during the many years it has been grown, it has been known to give excellent crops, of from 10 to 30 bushels to the acre, of excellent peas, which can be used for most of the same purposes as real peas. Field peas, where sown late, were injured by mildew, and in the southern counties were seriously affected by the Pea Weevil. Beans were much injured by the weather. Late frosts in spring and heavy rains made re-planting necessary in a great many places. Fodder crops with the exception of corn, yielded heavily, but wet weather at haying time made it sometimes difficult to save the crop. There was a general complaint that clover did not form seed, even where there was no midge. Wheat and oats, our most important cereal crops, were of good quality and yielded heavily. A most satisfactory and unexpected condition prevailed throughout the whole province, as far as the Hessian Fly is concerned. This is largely due to farmers having followed the advice given by specialists as to the best means of avoiding injury from the attacks of this insect. Most farmers speak of its absence as "a most remarkable disappearance." The only serious injury by the Hessian Fly recorded in Canada this year was in Manitoba, where, however, as only spring grain is sown and as there is there only one brood of the insect in the year, as far as we know, the Hessian Fly can be kept in check with comparative ease. Grasshoppers were troublesome in some parts of western Ontario, where they also occurred last year. They appeared again in destructive numbers in Manitoba, but wherever

the Criddle mixture was applied, most satisfactory results followed. It will be well for farmers, should grasshoppers appear in Ontario again next year, to give this mixture a trial. It is a great improvement on the well-known poisoned bran mash, which has been so widely used against cutworms and also to a less extent against grasshoppers. Mr. N. Criddle, of Aweme, Man., noticed that grasshoppers were very much attracted to fresh horse droppings, and he at once tried substituting that material, which is always obtainable on farms without cost, for the, in Manitoba, very expensive bran. The results were so satisfactory that many of the farmers in his district used the mixture during the past summer and saved their crop. This mixture consists of one pound of Paris green mixed with sixty pounds of fresh horse droppings. To this is added two pounds of salt, and the mixture is then scattered broadcast around the edges of the fields by means of a trowel or wooden paddle. It is probable that even a weaker mixture than the above will prove effective.

The pea crop as stated above was a small one in Ontario this year. Few field peas were planted and these only in northern counties. This is due almost entirely to the prevalence of the Pea Weevil, more generally known as the "Pea Bug," which is by far the worst enemy of this important crop. It is indeed at the present time one of the most destructive enemies of farm crops, demanding the urgent attention of farmers in Canada and the United States. The pea crop is one of very great importance, and there is no other which quite takes its place for feeding. The loss is now enormous, probably nearly one million dollars a year in Ontario alone, and yet there is a simple and effective remedy, which is well known and may be said to be perfectly satisfactory in every way, as it is effective, easy of application and of comparatively small cost. A great effort is now being made to stir up public opinion in this matter and get some definite concerted action taken during the present winter and next year, so as to induce pea growers to follow the advice which has been so often given. It does not seem unreasonable to hope, in view of the peculiar circumstances of this case, that in one year a perceptible change might be made in the amount of infested and injured peas on the market, and, with this insect, more perhaps than with any other, total extermination seems a possibility if all will work together; but united action would have to be taken in all parts of Ontario and the northern United States where seed peas are grown. Many farmers have already given up growing peas, and others are talking of doing the same. The facts of this infestation and the problem which they involve, are simpler than is ordinarily the case with a pest of equal magnitude. The Pea Weevil, as a regular crop pest, only occurs in Canada in certain counties of Ontario, and there are still many places in the north where good peas can be grown free of this pest. The counties worst affected are those lying just north of Lakes Ontario and Erie. It is an exotic insect and has no native food plant, its only known food being the cultivated pea, which is also an exotic and will not winter over in this country. Every pea, therefore, which is sown in spring, has passed through the hands of seedsmen and others, and thus it has been possible at some time to treat this seed before it is sown. A remedy which is perfectly effective and easy of application by everyone with ordinary care, is to fumigate the seed before sowing with bisulphide of carbon. The large seed merchants, for this purpose have special buildings called "bug-houses" and practise this remedy regularly, finding it quite satisfactory; and, were it not for farmers and gardeners who grow a few peas for their own use and will not adopt the proper means of destroying the weevils before sowing their seed, there would be little difficulty in quickly bringing down the numbers of this destructive enemy. Now, however, some seedsmen who formerly fumigated their seed regularly, are omitting to do so, claiming that their efforts are useless all the time there are so many who do nothing. Although treated seeds may contain no weevils, yet in an infested district a crop grown from clean seed may still become infested by weevils which will fly in from the surrounding district, where seeds containing living weevils had been sown, or from insects which emerged the previous autumn.

The full grown Pea Weevil, is a small, roundish, very active beetle about one-sixth of an inch in length, greyish brown in colour and bearing two conspicuous black spots at the end of the abdomen above. (See figure). These beetles lay their eggs on the green pods; from these, small white grubs hatch, which bore in and attack the nearest seed inside the pod. They penetrate by a minute hole which is afterwards almost obliterated by the growth of the increasing seed. There is only a single insect inside each seed, and it remains there until fully developed. This takes place perhaps, as an average date, by the middle of August, and, as a rule, most of the weevils remain in the seeds till the following spring. However, and this is one of the greatest difficulties in getting a perfect remedy for the Pea Weevil, some of the beetles, in certain seasons a large proportion of them, leave the peas in autumn and pass the winter about barns, buildings, etc. This makes it necessary to reap and thresh as soon as possible, so that the seed may be treated before the weevils leave it. Some of the best seed dealers have for years been urging upon growers the importance of this and have sent out printed circulars to their customers, offering a higher price for seeds delivered by a certain date, so that the injury may be as little as possible; the grain, being harvested before it is dead ripe, is also of better quality and germinates better. Efforts will be made during the coming winter to have this matter fully discussed at all the farmer's meetings in the Province. I am convinced that this problem of stamping out the Pea Weevil entirely, is a matter of possibility if farmers and seed merchants will only work together for a short time and carry out the instructions given. The Pea Crop of Canada is far too important for farmers to give up growing it, nor do I think that this would be a wise course to adopt, until a much greater effort has been made to get farmers to use the common sense plan which has proved so successful with those who have tried it. An old and well-tried remedy is to hold over seed peas till the second year before sowing. The beetles will emerge the first spring and will die inside the bags. Another good plan is to treat the seed with coal oil 1 gallon to 20 bushels of seed, turning the seed thoroughly with a shovel every day for 4 or 5 days.

Root Crops.

There has been a noticeable absence of some of the destructive enemies of root crops. The Turnip Aphis has hardly appeared. The Cabbage Butterfly, which last year was so injurious to cabbages, turnips and rape, has been very much reduced in numbers by bacterial and insect parasites. The Colorado Potato Beetle was troublesome where neglected, but is easily kept in check with the ordinary poison applications. The advisability of applying Paris green or some other poison in Bordeaux mixture has been demonstrated this year, when the Potato Rot has very much reduced crops which were not protected by this useful remedy. The Bordeaux mixture, consisting (for potatoes) of 6 lbs. of copper sulphate, 4 lbs. of fresh lime and 40 gallons of water, as a remedy for this terribly widespread and destructive disease, is one of the greatest triumphs of modern applied science. It always pays to apply it to growing potatoes to protect them against various fungous enemies, and it has been found that the ordinary poisons which destroy insects may be applied mixed with the Bordeaux mixture, without lessening the effect of either. The Gray Blister-beetle, *Macrobasis unicolor*, Kirby, was reported from a few places, but no serious injury was done, and it must be remembered that the occurrence of these beetles in large numbers indicates that many locusts have been, or will be, destroyed, because the larvæ of the blister-beetles feed entirely upon the eggs of grasshoppers. Asparagus Beetles occurred in numbers in the Niagara Peninsula, and have spread somewhat during the past year. The remedies most relied on are dusting larvæ freely with freshly slaked lime, collecting the beetles in beating nets and applying poisoned sprays to the food plant.

As a consequence of the wet season, Slugs have been more abundant than usual, and several complaints have been received of their injuries to root crops and various garden plants. These molluscs are seldom troublesome, except in damp places or in wet seasons. The best remedy is to dust plants lightly for three or four consecutive evenings, just at dew fall, with freshly slaked lime, which adheres to the viscid coating of the slugs, and causes them great discomfort, as is shown by the copious out-pouring of the slimy secretion. After two or three applications the animal loses the power of producing slime and dies. The lime has no injurious effect on plants and indeed is beneficial on many lands. When these creatures, as is sometimes the case, give trouble in greenhouses, lime or salt may be dusted between the flower pots on the benches ; a good bait which attracts slugs and snails very much, is bran damped sufficiently to make it adhere. A very small quantity of Paris green may be added to this and will soon clear out the marauders. In greenhouses the poisoned bran or oat-meal may be placed on slips of glass, which can be put out at night and removed during the day.

Fruit Crops.

The fruit crops of the province have been on the whole satisfactory, although irregular. In some places heavy yields were secured, but in others there was a shortage. The ordinary insect enemies have been less abundant than for many years, but fungous diseases, particularly the Black Spot of the Apple, have caused loss in most districts, and in a few places the Sooty fungus, *Labrella pomi*, has appeared. This produces on some varieties, particularly Rhode Island Greenings, an unsightly appearance which is known in the trade under the name of "Clouded Fruit." There has been a remarkable absence of injury from the Codling Moth, Cankerworms and Tent Caterpillars. Plums are reported as a light yield, owing to late spring frosts and excessive rain. Where spraying has been neglected, great injury has been done by the Plum Curculio and the Plum Rot has been more prevalent than for many years. This fungus every year destroys enormous numbers of peaches and plums, and the dried mummified fruit may frequently be seen in orchards otherwise well cared for. It is a most important part of the remedy for this disease, to gather, from the ground when they fall and from the trees after they have dried up, the diseased fruits, because in these is found the most fertile source of infestation of the crop of the following year. All should be burnt before the spring opens, and the trees should be sprayed carefully just after blossoming with poisoned Bordeaux mixture, which will have the double effect of checking the fungus and preventing injury by the Plum Curculio. The absence of so many of the regular enemies of the orchard must be due in a large measure to the season, but also certainly to the increasingly large number of fruit growers who now carry on their work in a scientific practical manner, spraying thoroughly and using the remedies which experience has shown are the proper ones for the different pests. The word "spraying", however, to many who endeavor to practise this operation, has still little more meaning than doing something, in any sort of a way, to fruit trees with a spraying pump. It cannot be too often insisted upon, that spraying is the operation of applying by means of a force pump and spraying nozzle a special liquid mixture, which varies according to the habits of the insect to be treated, with such force as to break up the liquid so thoroughly that it falls upon the plants treated as an actual mist or spray. Such terms as "sprinkling" and "showering" are inaccurate for the operation intended. Undoubtedly, much of the so-called spraying, as usually done, would be more accurately designated by these terms which describe a much less careful and less even distribution of liquids. The Eye-spotted Bud-moth has been rather troublesome in apple and plum orchards, particularly in the eastern counties and down through the Maritime Provinces.

The subject of the injurious Scale Insects of the orchard, to which so much attention has been directed of recent years, owing to the unfortunate introduction into our province of the San José scale, has done much to show the value of a practical knowledge of Entomology.

This has been brought prominently before the fruit growers of Canada by means of the magnificent work which has been carried on by the Honourable John Dryden, Minister of Agriculture for Ontario, through two members of the Council of our Society, Mr. Geo. E. Fisher and Prof. Lochhead, whose efforts have been well seconded by the nurserymen of the province, who have been most assiduous in conforming to all requirements which the Minister thought it wise to impose. As a consequence of this, the condition of orchards, as far as other scale insects and various other pests are concerned, is actually better than it was before the advent of the San José scale. The standard remedies for scale insects, kerosene emulsion and whale-oil soap solution, are now pretty well known and generally adopted. The Oyster-shell Bark-louse, next to the San José scale, is the one which does most harm. Where this occurs upon trees in the San José scale district, it is, of course, destroyed at the same time as that scale, when trees are treated with the drastic measures which have been found necessary. When trees are found to be infested by the Oyster-shell Bark-louse (Fig. 59), the proper steps to take are to spray the trees early in the winter with a simple whitewash containing one pound of fresh lime in every gallon of water. Two applications should be made, the second wash may be applied as soon as the first is dry. In spring invigorate the trees by spudding in a light application of well rotted manure around the roots, and during the summer spray the trees, at the time the young scale insects hatch, with kerosene emulsion or a whale-oil soap solution. For the San José scale the latest results obtained by Mr. Fisher have proved that this insect can be controlled by spraying infested trees early in spring with the California Lime-Sulphur and Salt wash, which Mr. Fisher has modified—he thinks, with equally good results—by omitting the salt. This treatment must be followed during the summer by spraying with kerosene emulsion. I have visited Mr. Fisher's experimental orchards several times and have seen the excellent results which he has secured ; these are certainly a monument not only to his great perservence but to the foresight of the Provincial Minister of Agriculture, under whose instigation the many and various experiments carried out by Mr. Fisher were made.

Fig. 59.—Oyster-shell bark louse on a twig.

In some orchards at Queenston and Niagara there are some interesting occurrences of the Plum Gall-mite, *Cecidoptes pruni*, Am., which are now receiving experimental treatment. The small round galls are clustered around the twigs and increase in numbers very rapidly. The injury to the tree is not very apparent at first, but ultimately the twigs are destroyed. The extremely small mites live in large numbers inside the galls, which are only one-sixteenth of an inch in diameter. There is apparently no opening to them except just at the time the mites emerge. Applications sprayed over the trees have so far proved unsatisfactory. Mr. Fisher has tried fumigating with hydrocyanic acid gas, and, although at first this was apparently successful, many of the mites certainly being killed, later examinations have shown that it is not a satisfactory remedy.

Fig. 60.—Grape-vine Leaf-hopper, much magnified.

The Grape-vine Leaf-hopper (Fig. 60), has done considerable harm in some vineyards in the neighborhood of St. Catharines, and experiments have been carried on with a view of getting a practical remedy for these troublesome insects, well known among growers as "the thrip." The most serious injuries by this leaf-hopper are its attacks upon the Virginian Creeper, where used upon houses and arbours.

The Apple Aphis has been rather more destructive than usual, and it has been found necessary towards the end of the season to advise the spraying of trees, when it was very

abundant. This is seldom the case in Ontario, although a regular thing in British Columbia, where it is very destructive every year. Apples were seen during the past summer in Prince Edward Island, which were seriously injured by this insect ; where the fruit was punctured, deep pits were left, giving the fruit a distorted and gnarled appearance, which rendered it quite unsaleable. This injury probably took place when the apples were very small. The Cherry Aphis appeared in very large numbers early in the season in western Ontario ; but later there was little sign of the insect upon the trees, and its injuries were hardly noticed. It is significant that just before the disappearance of these plant-lice one of the severe frosts, already referred to, occurred, and it seems possible that this may have been answerable for the disappearance of the plant-lice. It was not, however, the only cause, for a week later many of the insects were found in some orchards in the same localities.

Fig. 61.—Pear-tree Slug ; *a*, magnified.

The Pear Slug, *Eriocampa cerasi*, Peck (Fig. 61), was abundant in some places and did a great deal of harm by destroying the foliage of plum, cherry and pear trees. This pest seems to be very generally ignored by fruit growers and, as a consequence, it often levies heavy tribute. The autumn brood, skeletonizing the leaves, prevents them from performing their functions and thus the crop of the following year suffers.

White Grubs (*Lachnosterna*) were complained of as troublesome in strawberry beds, as well as in potato fields and pastures. There is no good practical remedy for these insects when occurring on farm crops. Where land can be ploughed up, this should be done in August, so as to disturb the pupæ which in many species form at this time, and are very tender. The life history, as generally accepted, is that the eggs are laid in June and the young larvæ feed until August of the following year, when they pupate and assume the perfect form. The beetles, however, do not then emerge but remain in their earthen cells until the following May. When strawberry beds are attacked, undoubtedly the best remedy, which, I think, was first suggested by Mr. P. C. Dempsey, of Trenton, is to adopt the one crop method ; this consists simply of planting out the new strawberry sets in spring or the previous August, and then taking the crop the next spring. As soon as such runners as are required for propagation are secured, the beds should be plowed up. White Grubs are most destruc ive in old beds, and, by adopting this method which also, horticulturists claim, gives the most paying crops, the insects are prevented from making headway.

Two interesting occurrences of the fungous parasite, *Cordycepe melolonthæ* (Fig. 62), came to my notice during the past season, one at Ottawa, reported by Mrs. Brown and Miss Lees, the other at Renfrew, by Mr. W. J. Kerr. These outbreaks of this beneficial fungus, although occurring rarely, as a rule, reduce the numbers of the white grubs rapidly and perceptibly where they occur.

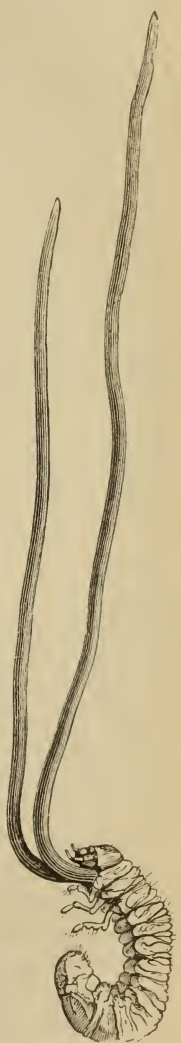


Fig. 62.—White-Grub fungus.

Two comparatively new fruit pests which require attention from fruit growers, are the Blackberry Soft-scale (*Lecanium Fitchi*), which has appeared in destructive numbers upon cultivated blackberries in western and central counties, and the Rose Scale (*Diaspis rosæ*), which attacks the rose and the blackberry. In the latter case, it frequently occurs with the Blackberry Soft-scale. This latter has a conspicuous dark

brown polished scale about $\frac{1}{8}$ inch in diameter, hemispherial in shape, and is frequently so thickly clustered on the canes as to cover portions of them entirely. Like many other scale insects, it increases most rapidly on old or worn out plantations, and is very much attacked by both fungous and insect parasites.

The Rose Scale is much smaller and flatter. The color is clear white, and the females are circular in outline, while the males are elongated. When abundant, they give the infested plants the appearance of having been finely spattered with lime. The remedy for both of these insects is to plant new plantations from healthy beds, or to prune severely and spray early in spring with kerosene emulsion or whale-oil soap solution.

A possible enemy of the apple may be mentioned, although as yet little is known of its injuries. Last autumn I found at Ottawa three small green larvæ of a saw-fly, in cells eaten about half an inch deep into the sides of apples. The walls of the cavities were white and dry, and the orifice was closed with debris gnawed from the apple, but there was no appearance of excrement in the cavity. The mouths of the orifices, however, were hardened and of a greenish hue as though they had been made before growth had ceased. These larvæ produced last spring the common Saw-fly (*Taxonus nigrisoma* Nort). It seems probable to me that the larvæ may merely have gnawed holes into the apples as presenting a convenient place for pupation ; but, as the three larvæ were in different apples from distant parts of the orchard, and all found by chance, it is just possible that they may have been abundant, and that we may have in future to deal with a new enemy of the apple. In England there is a saw-fly which causes considerable loss in the apple crop. These Canadian larvæ resemble very closely a species which is frequently abundant on docks, and some species of Polygonum riddling the leaves in autumn. I regret to say I took merely a superficial description of the larvæ before they pupated. I shall be glad to hear if anyone else has noticed this attack.

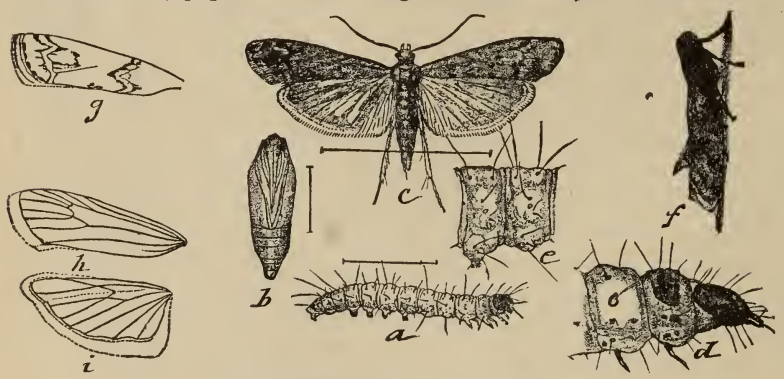


Fig. 63.—The Mediterranean Flour Moth.

The Mediterranean Flour Moth (Fig 63). An insect which has spread rapidly through Canada of late years, but of which little is said, is the above named which is a serious pest of many of our Canadian and American flour mills. Far greater care than has been practised in the past will have to be exercised by millers in keeping their premises clean and constantly swept out, before this pest is controlled. Millers, however, now understand the habits of this insect and the best means of checking its increase. In my own experience, thorough fumigation with sulphur has given the best results, accompanied with constant cleaning up, and in winter throwing open the mills to the full intensity of the winter weather. This, if, as some claim, it does not kill the larvæ, at any rate prevents them from developing so quickly, and probably from breeding for long periods. Two different parasites have been bred by me in large numbers during the two past years from infested mills. One of these, from Rockland, Ont., has been named *Idechthis ephestiæ* by Mr. W. H. Ashmead, the other is probably an undescribed species, and was received from Moulinette, Ont., where it occurred in such numbers as to attract the attention of the men in the mill and obtain a popular name, "the red-tailed fly."

The Buffalo Carpet Beetle (see Fig 31) has spread largely during the past summer, and now occurs as a household pest not only in western Ontario, but as far east as Ottawa. In the Province of Quebec it is found in the eastern townships, and in Nova Scotia there is another colony in the Annapolis valley. Housekeepers should use every effort on its first appearance to clear this destructive insect out of their houses. Carpets should be taken up and beaten thoroughly out of doors, the floors mopped with scalding water, and, before replacing the carpets, strips of tarred paper should be placed round the edges of rooms. All cracks in the floors after brushing out thoroughly should be sprayed or sprinkled with gasoline. Anyone suffering from the presence of this pest will do well to look up the articles which have appeared upon this subject in our reports, or I shall be pleased to give full particulars as to treatment to anyone who will apply to me on this subject, or concerning any other injurious insects.

An allied insect *Attagenus pellio* has also been reared from larvæ which were destroying carpets at Wolfville, N.S., and which were kindly forwarded to me by Mrs. M. G. DeWolfe.

ENTOMOLOGICAL RECORD, 1902.

By Dr. James Fletcher, Ottawa.

Since the appearance of the Entomological Record of 1901, many letters have been received, not only from Canadian students, but also from specialists in the United States, testifying to its value for the purposes for which it was prepared, viz. (1) to give the names and addresses of Canadian workers in the various orders of insects and of specialists who will help others working at the same subjects ; (2) to record species not previously published as occurring in Canada ; (3) to give exact data as to the distribution of species, together with dates when certain insects have been captured, so that places may be visited and desirable species sought for at the time and place where they are known to have occurred ; (4) to draw attention to works of particular value in the different departments of Entomology ; and (5) to place on record anything which it is thought will affect the progress of the study of the insects of the Dominion.

A great many notes of captures have been received, and, from these, selections have been made for mention of such species as, in the opinion of the writer, seemed worthy of recording. Great care has been exercised in endeavoring to arrive at correct determinations, and some species which have been reported have been for the present omitted until further light has been received.

One gratifying feature has been very marked, viz. the encouragement which has been afforded to beginners and collectors living in isolated or distant localities, from bringing them into correspondence with specialists elsewhere, concerning interesting species which they have been fortunate enough to take. As a consequence, a considerable amount of exchanging has been arranged during the past year, which has been mutually advantageous to those concerned. Some species which were generally thought to be exceedingly rare, have proved, by references in last year's Entomological Record, to be merely species with restricted localities, which may occur in some abundance in those localities, easily obtained by those living there and supplying them with a valuable means of obtaining from others many species to them more desirable in exchange. I find from my correspondents that there has been a most gratifying increase in their correspondence concerning Canadian insects. In this way, many students who would never have known of each other's existence, have been brought together, and there has been a consequent increase in the knowledge of Canadian insects and their distribution. Some have expressed their appreciation of the fact that they now feel that they can do effective work as factors in one large system with a definite end in view. This feeling has induced a few to ask

advice as to the choice of some special line of investigation, which would be of particular use to the science of Entomology in Canada. I believe that in 1903 more special work will be done in the Dominion than has ever been done before. As in the past, invaluable assistance has been rendered to Canadian collectors by experts in the United States and Canada. As much of the initial correspondence has passed through my hands, I must particularly express gratitude to Dr. L. O. Howard, Dr. Harrison G. Dyar, Mr. D. W. Coquillett, and Mr. W. H. Ashmead, of Washington; Dr. J. B. Smith, of New Brunswick, N. J.; Dr. H. Skinner, of Philadelphia; Dr. Wm. Barnes, of Decatur, Ill., who spent some weeks in British Columbia and visited Alberta last summer, when he called on several of our Western members thus encouraging and assisting them very much by identifying many species seen in their collections; Mr. E. P. Van Duzee, of Buffalo; Mr. H. Bird, of Rye, N.Y.; Prof. H. F. Wickham, of Iowa City, Iowa; and Mr. W. H. Harrington, of Ottawa, all of whom have been most kind and patient in identifying species whenever submitted to them. I am pleased that, in almost all instances, Canadian collectors have gladly given specimens to these specialists upon a suggestion that they would be acceptable. When an expert authority who has gained his knowledge after many years of close study, takes the trouble to go through a large number of specimens and name them, sometimes at the expenditure of much time, the least that can be done is to make a great effort and considerable sacrifice to provide him with any specimens which he may indicate as desirable. I presume here also to remind my readers that they should be very careful to remember that return postage has to be paid by these gentlemen, but that they will very seldom mention this. The amount of postage on parcels returned may be seen by examining the postage stamps on the wrappers, and this or its equivalent should be scrupulously returned. Specimens of undescribed species, even when uniques, are useless in a private cabinet, and, when these are described by a specialist, he should at any rate have the privilege of retaining them. Such specimens when deposited in the collection of a recognized authority, are where they may be of benefit to a very large number of working entomologists, but when hidden away in a private collection they are practically useless. This should indicate the very great importance of entomologists depositing in National Museums, or in the cabinets of Societies, like our own, where there is a regular curator, specimens of great rarity, or such as are of particular interest, not only for the reason that they may be of use to the greatest number possible but also to preserve them from destruction more effectually than is possible in any private collection. When a new species is submitted for description, as full a series as possible, and of specimens in the best condition obtainable, should always be sent. Unfortunately, it is too common a practice to send a poor specimen for identification. This is largely done of course to avoid the danger of destruction in the mails; but, if specimens are firmly pinned, supported where necessary with cotton wool, and carefully packed with plenty of soft material between the box containing the specimens and the outside wrapper or box, they may now be sent with comparative safety. In the case of lepidoptera specially prized, specimens should be relaxed, taken from their pins, and put in papers for transmission by mail.

During the past year I have learnt of several more naturalists in different parts of Canada, who are working at various orders of insects. Some of these are connected with the public schools of the country, in which Nature Study has recently been recognized as an important part of education. In British Columbia the British Columbian Entomological Society, with its headquarters at Vancouver, and with a most energetic secretary in the person of Mr. R. V. Harvey, and the Rev. G. W. Taylor as President, has done excellent work during the past year in working up the insect fauna of the province. The Society has already issued three lists containing the names of such species of lepidoptera as have been identified, and similar lists of the other orders are to appear. Quarterly meetings are held for the exhibition of specimens at various centres, and a monthly serial in manuscript is circulated, giving the experiences

of the different members for the previous month. Notes upon captures, upon insects identified, and on methods and arrangement of collections, on the rearing of larvæ, etc., are added by each member upon blank sheets, and the number is then passed on to the next in order. The North-west Entomological Society, which owed its existence to the enthusiasm of Mr. Percy B. Gregson, of Blackfalds, Alta., has done such good work that it drew sufficient attention to itself for a public meeting to be called in Calgary, where its scope was extended and the name of the Society changed to the Territorial Natural History Society, with the following objects :—To instruct farmers as to the nature of beneficial and injurious insects, weeds and birds, and to establish natural history museums at central points in connection with schools, etc. Arrangements have already been made to establish museums of natural history at Blackfalds, Lacombe, Calgary and Regina. The last of these will be in the care of Mr. T. N. Willing, the Territorial Government Weed Inspector, who is a keen observer and enthusiastic naturalist. Mr. Willing is also the secretary of the new Society.

Literature.

Bibliographical notes on entomology have appeared regularly as usual in entomological journals and scientific magazines, and a Bibliography of Canadian Entomology is prepared annually for the Royal Society of Canada by Dr. C. J. S. Bethune, and appears in its transactions. The Canadian Entomologist (London, Ont.), Le Naturaliste Canadien, and the Ottawa Naturalist are indispensible to the working entomologist. The same also must be said of the American Naturalist, Entomological News, Psyche, Journal of the New York Entomological Society, Transactions of the Amer. Ent'l. Soc'y. and Science. In these publications every book of importance is noticed, and there is no necessity here to make particular mention of many works of a general nature which have appeared during the past year.

I would, however, direct attention to "Caterpillars and their Moths" by Miss I. M. Eliot and Miss Caroline G. Soule. This is a charming book, written in an attractive style, which illustrates on every page the great fascination there is in rearing insects from the egg and also how important discoveries may be made by close observers, even in the case of well known insects. The clear descriptions of methods, and hints on breeding, will be found very helpful, even to many who have had considerable experience in this work.

"The Common Spiders of the United States," by J. H. Emerton. This makes accessible a new field of study in a subject of great interest to everyone. The book is well illustrated and each of the 200 or more species is figured and described in simple language. It is a welcome addition to our literature.

"The Book of Bugs," by Harvey Sutherland. Notwithstanding the title, which will perhaps deter some from examining it, this book, which is written in a novel, racy style, will induce all who open it to read on and on to the end, and in doing so they will obtain many useful and accurate facts concerning several common insects and some bugs. It will also probably commend itself to a class of readers who will be benefited by the information given and who might not be reached by the ordinary works on entomology.

Specialists.

It is to be hoped that now this record provides a means of bringing collectors in all parts of the country into correspondence, some of those, who make general collections including all orders, may specialize their studies more, so that, while not giving up their general collection, they may make a particular study of some one order. A few have recently signified their determination to do this, and the specialists mentioned below will be glad to correspond with collectors concerning the insects mentioned in connection with their names. Canada is so large that specialists are urgently needed in every Province of the Dominion, not only of orders, but

also of families, or even separate genera. The lepidoptera and coleoptera have always been fairly well worked, but specialists in the other orders are few, notwithstanding the good work which doubtless can be done. The hymenoptera, diptera, and hemiptera have a few devotees, but many of the other orders are almost entirely neglected. The orders which perhaps most demand attention at the present time, are the orthoptera and the neuroptera. It is strange, in view of the enormous damage sometimes done by locusts, that so few students have devoted attention to them. The odonata also offer an almost unworked field for original research. It is to be hoped that, before long, some will take up these orders more energetically than has been done in the past.

As a matter of course the reference collections, including all orders of insects of the Entomological Society of Ontario, at London, of the Division of Entomology, at Ottawa, and of the Agricultural College at Guelph, are being added to continually. To the best of their ability the officers at the Division of Entomology, at Ottawa, will name, or get named, insects in all orders, and will be glad to help or advise in any way in their power all applications for information concerning insects.

Collectors in the field have frequent opportunities of catching insects belonging to other orders than those which they study. I would point out that very little trouble is required to pin such specimens without setting them, and attach a label with the date and locality. These may then be put on one side in a cigar box, to be sent when convenient to specialists. In this way, with little labour great service may be done to entomology. If Canadian collectors will save specimens as suggested and forward them to me (parcels and letters concerning insects may be sent to me without postage), I shall be pleased to forward them to any specialists they may designate. The information conveyed with these specimens as to the distribution and date of occurrence of insects will be of great value in the official work of the Division of Entomology, and collectors will be at no expense for postage.

The following are making special studies :—

LEPIDOPTERA.

Rearing from the egg. Messrs. Lyman and Brainerd, of Montreal, Rev. Dr. Fyles, Quebec, Messrs. C. H. Young, Hurdman's Bridge. A. Gibson, and J. Fletcher, Ottawa, J.W. Cockle, Kaslo, B. C.

Diurnals. H. H. Lyman, Montreal, J. Fletcher, Ottawa, F. H. Wolley-Dod, Millarville, Alta

Nocturnals. The Genus Hydroecia, Messrs. A. F. Winn and H. H. Lyman, of Montreal, and J. A. Moffat, of London. The genus Apantesis (Arctia) A. Gibson, Ottawa. The Genus Carneades, F. H. Wolley-Dod, Millarville, Alta. The Geometridae.—Several collectors have agreed to make a special study of the geometers. The Rev. G. W. Taylor on the Pacific Coast and Mr. W. McIntosh, on the Atlantic seaboard, and the Division of Entomology of the Government Experimental Farm, at Ottawa, have already begun a critical study of these moths. Messrs A. W. Hanham, and E. F. Heath have made large collections of the geometers of Manitoba. It is a favourite group with Mr. Hanham, who now lives at Victoria, and he will doubtless help in working up the Vancouver Island species. The Rev. G. W. Taylor, at a recent meeting of the British Columbia Entomological Society, showed four drawers of geometers containing 700 specimens representing 144 good species, nearly all of which had been taken this year at Wellington, B. C. Mr. Cockle has collected geometers assiduously in the Kootenays, and so much work on these interesting moths is now in progress that I have decided to hold over all references to captures in this family until next year's Record, when it is to be hoped that Dr. Dyar's anxiously looked for catalogue of the lepidoptera of North America, will have apppeared. In the same way, it is perhaps advisable, in the mean-

time, not to record the varous species of Hydræcias which are being studied by many, as new light is daily being received, particularly through the excellent work of Mr. Henry Bird, of Rye, N. Y., in rearing the species from their food plants.

Coleoptera.

Our highest authority in this order is Mr. W. H. Harrington, of Ottawa. Mr. R. J. Crew, of Toronto, who has for many years done good work, is devoting special attention to the Pselaphidæ. Mr. J. D. Evans, of Trenton, is making a critical study of the genus Lachnosterna. And Mr. E. P. Venables, of Vernon, B. C., is going to devote his time specially to beetles.

Hymenoptera.

Mr. Harrington again is our leading authority in this order, and is constantly naming material. The hymenoptera of the Okanagan Valley in British Columbia, will be specially collected by Mr. Venables.

I have requested Mr. W. H. Harrington to prepare the record of hymenoptera for 1902, which he has kindly done. It would certainly be advantageous if each Order could be treated of by some one who is working specially upon it, and in future this may perhaps be arranged.

Diptera.

Large collections have been made by Mr. Harrington, at Ottawa, and Mr. G. Gagnon, at Montreal. Mr. Venables has collected many species of Tabanidæ at Vernon, B.C. Next season, Mr. W. McIntosh, of St. John, N. B., intends to devote much time to this order.

Hemiptera

Mr. W. H. Harrington has for many years collected these insects, and has named much material for correspondents. He has also published in the Ottawa Naturalist a list of the Ottawa species. During the past summer the Rev. G. W. Taylor has been studying the Vancouver Island forms with the help of Mr. E. P. Van Duzee, of Buffalo, and has collected this year about 125 distinct species. Mr. C. Stevenson, of Montreal, will study the heteroptera of the Island of Montreal, the Rev. T. W. Fyles, the scale insects of the Province of Quebec, and Prof. Lochhead, those of Ontario next season.

Orthoptera.

Mr. E. M. Walker, of Toronto, is so far our only authority in this order. In the west Mr. Norman Criddle, at Aweme, Man., and Mr. T. N. Willing, at various points in the Northwest Territories have collected material, which has added much to our knowledge of these insects.

The Season of 1902.

The wet dull season of 1902 in all parts of Canada has been very unpropitious for the collector of insects. The persevering collector, however, has as usual added little by little to his collection by constantly being on the alert. A few records of remarkable catches on certain evenings have been received from lepidopterists. Mr. E. Firmstone Heath, of Cartwright, Man., mentions May 22, as such, and Mr. A. J. Dennis, of Beulah, Man., had an exceptional experience of the same kind on June 11 ; Mr. J. D. Evans, of Trenton, Ont., and Mr. C. H. Young, of Hurdman's Bridge, Ont., also report good occasional nights, but in most places the season of 1902 must be characterised as exceptionally poor. Many of the well known crop pests were also noticeably less abundant than usual.

The following list gives the names of the most active workers in Canada which have been heard from during the past year. There are doubtless many others, but I have not heard from them during 1902. The initials in parentheses after their names indicate the orders they are studying, or if they have general collections.

Anderson, E. M., Victoria, B. C. (L.)
Bethune, Rev. C. J. S., London, Ont. (Gen., L., C.)
Bégin, Rev. P. A., Sherbrooke, Q. (Gen.)
Bice, J., London, Ont. (L.)
Baird, Thomas, High River, Alta. (Gen.)
Browne, Edgar J., London Ont. (L., C.)
Brainerd, Dwight, Montreal. (L.)
Bryant, Theodore, Wellington, B. C. (L.)
Bush, A., Vancouver, B. C. (L.)
Chagnon, Gus., Montreal. (D., C.)
Cockle, J. W., Kaslo, B. C. (L.)
Criddle, N., Aweme, Man. (L., Or., C.)
Crew. R. J., Toronto. (C.)
Dennis, A. J., Beulah, Man. (L.)
Desrochers, Rev. J. E., Rigaud, Q. (L., C.)
Dod, F. H. Wolley-, Millarville, Alta (L.)
Draper, R., Vancouver. (L.)
Evans, J. D., Trenton, Ont. (Gen., L., C., Hym.)
Fletcher, Dr. J., Ottawa. (Gen., L., C.)
Fyles, Rev. Thos. W., Levis, Que. (Gen., L., Hym.)
Gibson, Arthur, Ottawa. (L.)
Grant, C. E. Orillia, Ont. (L.)
Gregson, P. B., Blackfalds, Alta. (Gen.)
Hanham, A. W., Victoria, B. C. (L., C.)
Harrington, W. H., Ottawa. (C., Hym., Hem., D.)
Harvey, R. V., Vancouver. (L., Odon.)
Heath, E. F., Cartwright, Man. (L.)
Huard, Rev. Victor. Quebec. (Gen.)
Jones, W. A. Dashwood, New Westminster. B. C. (L.)
Lochhead, Prof. W., Guelph, Ont. (Gen., Or.)
Lyman, H. H., Montreal. (L.)
McIntosh, W., St. John, N. B. (L., D., C.)
MacLaughlin, T. J., Ottawa. (Odon.)
Marmont, L E., Rounthwaite, Man. (L.)
Metcalfe, W., Ottawa. (L., C.)
Moffat, J. A., London. (L.)
Parsons, C., London. (L., C.)
Perrin, Jos., Halifax, N. S. (L.)
Norris, A. E., Montreal. (L., Hem.)
Ouellet, Rev. C. J., Montreal. (C., Hym.)
Richard, A. E., Ottawa. (L.)
Roy, Rev. Elias, Levis, Q. (C.)
Sandercock, W. C., Lauder, Man. (L.)
Simpson, Willibert, Ottawa. (C.)
Suffield, J. D., Morden, Man. (L.)
Sanson, N. B., Banff, Alta. (Gen., L.),
Schmitt, Dr. J., Anticosti. (Gen.)
Stevenson, Charles, Montreal. (L., Hem.)
Tanton, J., London, Ont. (L.)
Taylor, Rev. G. W., Wellington, B. C. (L., Hem., C.)
Venables, E. P., Vernon, B. C. (L., C., Hym.)
Walker, E. M., Toronto. (Or. Odon.)
Winn, A. F., Montreal. (L.)
Wilson, E., Vancouver. (L.)
Wilson, Jno., Vancouver (L.)
Wilson, T., Vancouver. (L.)
Williams, J B., Toronto. (L.)
Willing, T. N., Regina. (L., Or., C.)
Young, C. H., Hurdman's Bridge, Ont. (L.)

NOTES OF CAPTURES.

Lepidoptera.

(*Arranged according to Smith's List of the Lepidoptera of Boreal America.*)

RHOPALOCERA.

Argynnis idalia, Dru. Aweme (Criddle).

Argynnis astarte, Db.-Hw. Sulphur Mountain, Banff, 27 June; (Sanson). Mountain just above Lake Agnes, Laggan, B. C., 18 Aug. (Dr. W. Barnes).

Argynnis triclaris, Hbn. Nepigon, 12 July. Not previously taken at this locality. The specimen was a female from which about a dozen eggs were obtained and the larvæ were carried to hibernation. Food plant, *Viola eu-cucullata*. Fletcher).

Melitæa Harrisii, Scud. Abundant, Halifax, N. S. (Perrin).

Grapta gracilis, G. & R. Anticosti, (Dr. J. Schmitt).

Cœnonympha inornata, Edw. Several specimens of this little satyrid have been taken during the past summer in localities very distant from previous records. Rockcliffe, Ottawa, near the Rifle Range, 14 June, (Richard); Piedmont, Que. (Norris). St. Hilaire, Que., 22 June, (Stevenson).

Erebia disa, Thunb., var. *mancinus*, Db.-Hw. A few specimens of this very local species were taken by Mr. N. B. Sanson at Banff, Alta., in the middle of July. Mr. Sanson obtained eggs, from which larvæ at Ottawa are now hibernating after second moult.

Chionobas jutta, Hbn. A new locality for this species has been found by Mr. A. E. Richard at Langevin, Que., 50 miles south of Quebec city, 27 July.

Thecla spinetorum, Bdv. A fine male of this rare species was taken at Fairview, B. C., (Edmund Reynolds).

Thecla irus, Gdt. Anticosti, (Schmitt).

Chrysophanus dorcas, Kirby. Rounthwaite, Man., (Marmont).

Papilio cresphontes, Cram. More abundant than for many years, London, (Moffat).

Pieris napi, Esp., var. *bryoniæ*, Ochs. Banff, Alta., 3 May, (Sanson).

Papilio nitra, Edw. High River, Alta., (T. Baird).

Pamphila pawnee, Dodge. Cartwright, (Heath). Aweme, (Criddle).

Terias lisa, Bd-Lec. Ottawa, 18 Oct. (Gibson).

Carterocephalus mandan, Edw. Halifax, (Perrin).

HETEROCERA.

Lepisesia ulalume, Strk. Mr. Harvey writes to me that the specimen credited to him in last year's record was taken by Mr. E. Wilson. Two fresh records have been received for 1902. 26 May, Vancouver, B. C., (Bush); and a second by the Hon. N. C. Rothschild, near the same place.

Deidamia inscripta, Harr. London, (J. Bice and J. Tanton).

Philampelus pandorus, Hbn. Trenton, 20 Aug., (Evans).

Ampelophaga versicolor, Harr. London, (J. Bice).

Protoparce cingulata, Fab. "St. John, 5 Oct. I had no occurrence of this fine hawk-moth in New Brunswick until now. I have just caught two specimens." (McIntosh).

Albuna pyramidalis, Walk. This species is not uncommon at Nepigon, north of Lake Superior, and may frequently be seen along the railway track. In July last the writer took five specimens flying around a raspberry bush. There were two females and three males, and the variations of colour covered all the three varieties, var. *montana*, var. *rubescens* and var. *coloradensis*, which are recognized in Beutenmuller's Monograph of the Sesiidae. The two varieties *rubescens* and *coloradensis* were also taken this year at Vancouver by Mr. Harvey, and the var. *montana* by Mr. Cockle at Kaslo.

Sesia albicornis, H. Edw. A specimen taken at Ottawa some years ago by the Rev. G. W. Taylor is this species. It has not been previously recorded for this locality.

Sarrothripa columbiana, H. Edw. Victoria, May, (Anderson and Hanham).

Arctia yarrowi, Stretch. This rare species only once previously recorded in Canada from Hudson Bay by Dr. Robert Bell, was taken on 18 Aug. last in the Rocky Mountains, on a bare summit above Lake Agnes, Laggan, Alta., (Dr. W. Barnes).

Several other species of *Arctia* which have been recorded, are now receiving special study and will be reported on later.

Phobetron pithecium, A. and S, Mt. St. Hilaire, Q. (Stevenson).

Euproctis chrysorrhœa, L. The first Canadian specimen of the Brown-tailed Moth, which has been so destructive around Boston, Mass. was taken at St. John, N. B., by Mr. McIntosh this year. No others were seen.

Datana contracta, Walk. Trenton, 10 to 24 July, (Evans).

Gluphisia severa, H. Ed. "Have had a single specimen in my collection for years." Cartwright, June, (Heath). Kalso, (Cockle).

Hepialus montanus, Stretch. Dr. Barnes reports this as common at Vancouver and Victoria.

Hepialus mustelinus, Pack. St. John, common, (McIntosh). Anticosti, (Schmitt). Ottawa, (Young, Gibson).

Bombycia improvisa, H. Ed. Victoria, 19th October, (Hanham). 26th October, (Anderson).

Bombycia semicircularis, Grt. New Westminster, (Jones), Victoria, 19th June, (Hanham).

Bombycia Tearlii, H. Ed. New Westminster, (Jones).

Feralia major, Smith. Ottawa, 20th April, (Fletcher). Toronto, (Gibson).

Momophana Comstocki, Grt. Victoria, 16th April, (Anderson). New Westminster, (Jones).

Acronycta hesperida, Smith. Kaslo, Eggs sent 4th July. (Cockle). Bred specimen 28th June, Vancouver, (Harvey).

Acronycta hæsitata, Grt. Meech Lake, Que., 2nd June, (Young).

Acronycta perdita, Grt. Victoria, (Anderson).

Acronycta Canadensis, Sm. Larva on poplar ; pupa Aug., 1901 ; imago 27th May, 1902. Kalso, (Cockle).

hytonix sensilis, Grt. Meech Lake, Que., 7th June, (Young)

Semiophora elimata, Gn. St. John, 24th July, (McIntosh).

Semiophora Youngii, Sm. Mer Bleue, Ottawa, 18th Sept. (Young, Gibson).

Agrotis genicula, G. & R. Meech Lake, Que., 9th June, (Young).

Noctua jucunda, Walk. Meech Lake, Que., 26th July, (Young).

Noctua rubifera, Grt. Meech Lake, 25th July, (Young).

Noctua atricincta, Beulah, Man., (Dennis).

Porosagrotis mimallonis, Grt. Meech Lake, 31st July, (Young).

Carneades fumalis, Grt. Meech Lake, 3rd Sept., (Young).

Carneades velleripennis, Grt. Meech Lake, 25th Aug., (Young).

Carneades reuda, Strck. Victoria, 1st Sept., (Anderson).

Carneades pleuritica, Grt. Aweme, Man., (Criddle).

Carneades titubatis. Victoria, 1st Sept., (Anderson).

Carneades vetusta, Walk. Victoria, (Hanham).

Carneades vulpina, Sm. Kalso, 27th July, (Cockle).

Carneades Ridingsiana, Grt. Kalso, 22nd Aug., (Cockle). Beulah, (Dennis).

Mamestra circumvadis, Sm. Jl. N. Y. Ent. Soc., 1902, p. 42. Aweme, (Criddle). Cartwright, (Heath).

Mamestra obscura, Sm. Cartwright, (Heath).

Mamestra anguina, Grt. Cartwright. Several ; have previously only seen an odd one at long intervals, (Heath).

Mamestra rectilinea, Sm, Victoria, Aug., 23, (Anderson).

Scotogramma sedilis, Sm. Kaslo B. C., (Cockle). Very rare.

Scotogramma inconcinna, Sm. Kaslo, (Cockle).

Hadena nigrior, Sm. Meech Lake, 14th June, (Young).

Hadena claudens, Walk. Victoria, (Anderson).

Hadena cariosa, Grt. Meech Lake, 16th July, (Young).

Hadena plutonia, Grt. "At sugar", Cartwright, 12th July, (Heath).

Hadena algens, Sm. Meech Lake, 12th Sept., (Young).

Hadena binotata, Walk. Victoria, B. C., July, (Harvey).

Oncocnemis Barnesii, Sm. Kaslo, B. C., (Cockle). This was described from the unique type in Dr. Barnes's collection, taken in Yellowstone Park.

Oncocnemis riparia, Morr. Aweme, (Criddle).

Macronoctua onusta, Grt. Two specimens reared from larvæ feeding in and on stems of *Iris versicolor*, L., emerged 3rd Sept., Montreal, (Winn). Belleville, 1880, (Evans). Ottawa, 29th Sept., 1902, (Fletcher).

Hydræcia inquisita, G. & R. Two specimens, 12th and 25th Sept., Ottawa, (Young). Trenton, (Evans).

Hydræcia cerussata, Grt. Ottawa, two specimens, 8th Sept., (Fletcher, Young).

Hydræcia marginidens, Gn. Larva common in stems of *Cicuta*, near Montreal West, end of July, (Winn).

Several other species of *Hydræcia* have been reported, but there is so much confusion in the genus that for the present they are held over. Those mentioned above have been identified by Mr. Henry Bird.

Arzama diffusa, Grt. Trenton, (Evans).

Arzama densa, Walk. Vancouver, (Harvey).

Tæniocampa oviduca, Grt. Meech Lake, Que., 26th May, (Young).

Tæniocampa culea, Gn. Meech Lake, Que., 31st May, (Young).

Tæniocampa subterminata, Sm. Vancouver, abundant, (T. Wilson, Bush and Harvey).

Perigrapha transparens, Grt. 3 specimens, April, Vancouver, (Harvey).

Scopelosoma devia, Grt. Ottawa, 22nd April, (Young).

Ipimorpha pleonectusa, Grt. "A leaf roller on poplar," Kaslo, (Cockle). Victoria, (Anderson).

Xylina Baileyi, Grt. Wellington, (Taylor).

Xylina gausapata, Grt. Victoria, 21st Oct., (Anderson). This is a very rare species.

Xylina Thaxteri, Grt. New Westminster, (Jones).

Xylina holocinerea, Sm. Wellington, April, (Taylor). New Westminster, (Jones).

Xylina fagina, Morr. 16th April, Ottawa, (Young). Wellington, 17th April, (Taylor). New Westminster (Jones)

Xylina ferrealis, Grt. Sept., Ottawa, (Gibson).

Plusia formosa, Grt. St. John, July 24, 2 specimens. (McIntosh).

Plusia mappa, G. & R. Hatzic, B. C., July, (R. Draper). Victoria, (Taylor). St. John, N. B., Not uncommon. (McIntosh).

Plusia metallica, Grt. =*scapularis*, H. Ed., and *lenzii*, Behr. Kalso, (Cockle). Wellington, (Taylor). Victoria, July 7, (Anderson).

Plusia rectangula, Kirby = *mortuorum*, Gn. St. John, common, (McIntosh). Montreal, 5 sp., 19th Aug., (Norris). Wellington, (Taylor). Victoria, (Anderson).

Plusia diasema, Dalm. A few specimens of this fine species have been taken at Kalso by Mr. Cockle in August.

Plusia alias, Ottol. This species has in the past been confused with *rectangula*, which it resembles, but has less silver. It has also been commonly labelled *u-aureum*, but has been recently characterized by Mr. Ottolengui as a species under the name of *alias*. St. John, common, (McIntosh).

Plusia excelsa, Ottol. Kaslo, July 31, (Cockle).

Plusia variana, Ottol. St. John, (McIntosh).

Plusia rubidus, Ottol. St. John, (McIntosh).

Melaporphyria ononis, Fab. Cartwright, (Heath). "Have not seen it for many years." A day-flyer. July, Lauder, Man., (Sandercock). Beulah, (Dennis).

Copablepharon absidum, Har. Five specimens of this striking moth were taken by Mr. Criddle at Aweme, on July 11; three of these have a subterminal row of very fine dark brown dashes across the primaries.

Heliothis phlogophagus, G. & R. Beulah, Man., (Dennis).

Anarta melanopa, Thunb. Mount Cheam, B. C., 14th Aug., (Bush and Fletcher).

Annaphila diva, Grt. Vancouver, June, (Bush).

Catocala hermia, H. Ed. Hatzic, Aug., (Draper).

Catocala elda, Behrens. Hatzic, B. C., (Draper).

Pseudolimacodes littera, Gn. Two specimens of this pretty little moth have been taken at Ottawa in June. (Gibson, Young).

Erebus odora, L. Vancouver ; found in an electric light, (Bush). We now have records of this fine immigrant right across Canada, from ocean to ocean. It is very remarkable if the species does not breed in Canada.

Capis curvata, Grt. At light, Cartwright, (Heath).

Brephos infans, Moeschl. This interesting little moth has now been recorded from the Atlantic to the Pacific. St. John, (McIntosh). Montreal, 25th March, (Norris). Ottawa, April, (Fletcher). Toronto, April, (Gibson). Aweme, Man., (Criddle). High River, Alta., (T. Baird). Banff, Alta., (Sanson). Victoria, B. C., (Anderson). Nanaimo and Wellington, B. C., (Taylor).

COLEOPTERA :

Cicindela montana, Lee.

Cincindela formosa, Say, var, *Manitoba*, Leng.

Cincindela scutellaris, Say, var. *Lecontei*, Hald.

Cincindela venusta, Lec.

All of the above 4 species have been taken at Aweme by Mr. Criddle.

Cychrus viduus, Dej. Several specimens of this handsome beetle are recorded as captured in 1902. St. John, (McIntosh). Mount St. Hilaire, Q., June 11 ; two other specimens were taken at the same place three years ago, (Chagnon). Mt. St. Hilaire, Q. July 1. (Stevenson).

Blethisa Julii, Lec. Specimens were taken at Quebec some years ago, (Hanham).

Blethisa quadricollis, Hald. Hull, Q., and Buckingham, Q., (Harrington).

Blethisa multipunctata, L. Two specimens under dead leaves, Montreal, Sept., (Chagnon).

Blethisa Oregonensis, Lec. Victoria, (Taylor).

Calathus advena, Lec. St. John, (McIntosh).

Galerita janus, Fab., Rigaud, May 25, (Stevenson).

Platynus anchomenoides, Rand. St. John, (McIntosh).

Platynus excavatus, Dej. St. John, (McIntosh).

Platynus 4-punctatus, Dej. St. John, (McIntosh).

Platynus nigriceps, Lec. Rare ; Toronto, May 15, (Crew). Nepigon, (Fletcher).

Callida punctata, Lec. Montreal, July 11, on flowers, (Chagnon).

Brachylobus lithophilus, Say. Toronto, rare, May 15, (Crew).

Harpalus pleuriticus, Lec. St. John, (McIntosh.)

Harpalus laticeps, Lec. St. John, (McIntosh).

Sphæridium scarabæoides, L. Toronto, (Crew). This interesting beetle first appeared at Toronto about three years ago, and is evidently spreading through Canada.

Cercyon indistinctum, Horn. Trenton, (Evans).

Pselaphus Erichsonii, Lec. Toronto, (Crew). Ottawa, (Harrington).

Gymnusa brevicollis, Grav. Toronto, rare, (Crew).

Quedius vernix, Lec. Wilcox Lake, north of Toronto, under a stump, March 28 ; two specimens, (Crew).

Tachyporus jocosus, Say. St. John, May 1, (McIntosh).

Coccinella monticola, Muls. St. John, (McIntosh).

Aphorista læta, Lec. Vernon, (Venables). Kaslo, (Cockle).

Hister semiruber, Casey. Aweme, Man. (Criddle.) Blackfalds, Alta. (Gregson).

Hister coarctatus, Lec. Trenton, (Evans).

Ips obtusus, Say. In running sap on an oak tree, Toronto, Sept. 7th, very rare. (Crew).

Prionocyphon discoideus, Say. June 28, St. John, (McIntosh).

Cyphon concinnus, Lec. Vernon, (Venables).

Calochromus dimidiata, Lec. Osoyoos, (C. de B. Green).

Corymbites medianus, Germ. "Trout Creek," Toronto, June 5, (Crew).

Corymbites hamatus, Say. "Trout Creek," Toronto, June 5, rare, (Crew).

Chrysophana placida, Lec. Vernon, (Venables).

Malachius æneus, L. St. John's, Que. June 9, (Chagnon).

Xestobium elegans, Horn. Anticosti, (Schmitt).

Cupes capitata, Fab. Toronto, August 15, rare, (Crew).

Hylecœtus lugubris, Say. A pair of this rare and interesting Lymexilid was taken this season on an old maple stump at Rigaud, Que., by Rev. Father Desrochers. He had also previously taken two females at the same place. The female differs from the male in having the head and thorax reddish orange.

Canthon simplex, Lec. Macleod, Alta., June 20, (Fletcher).

Xyloryctes satyrus, Fab. Two specimens of this fine scarab were taken at Trenton, 6 June (Evans). Ottawa, (Fletcher, Harrington).

Tylonotus bimaculatus, Hald. Trenton, 27 August, at light, had only two specimens before, (Evans).

Obrium rubrum, Newm. Trenton, (Evans). This rare little longicorn is occasionally found at Ottawa on hickories.

Neoclytus capræa, Say. St. John, (McIntosh).

Desmocerus cribripennis, Horn. Vancouver, May, (Harvey). Vernon, (Venables).

Toxotus obtusus, Lec. Vernon, (Venables).

Anthophylax mirificus, Bland. One male, Kaslo, (Cockle).

Acmaeops bivittata, Say. Calgary, (Fletcher).

Acmaeops atra, Lec. Vernon, (Venables).

Acmaeops subpilosa, Lec. Vernon, (Venables).

Acmaeops longicornis, Kirby, Vernon, (Venables).

Gaurotes Cressoni, Bland. Vernon, (Venables).

Bellamira scalaris, Say. Ottawa, (Fletcher).

Leptura sanguinea, Lec. St. John, (McIntosh).

Leptura lineola, Say. Beaten from dogwood blossoms, "Trout Creek," Toronto, June 9, (Crew).

Leptura vagans, Oliv. With the above, (Crew).

Leptura vexatrix, Mann. Blackfalds, Alta. June 3, (Gregson).

Leptura tibialis, Lec. Anticosti, (Schmitt).

Encyclops cæruleus, Say. "Trout Creek," Toronto, (Crew).

Goes debilis, Lec. "Trout Creek," Toronto, June 9, (Crew).

Goes oculata, Lec. with the above, rare, (Crew).

Eupogonius vestitus, Say. Also with the above, rare, (Crew).

Chrysochus cobaltinus, Lec. Vernon, (Venables).

Monoxia puncticollis, Say.

Many specimens, very variable. Halifax, N.S., (Evans).

Microrhopala excavata, Oliv. Say. St. John, July 24, (McIntosh).

Cassida viridis, L. This European tortoise beetle has evidently established itself in Canada. Dr. Fyles has referred to it in the Canadian Entomologist XXXIV., p. 273, and his note has been commented upon by Rev. Elias Roy, in Le Naturaliste Canadien, 1902, p. 145, as *C. thoracica*, Illig. Dr. Fyles has recently referred his specimens to

the British Museum and has received the following report from Mr. C. O. Waterhouse: "I have carefully examined the Cassida you send, and I am sure it is our common thistle species *C. viridis*." Mr. Winn reports that it was common in all stages at Levis, Que., on Aug. 21, feeding upon dock and thistle.

Mordella serval, Say. St. John, July 24, (McIntosh).

Mordella borealis, Lec. St. John, (McIntosh). Both this and *M. serval* are rare species.

Corphyra inconspicua, Horn. A specimen of this Californian species was taken at Vernon by Mr. Venables.

Calopus aspersus, Lec. Vernon, (Venables).

Rhinomacer pilosus, Lec. St. John, June 9, McIntosh).

Myodites scaber, Lec. Vernon, (Venables).

Myodites zeschii, Lec. St. John, (McIntosh). Abundant in the beginning of July on the buds of Solidago at Nepigon, (Fletcher).

Peritelopsis globiventris, Lec. Vernon, (Venables).

Geoderces melanothrix, Kirby. St. John, June 23, (McIntosh).

Phytonomus punctatus, Fab. Victoria, July, (Hanham). This Clover Weevil has apparently spread to the Pacific province and is there in considerable numbers. Mr. Hanham writes that during the last week in July he took 100 specimens on his tennis lawn from pieces of board put there for the purpose of trapping insects, and he could collect specimens at any time during the season by the same method. He saw no sign of the fungous disease which usually controls this insect in the east.

Gryphidius equiseti, Fab. St. John, July 8, (McIntosh).

Lixellus filiformis, Lec. and *Lixus rubellus*, Rand. Appear to be quite common on plants growing at the edge of a lake in Mount St. Hilaire, Que. The former is often found on weeds emerging only a few inches from the water, and growing sometimes forty or fifty feet from the shore. Some of the specimens are covered with a hard coat of mud. *L. rubellus*, Rand., is found on plants growing close to the water's edge, (Chagnon).

Orthoptera.

Mr. E. M. Walker, of Toronto, has continued his studies of the Canadian locusts and their allies, and has published some of his results in the *Canadian Entomologist*, but has been prevented this year by other work from preparing a report upon recent captures. He however sends the following notes on species of special interest:

Melanoplus Bruneri, Scudd., a single male was taken at Dwight, Northern Muskoka, 2nd September. This is of special interest, as it is a western species known only previously from Alberta and some of the western states. (Walker.)

Xiphidium saltans, Scudd., another western insect, which was taken in considerable numbers in a certain part of High Park, Toronto, during August and September. They occurred in bunches of rather long grass on sandy soil, and were in company with *Melanoplus Dawsoni*, Scudd., among other Orthoptera. Both *X. saltans* and *M. Dawsoni* are species belonging to the western prairies and their occurrence together so far east is of some interest. (Walker.)

Odonata.

A few workers have collected Dragon-flies during 1902 and more extensive work is planned for next season. Several observers have reported the extraordinary numbers of these insects seen on the prairies during the past season. Mr. Harvey, of Vancouver, Mr. E. M. Walker, of Toronto, and Mr. T. J. McLaughlin, of Ottawa, have sent in short lists of species. These will be reported upon in the next Entomological Record.

HYMENOPTERA.

By W. Hague Harrington, Ottawa.

Collectors are being gradually attracted to this important order, and several nice lots have been sent in for determination. Among those who are now collecting may be mentioned Mr. R.V. Harvey, Vancouver, B.C.; Mr. E. P. Venables, Vernon, B.C.; Mr. A. G. Leavitt, St. John, N.B.; Mr. J. B. A. Leo Leymarie, Montreal, and Dr. Schmitt, Anticosti Island, Que. This number will undoubtedly increase as our members realize how much of interest from the scientific standpoint, and how much of importance from an economic aspect the species of this order possess. The enormous number of species, even in our northern regions, ensures the continual discovery of rare and new forms, thus giving a frequent stimulus to the collector and student of them. Indeed, the trouble at present is not so much to obtain new material as to determine and utilize what is received. This difficulty will gradually disappear as specimens become named and arranged in a greater number of accessible collections, and as classifications are placed upon a more durable basis and synopses and descriptive monographs are multiplied.

No works dealing specially with Canadian Hymenoptera have, I think, appeared during the year, but the several entomological magazines have contained various articles in which species from Canada are described or mentioned. Ashmead has continued in the *Canadian Entomologist* his valuable papers on the "Classification of the Fossorial, Predaceous and Parasitic Wasps, or the Super-family Vespoidea," and in the November number of the *Canadian Entomologist* the family Trigonalidæ is reached and tabulated. An annotated list of the Ottawa species of the Super-family Sphegoidea was published in the *Ottawa Naturalist*, vol. xv. p. 215, January 1902 (Harrington). Though not treating of Canadian specimens, the "Papers from the Harriman Alaska Expedition" are of extreme interest and value, as a large proportion of the insects catalogued and described are certain to be distributed through our adjacent territories, some indeed being transcontinental in their distribution. The entomologist to the expedition was Prof. Trevor Kincaid, and the extent of his collections testify to his ability and assiduity. He has discussed the Tenthredinoidea in paper No. vii., enumerating over fifty species, of which more than one-half are new. He has also, in paper No. xiv., dealt with the Sphegoidea and Vespoidea, of which only nine species occurred, two of which are new. The Formicoidea yielded only six species which were considered by Pergande. All the rest of the Hymenoptera were placed in Ashmead's hands and proved very rich in new species. His report, paper No. xxviii., contains not only the descriptions of these but is a complete catalogue of all species now known from Alaska. These number in all 335 species of which he describes 201 as new. This will give some idea of the yet unknown riches of our own northern fauna. An interesting paper has been received from Dr. Kiaer of Tromso Museum, Norway- "Die arktishen Tenthrediniden"—a catalogue of the Arctic sawflies of Europe, Asia and America, which enumerates a number of Canadian species.

The material amassed during the past season by our various collectors is as yet largely undetermined ; even the Ottawa species showing a very large proportion unnamed. The following list, therefore, does not pretend to give in any measure a complete record, but mentions only a few of the species which appear of more than ordinary interest :

Bombus frigidus, Smith. This is an Arctic species recorded from Great Slave Lake and the Yukon River. Females and workers received from Anticosti Island (Schmitt).

Bombus juxtus, Cress. From Goldstream, B.C. (Harvey).

Bombus mixtuosus, Ashm. One of the new species described from Alaska. Specimens from Vancouver (Harvey), Rocky Mountains, Laggan ? (Bean) and Banff, Alta., (Fletcher). A worker minor from Nepigon (Fletcher) may also possibly belong to this species.

Bombomelecta thoracica, Cress. Vernon, B.C. (Venables).

Perdita 8-maculata, Say. A pretty little species from St. John, N.B., (Leavitt).

Spilomena pusilla, Say. This little species, the smallest of our Sphegoidea, was omitted from the recently published list of Ottawa species. The single example taken had been placed with some unexamined proctotrypids, some forms of which it superficially resembles. Ottawa (Harrington).

Thyreopus latipes, Smith. Not known to me before from the Pacific coast. Two males from Victoria (Harvey), and one from St. John, N.B. (Leavitt.)

Odynerus arvensis, Sauss. Male from Trenton, Ont. (Evans).

Polybia flavitarsis, Sauss. This seems to be a common species in Vancouver Island. Specimens received from Victoria (Taylor and Harvey).

Ibalia maculipennis, Hald. This interesting cynipid has been taken at Montreal (Chagnon).

Ichneumon viola, Cress. A fine distinct species from Goldstream, B.C. (Harvey).

Thalessa Nortoni, Cress. This large ichneumon-fly seems to be widely distributed but rare, and has hitherto been vainly sought at Ottawa. From Levis, Que. (Fyles), Victoria, B.C. (Harvey), Mount Ché-am, Fraser River, B.C. (Fletcher).

Dyseidopus Vancouverensis, Bradley. A new species described in *Entomological News*, vol. xiii., p. 307, December, 1902, from Vancouver, B.C. (Harvey).

Odontomerus bicolor, Cress. Victoria, B.C. (Harvey).

Metopius pollinctorius, Say. A large and striking tryphonid, Ottawa (Harrington).

Tremex columba, Linn. A common eastern species, Vernon, B.C. (Venables).

Calamenta (Cephus) trimaculatus, Say. Seems to be a rare species. Trenton (Evans).

Lyda atrata, Cress. One male only has been taken near Ottawa (Evans).

Bactrocerus excavatus, Nort. Also a rare form from Trenton (Evans).

Schizoceros plumiger, Klug. Taken for first time in Canada at Deloraine, Man. (Fletcher)

Hylotoma rubiginosa, Beauv. Also an addition to our saw-flies. Nepigon, Ont. (Fletcher).

Blenocampa inhabilis, Nort. St. John's, Que. (Chagnon), Halifax, N.S. (Evans).

Anoplonyx Canadensis, Hrgtn. A new species described from Ottawa (Harrington).

Trichiocampa gregarius, Dyar. St. John's, Que. (Chagnon), Ottawa (Harrington).

Pteronus magus, Marlatt. This species was described from Canada, but no locality was given. A fine female was taken at Trenton, Ont. (Evans).

Taxonus nigrisoma, Nort. This common species has been found to have the habit of boring into apples before pupating (Fletcher).

Pachyprotasis nigrofasciata, Esch. Taken by Kincaid in Alaska and found by him to be identical with *Macrophya omega*, Nort. A species with a wide distribution in the United States and Canada. Its records include the Pacific coast, Saskatchewan and Labrador. Now received from Anticosti Island, Que. (Schmitt).

Macrophya fuliginea, Nort. This species seems rare and local. Montreal (Ouellet).

Macrophya albilabris, Hrgtn. Male from Montreal (Ouellet). Female not known.

Macrophya Oregona, Cress. First occurrence in Canada. Vancouver, B.C. (Harvey).

Homœoneura 14-punctata, Nort. Occurs rarely at Ottawa (Harrington). Montreal, Ouellet).

Tenthredo nigrisoma, Hrgtn. Inhabits British Columbia and Alaska. Vancouver (Harvey).

Tenthredo eximia, Nort. At Ottawa, a rare species. Montreal (Ouellet).

DIPTERA.

By W. Hague Harrington, Ottawa.

Scant attention is given to the members of this order by our collectors, and no papers have been published recently regarding our flies except that of Mr. Chagnon upon the Syrphidae of the Province of Quebec which first appeared in the Naturaliste Canadien for 1901, but is now issued as a pamphlet of 75 pages in which he describes 33 genera and 71 species. Mr. Chagnon seems to be the only Canadian collector specially studying diptera. A few are taken occasionally by other members, but in most collections these insects are probably unnamed. Lists have been received from Mr. Harvey, of Vancouver, and Mr. McIntosh, of St. John, N. B. These will be reported at a latter date. Dr. Schmitt, of Anticosti Island, has forwarded some from that unworked locality, but many of the species have yet to be determined. Since the discovery of the carrying of fever germs by mosquitoes, special attention has been directed to these forms in America and elsewhere, and many new species have been described, and much has been learned of the larval habits of different species which was formerly unknown. The wave of investigation has however been but slightly felt in Canada.

The following eleven species of diptera have been added to our fauna at intervals ;

Sciophila subcœrulea, Coq. n. sp. Proc. U.S. Nat. Mus. Vol. xxiii, p. 595—Canada, New Hampshire and Pennsylvania. Ottawa (Harrington).

Dryomyza aristalis, Coq. n. sp. Proc. U.S. Nat. Mus. Vol. xxiii, p. 617—Ottawa, Can-(Harrington).

Culex Fletcheri, Coq. n. sp. Proc. U.S. Nat. Mus. Vol. xxv, p. 84—Alberta and Assiniboia (Fletcher).

Simulium fulvum, Coq. n. sp. Proc. U.S. Nat. Mus., Vol. xxv, p. 96—Montana, Colorado, Alaska and British Columbia. Calgary, Medicine Hat, N. W. T. and Mt. Cheam, B. C. (Fletcher). Laggan, B. C. (Wickham).

Oestrophasia calva, Coq. n. sp. Proc. U.S. Nat. Mus., Vol. xxv, p. 109—Arizona, Canada. Ottawa (Harrington).

Exoristoides Harringtoni, Coq. n. sp. Proc. U.S. Nat. Mus. Vol, xxv, p. 110—Ottawa (Harrington).

Mydæa flavicornis, Coq. n. sp. Proc. U.S. Nat. Mus. Vol. xxv, p. 123. Missouri, Canada. Rouville, Q. (Chagnon).

Tephronota Canadensis, Johnson, n. sp. Ent. News. Vol. xiii, p. 144—Rigaud, Que. (Chagnon).

Psilocephala grandis, Johnson, n. sp. Can. Ent. Vol. xxxiv, p. 241—Rouville, Que. (Chagnon).

Pyrgota Chagnoni, Johnson, n. sp. Can. Ent. Vol. xxxii, p. 246—Montreal. (Chagnon).

Tipula decora, Doane, n. sp. Journ. N.Y. Ent. Soc. Vol. ix, p. 125—Montreal (Chagnon).

Mr. Chagnon writes : My most important capture among the Syrphidæ is a specimen of *Merodon equestris*, Fab. This is new to North America and is an interesting addition to our fauna. Mr. McIntosh has also added many new species to the Canadian list, all of which have passed through Mr. Coquillett's hands.

A KEY TO ORCHARD INSECTS.

By W. Lochhead, Ontario Agricultural College, Guelph.

Signs are not wanting that our fruit growers desire more definite information about the insects commonly met with in the orchards. They want to *know* the insects which they are constantly fighting. They want to *spray intelligently* and with a definite purpose in view, and not by a blind *rule-of-thumb*, as set forth in some spray calendar.

The day is fast approaching when the successful fruit-grower will not dare to neglect the study of insects. He must know, or recognize, the authors of the injuries done to his trees and shrubs, if he ever hopes to get the largest returns for his investment.

In the following *Key to Orchard Insects* an attempt is made to group the insects according to (1) the host-plant attacked; (2) the particular part or parts of the host-plant attacked; (3) the character of the injuries; and (4) in some instances, the most peculiar characteristic habits. Insects are known by their work. Every insect has its own peculiar mode of working, and when the injurious insect is once recognized and its habits known, it is usually not difficult to follow a line of treatment which will be successful.

Remedies are not given here. They may be found in the Spray Calendar, (Bulletin 122), published by the Department of Agriculture, Toronto.

From the stand-point of the fruit-grower, the *mouth-parts* of insects are the most important portions of their anatomy. Consequently, a special study should be made of these parts. The young and adults of beetles, grasshoppers, and crickets have *biting* mouth-parts, hence they can usually be readily killed by the application of Paris Green, or some other poisonous substance to their food. The adults of butterflies and moths have *sucking* mouth-parts, hence cannot be killed by poisons. These, however, are not usually injurious. The young forms of these, known as caterpillars, have *biting* mouth-parts, hence they can be poisoned. Both the young and adult forms of bugs and plant lice have *sucking* mouth-parts, hence they must be treated with powders, liquids or gases that kill by contact or suffocation.

It is also of importance that the fruit-grower learn to recognize the larvæ, for they are usually the most injurious stage of insect life. The young of moths and butterflies, usually called *caterpillars*, are in most cases 16-legged, with the exception of the *loopers* which are 10-legged. The *grubs* or *worms* of saw-flies are 20-legged. The young of beetles, or grubs, are usually 6-legged. The maggots of flies, bees and wasps are usually *legless*. The young of grasshoppers, bugs and plant-lice are 6-legged, and resemble more or less the adult forms.

In the preparation of this *Key*, the writer received valuable aid and suggestions from the writings of Dr. A. D. Hopkins, of West Virginia; Prof. L. Bruner, of Nebraska; Dr. W. Saunders, of Ottawa; and Dr. Bethune, of London.

Key to Apple Insects.

A. *Attacking the Roots*:

1. Causing knots or swellings on the smaller roots—bluish-white mouldy lice.
Woolly Aphis (Schizoneura lanigera), Fig. 64.

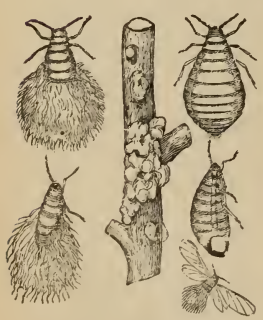


Fig. 64. Woolly Aphis.

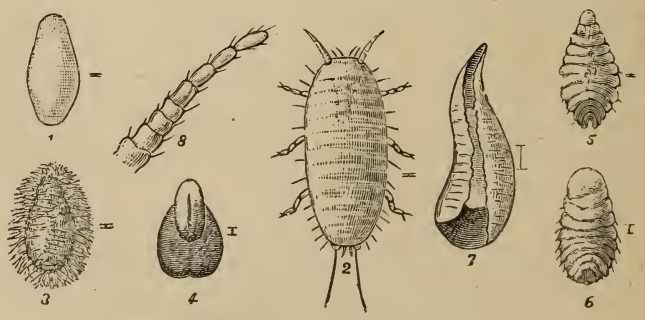


Fig. 65. Oyster-shell Bark-louse.

B. *Attacking the Trunk, Branches, and Twigs*:

1. Producing longitudinal slits in the bark; eggs under the edges of the slits.
Buffalo Tree-hopper (Ceresa bubalus). See Fig. 7.

a. *Fixed to Bark* :

1. Producing an ashy-gray incrustation on the bark ; scales round, and gray and black.

   San José scale (Aspidiotus perniciosus). See Figs. 4 and 5.

2. Bark rough with mussel-shaped scales.

   Oyster-shell Bark-Louse (Mytilaspis pomorum). Fig. 65.

3. Bark scurfy with white scales.

   Scurfy Bark Louse (Chionaspis furfurus). Fig. 66.

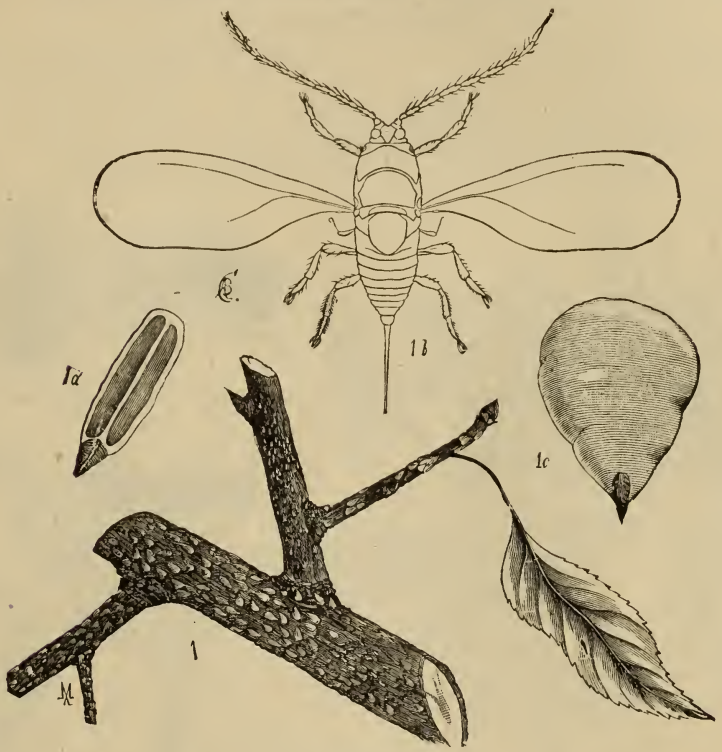


Fig. 66. The Scurfy Bark-louse.

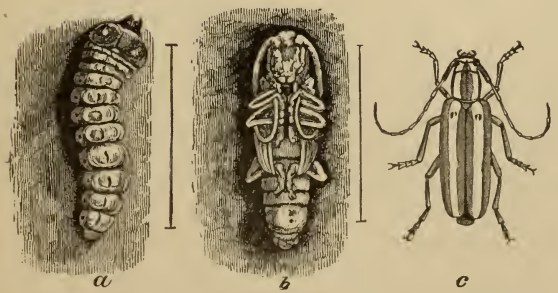


Fig. 67. Saperda Candida : (*a*) borer ; (*b*) pupa ; (*c*) beetle.

Fig. 68. Osmoderma scabra.

Fig. 69. Scolytus beetle.

b. Making Tunnels in the Wood :

1. Large square-headed legless borer, at or near the ground in tunnels, with saw-dust-like excrement.

   Round-Headed Borer (Saperda candida). Fig. 67.

2. Large flat-headed, legless borer, in upper trunk in tunnels, with saw-dust-like excrement

Flat-Headed Borer (Chrysobothris femorata).

3. Large larva in decaying wood.

Eyed Elater (Alaus oculatus) and *Rough Osmoderma* (Osmoderma scabra). Fig. 68.

c. Making tunnels between the Bark and Wood:

1. *Fruit Bark Beetle* (Scolytus rugulosus). Figs. 69 and 70.

d. White woolly patches on the twigs which are usually scarred:

Woolly Aphis (Schizoneura lanigera).

e. Green soft-bodied insects in clusters on young growths, and particularly at ends of twigs, producing distortions:

Apple Aphis (Aphis mali). Fig. 71.

f. Snout Beetles gnawing off the bark in patches:

Imbricated Snout Beetle (Epicærus imbricatus). Fig. 72.

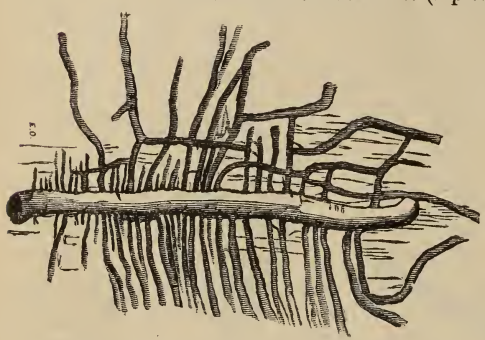


Fig. 70. Tunnels under bark made by Scolytus beetle.

Fig. 72. Imbricated Snout-beetle.

Fig. 73. Cacœcia rosaceana moth; wings open and closed.

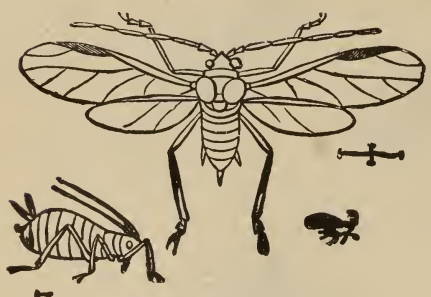


Fig. 71. Apple Aphis.

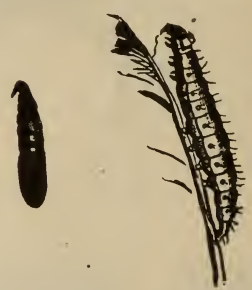


Fig. 74. Cacœcia rosaceana chrysalis and caterpillar, magnified.

C. *Attacking the Buds:*

a. Folding together the opening leaves and feeding within.

Oblique Banded Leaf-Roller (Cacœcia rosaceana), Figs, 73 and 74, and *Leaf-Crumpler* (Phycis indiginella). Fig. 75.

b. Eating the centre of the bud, or tunnelling it.

Eye Spotted Bud-Moth (Tmetocera ocellana).

c. Measuring Worms—eating leaves of buds.

Canker-Worms (Anisopteryx pometaria).

d. Caterpillars feeding within pistol-shaped cases, and eating irregular holes in the bud leaves. *Pistol-Case Bearer* (Coleophora malivorella). Fig. 76.

e. Caterpillars feeding within cigar-shaped cases, and eating small round holes in the bud leaves. *Cigar-Case Bearer* (Coleophora Fletcherella).

D. *Attacking the Leaves* :

a. Gregarious caterpillars.

1. Caterpillars protected by webs—

a. Webs in forks of branches in spring.

Tent Caterpillar (Clisiocampa Americana). Fig. 77.

b. Webs covering the leaves in summer and early autumn.

Fall Web-Worm (Hyphantria cunea).

c. Leaves partly eaten and drawn together by a web.

Palmer Worm (Ypsolophus pomotellus).

2. Caterpillars not protected by a web :

a. Clustered on limbs.

Yellow-necked Caterpillar (Datana ministra).

b. *Red-Humped Apple-Tree Caterpillar* (Oedemasia concinna). Fig. 78.

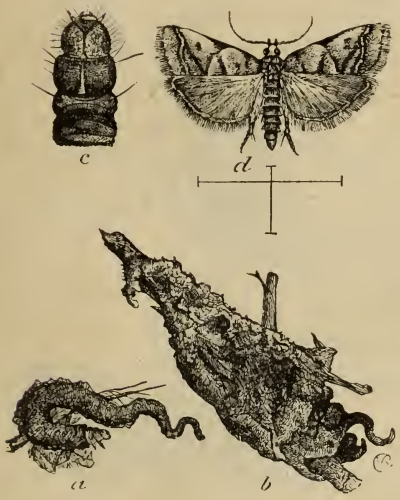


Fig. 75. Leaf crumpler ; (*a*) and (*b*) winter cases ; (*c*) head of caterpillar ; (*d*) moth.

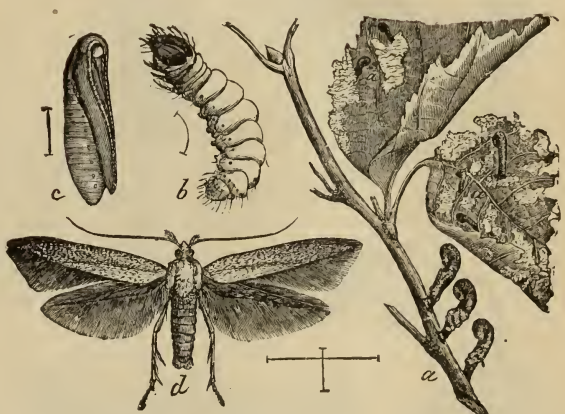


Fig. 76. Pistol-case Bearer ; (*a*) pistol-cases ; (*b*) caterpillar ; (*c*) pupa ; (*d*) moth.

3. Green soft-bodied insects, with sucking mouths.

Plant Lice (Aphis spp). Fig. 79.

b. *Solitary Caterpillars* :

1. Protected caterpillars—

a. Mining within the leaf, pupa inside of folded leaf.

Apple-leaf Miner (Tischeria malifoliella).

b. Mining within the leaf, mature larva and pupa within small oval seed-like bodies.

Resplendent Shield Bearer (Aspidisca splendoriferella). Fig. 80.

c. Feeding within pistol-shaped cases which stand out from the leaf.

Pistol-Case Bearer (Coleophora malivorella).

d. Feeding within cigar-shaped cases, which stand out from the leaf.

Cigar-Case Bearer (Coleophora Fletcherella).

e. Feeding within folded leaves.

Leaf-Roller (Teras malivorana) and (Cacœcia rosaceana).

f. Feeding within tubes of silk, open at both ends, on epidermis and inner tissues leaving the veinlets.

Bud-Moth (Tmetocera ocellana).

g. Feeding on tissues of leaves beneath a silk web.
Apple-leaf Skeletonizer (Pempelia Hammondi). Fig. 81.

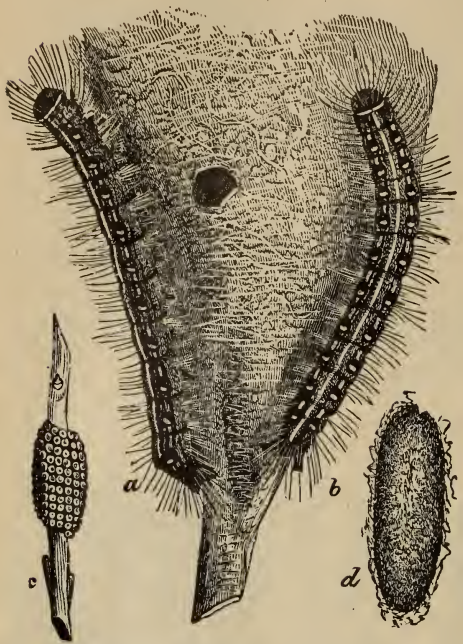


Fig. 77. Caterpillar (*a*) and (*b*) on their web ; (*c*) egg-cluster (*d*) cocoon.

Fig. 78. Red-humped Apple-tree Caterpillar.

Fig. 79. Aphis, wingless female, immensely magnified.

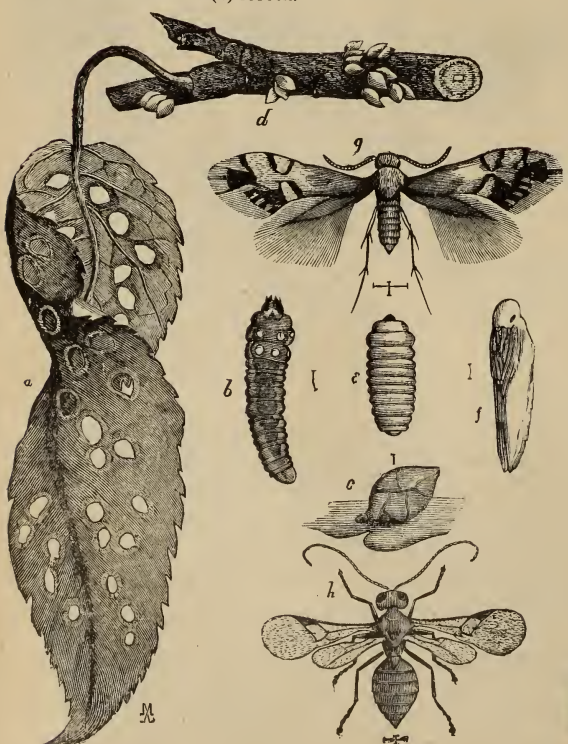


Fig. 80. Aspidisca splendoriferella ; (*a*) leaf showing mines ; (*b*) caterpillar ; (*c*) and (*d*) pupal cases ; (*e*) larva about to change ; (*f*) chrysalis ; (*g*) moth ; (*h*) parasite—all except leaf and twig highly magnified.

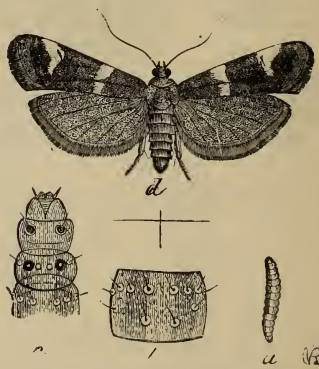


Fig. 81. Pempelia Hammondi : (*a*) caterpillar ; (*b*) a segment (*c*) head, and following segments highly magnified ; (*d*) moth.

Fig. 82. Cut-worm and Moth.

2. *Unprotected Caterpillars* :

a. Measuring worms, in spring feeding in the day-time.

Canker Worms (Anisopteryx pometaria and A. vernata). Fig. 83.

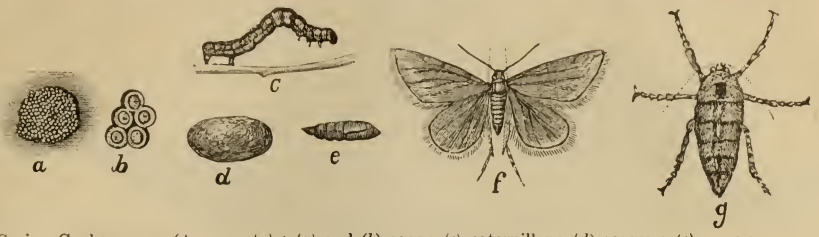


Fig. 83. Spring Canker-worm (A. vernata) : (*a*) and (*b*) eggs ; (*c*) caterpillar ; (*d*) cocoon ; (*e*) [illegible] male moth (*g*) wingless female moth.

b. Sleek 16-legged caterpillars, feeding at night.

Cutworms. Fig. 82.

c. Large, green caterpillar, covered with spiny tubercles.

Cecropia Moth (Samia cecropia). Fig. 84.

Fig. 84. Cecropia caterpillar.

d. Large apple-green caterpillar, with white oblique stripes on sides.

Polyphemus Moth (Telea polyphemus).

e. Hairy caterpillar with long black tufts over head and tail.

Tussock Moth (Orgyia leucostigma).

f. Large green caterpillar with a reddish-brown horn at tail, and seven oblique stripes on each side.

Apple Sphinx (Sphinx gordius). Fig. 85.

Fig. 85. Sphinx gordius.

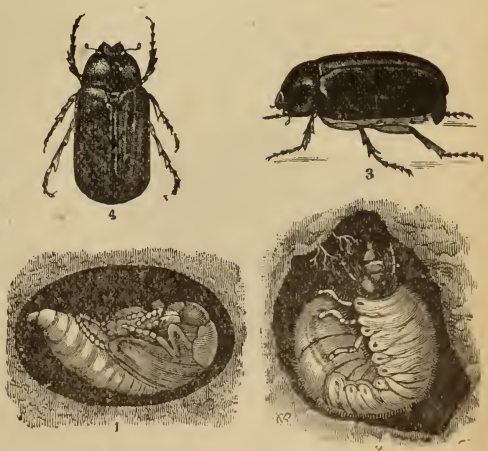


Fig. 87. May beetles : *1* pupa ; *2* grub ; *3* & *4* beetles.

g. Small caterpillar, with brown head and yellowish-green body, feeding on leaves.

Apple-Tree Bucculatrix (Bucculatrix pomifoliella).

3. *Beetles* :

a. Large brown beetle feeding at night on leaves.

May-beetle (Lachnosterna fusca). Fig. 87.

b. Small brown beetles, feeding at night.

Leaf-beetles.

E. *Attacking the Fruit* :

a. Boring tunnels through the fruit—

1. Tunnels mostly about the core,—brown excrement often visible at opening at blossom end of apple :

Codling Moth. (Carpocapsa pomonella).

2. Tunnels irregular and numerous,—

Apple Maggot. (Trypeta pomonella).

b. Puncturing the Fruit :

1. Puncturing the fruit and distorting it, a 4-humped beetle,—

Apple Curculio. (Anthonomus quadrigibbus).

2. Purplish spots about the circular scales,—

San José scale. (Aspidiotus perniciosus).

c. Eating holes in the Fruit :

1. Large light-yellow or apple-green caterpillars with a narrow cream-colored stripe along middle of the back,—

Green-fruit Worms. (Xylina sp.,).

2. Beetle, yellowish, hairy, $\frac{1}{2}$ inch long,—

Bumble-flower-beetle. (Euphoria inda), Fig. 88.

Fig. 88. Bumble-flour beetle.

WINTER CONDITIONS OF SOME OF THE APPLE INSECTS.

A. *Attached to trunk, branches, and twigs* :

1. White cocoons $\frac{1}{2}$ to $\frac{3}{4}$ inch long, under loose bark, or burlap, during fall and winter,—

Codling Moth. (Carpocapsa pomonella).

2. Bracelets of varnished eggs around twigs in fall and winter,—

Tent Caterpillar. (Clisiocampa Americana). Fig. 77 (*c*).

3. Clusters of cylindrical eggs on branches and twigs in winter,—

Fall Cankerworm. (Anisopteryx pometaria).

4. Clusters of round, ribbed eggs,—

Cutworms.

5. Small, oval, shining, black eggs, usually clustered in axils of buds, in crevices, or under bark of upper branches and twigs, in winter,—

Apple Aphis. (Aphis mali).

Fig. 89. Leaf-crumpler : Winter cases covered with withered leaves.

6. Minute pistol-shaped cases on bark in winter,—

Pistol-Case-Bearer. (Coleophora malivorella).

7. Minute cigar-shaped cases on bark in winter,—

Cigar-Case-Bearer. (Coleophora Fletcherella).

8. Clusters of glistening oval cases on twigs in winter,—

Resplendent-Case-Bearer. (Aspidisca splendoriferella).

9. Minute silken cocoons at axils of buds, and in crevices of bark,—

Bud Moth. (Tmetocera ocellana).

10. Black, crumpled leaves folded together and fastened to the branches during winter—half-grown caterpillars in tortuous tubes within,—

Leaf Crumpler. (Phycis indiginella), Fig. 89.

11. Large silken cocoons, 3 inches long firmly attached to twigs during winter,—
Cecropia Moth. (Samia cecropia), Fig. 90.

Fig. 90. Cocoon of the Cecropia moth.

12. Elongated white, ribbed cocoons, $\frac{1}{3}$ inch long, on twigs during winter,—
Apple Leaf Bucculatrix. (B. pomifoliella).
13. Mussel-shaped scales with whitish eggs underneath in winter,—
Oyster Shell Bark-Louse. (Mytilaspis pomorum).
14. Whitish scales with purple eggs underneath in winter,—
Scurfy Bark-Louse. (Chionaspis furfurus).
15. Minute black circular scales with a depressed ring about a central nipple,—
San José scale. (Aspidiotus perniciosus).
16. A mass of eggs on a cocoon fastened to a dead leaf or a twig in winter,—
Tussock Moth. (Orgyia leucostigma).
17. Eggs in oval slits,—
Buffalo Tree-Hopper. (Ceresa bubalus).

A Key to Plum Insects.

A. *Attacking the Roots* :
1. Burrowing about the crown of the roots, occasionally in young trees,—
Peach-tree Borer. (Sannina exitiosa).

B. *Attacking the Trunk, Branches, and Twigs* :
1. Making tunnels in the wood ; saw-dust-like excrement at the mouth of unnels,—
Flat-headed Borer. (Chrysobothris femorata).
2. Making tunnels in the bark :
Fruit Bark Beetle. (Scolytus rugulosus).
3. Bases of buds perforated, the bark becomes discolored, and the leaves and fruit wither,—
Pear-Blight Beetle. (Xyleborus pyri).
4. *Fixed to Bark* :
a Flat, or saddle-shaped, or hemispherical dark brown scales. Large scales after mid-summer are brittle and contain only a whitish dust or empty egg-shells. Wintering forms are small and flattish,—
Plum Lecanium. (Lecanium cerasifex).
b Ashy gray appearance of bark of badly infested trees ; small gray, or black circular scales,—
San José scale. (Aspidiotus perniciosus).
c Mussel-shaped scales, with whitish eggs underneath in winter,—
Oyster-Shell Bark Louse. (Mytilaspis pomorum).
d. Bark scurfy with white scales, purplish eggs underneath in winter.
Scurfy Bark-Louse (Chionaspis furfurus).

5. Producing longitudinal slits and eventually oval-shaped scars.
Buffalo Tree-Hopper (Ceresa bubalus).

C. *Attacking the Leaves* :

1. *Feeding in Colonies* :

a. Protected by webs in the forks of branches.
American Tent Caterpillar, (Clisiocampa Americana).

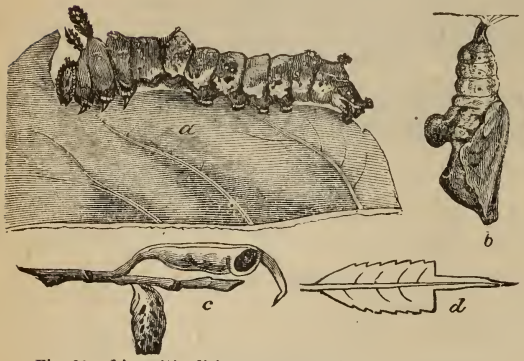


Fig. 91. Limenitis disippus, *a*. caterpillar ; *b*. chrysalis ; *c*. *d*. larval case.

Fig. 92. L. disippus butterfly ; colours orange-red and black.

b. Protected by webs covering the leaves.
Fall Web-worm (Hyphantria cunea).

c. Not protected by webs, greenish lice with sucking mouths.
Plum Leaf Aphis (Aphis prunifolii).

2. *Solitary* :

a. Measuring worms feeding in the day time and in spring.
Canker worms (Anisopteryx pometaria).

Fig. 93. Plum Curculio attacking young fruit ; 3 crescent mark ; 4 beetle puncturing fruit.

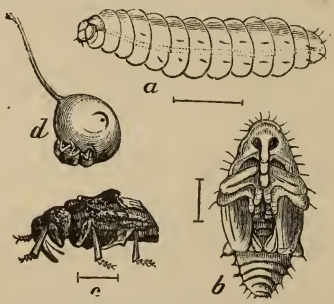


Fig. 94. Plum Curculio : *a*. larva ; *b*. pupa ; *c*. beetle ; *d*. natural size on young fruit.

Fig. 95. Plum Gouger (magnified).

Fig. 96. Rosechafer.

b. Fat, greasy caterpillars, feeding at night in spring.
Cutworms.

c. Hairy Caterpillar, with long black plumes over head and tail.
Tussock Moth (Orgyia leucostigma).

d. Large buzzing beetle.
June Bug (Lachnosterna fusca).

e. Large apple-green caterpillar, with a tail horn, and with seven broad, oblique white stripes along each side.

Plum Tree Sphinx (Sphinx drupiferarum).

Other larvae are occasionally found feeding on the leaves of plum :

The Viceroy (Limenitis disippus), figs. 91 and 92, Polyphemus and Cecropia.

D. *Attacking the Fruit* :

1. Puncturing and making a crescent-shaped slit in the skin of the young fruit, which soon drops.

Plum Curculio (Conotrachelus nenuphar) figs. 93 and 94.

2. Making a round hole in the young fruit.

Plum Gouger (Coccotorus scutellaris) Fig. 95.

3. Eating holes in the ripe fruit.

Bumble Flower Beetle (Euphoria inda).

4. Eating holes in the half ripe fruit.

Rose Chafer (Macrodactylus subspinosus), Fig 96.

Key to Pear Insects.

A. *Attacking the Root* :

1. Large yellowish-white borer, with a brown head, boring holes in the roots.

Broad necked Prionus (Prionus laticollis), Fig. 97.

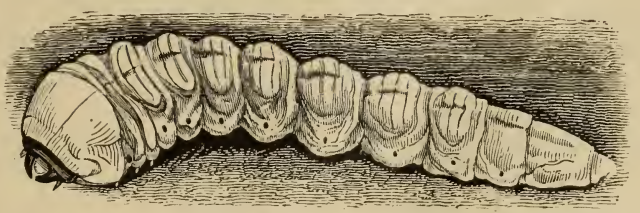


Fig. 97. Prionus laticollis grub.

B. *Attacking the Trunk, Branches, and Twigs* :

1. The following insects which attack apple (which see) also attack pear.

Round Headed Apple-Tree Borer (Saperda candida).

Flat Headed Apple-Tree Borer (Chrysobothris femorata).

Oyster Shell Bark-Louse (Mytilaspis pomorum).

Scurfy Bark-Louse (Chionaspis furfurus).

San José Scale (Aspidiotus perniciosus).

2. Large soft whitish larvae boring deeply into the wood.

Pigeon Tremex (Tremex columba).

3. In the Spring (May) much honey dew at axils of leaves on smaller twigs, and small yellow jumping insects in the sap, foliage yellowish.

Pear-Tree Psylla (Psylla pyricola).

4. Perforations at the base of some buds ; twigs blighted and leaves withered about mid-summer.

Pear-Blight Beetle (Xyleborus pyri).

C. *Attacking the Buds* :

1. The following insects which attack the buds of the apple (which see) also attack those of pear.

Oblique Banded Leaf-Roller (Cacoecia rosaceana).

Eye Spotted Bud-Moth (Tmetocera ocellana).

Canker Worms (Anisopteryx pometaria).

D. *Attaking the Leaves* :

1. A slug-like, slimy larva feeding in July and September on the tissues of the upper side of the leaves.

Pear Tree Slug (Eriocampa cerasi).

2. " Reddish blister spots 1-8 inch or more in diameter appearing on leaves in spring, and changing to black corky spots in July, each with a minute opening in it."

Pear Leaf Blister (Phytoptus pyri).

2. The following insects which feed on the leaves of apple (which see) also feed on the leaves of pear.

Red-Humped Apple-Tree Caterpillar (Oedemasia concinna).
Fall Web-Worm (Hyphantria cunea).
Tent Caterpillar (Clisiocampa).
Yellow necked Caterpillar (Datana ministra).
Canker Worms (Anisopteryx).
Bud Moth (Tmetocera ocellana).
Tussock Moth (Orgyia leucostigma).
Cecropia Moth (Samia cecropia).
June Beetle (Lachnosterna fusca).
Goldsmith Beetle (Cotalpa lanigera).

E. *Attacking the Fruit* :

The following insects, which attack the apple and plum (which see) also attack the pear.

Codling Moth (Carpocapsa pomonella).
Plum Curculio (Conotrachelus nenuphar).
Bumble-Flower Beetle (Euphoria inda).

Key to Cherry Insects.

A. *Attacking the Root* :

1. Thick whitish grub, with brown head and legs, feeding in decaying roots. Beetle large with powerful mandibles.

Stag-Beetle (Lucanus dama), Figs. 98 and 99.

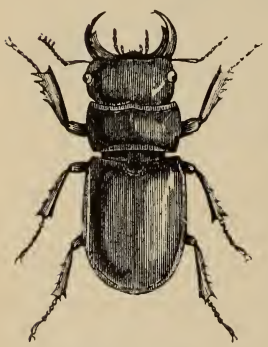


Fig. 98. Stag-beetle.

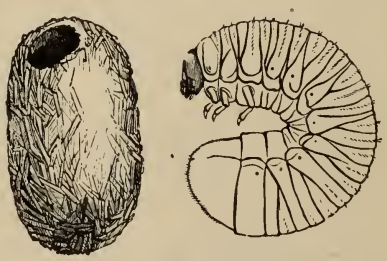


Fig. 99. Stag-beetle, cocoon and larva.

Fig. 100. Apple Twig-borer.

2. Large white fleshy grub, with reddish head, feeding in old roots.

Rough Osmoderma (Osmoderma scabra).

B. *Attacking the Trunk, Branches and Twigs* :

1. A snout-beetle, gnawing the twigs and fruit.

Imbricated Snout-Beetle (Epicaerus imbricatus).

2. A small beetle boring into the branches just above a bud, and burrowing downwards.
Apple-Twig-Borer (Amphicerus bicaudatus), Figs. 100, 101.

3. A flattened grub tunneling in the bark and sap-wood ; beetle bronzy metallic.
Divaricated Buprestis (Dicerca divaricata).

4. Large sucking insect with transparent wings inflicting wounds on the smaller limbs, and depositing eggs therein, in August and September.
Dog-day Cicada (Cicada tibicen).

5. Small circular scales, black in winter, with a circular depression about a central nipple.
San José scale (Aspidiotus perniciosus).

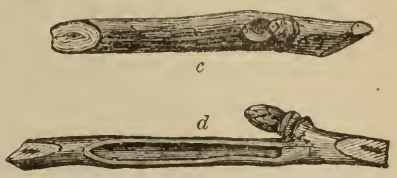


Fig. 101. Twigs showing work of Borer.

Attacking the Leaves :

1. A small beetle feeding on the leaves of red cherry.
Cherry-Leaf Beetle (Galerucella clavicollis).

2. A slug, shiny, dark-green, ½-inch long, feeding on soft tissues leaving the veins.
Pear or Cherry Slug (Eriocampa cerasi.)

3. Shining black plant-lice, infesting the terminal twigs chiefly, which become distorted and discolored.
Cherry Aphis (Myzus cerasi).

Fig. 102.
Callosamia promethea caterpillar.

4. Large bluish-green caterpillar, 2 inches long, with blue warts on each segment, and coral-red ones on 3rd and 4th segments.
Promethea Moth (Callosamia promethea), Fig. 102.

5. Large pale-green spiny caterpillar, striped on each each side with white and lilac.
Io Moth (Hyperchiria Io).

6. Caterpillars in colonies protected by webs in forks of branches, in spring.
American Tent Caterpillar (Clisiocampa Americana), and *Forest Tent Caterpillar* (not in webs).

7. Caterpillars in colonies not protected by webs covering the leaves in summer and early autumn.
Fall Web-Worm (Hyphantria cunea).

And other insects, most of which also attack the leaves of apple.

D. *Attacking the Fruit* :

1. Making a crescent cut on the cherry ; grub, white and footless, with a brownish horny head, feeding within. *Plum Curculio* (Conotrachelus nenuphar).

2. Yellowish white maggots feeding on the pulpy juices near the pit, inducing a rotting. (Cornell Bull. 172).
Cherry Frit Fly (Rhagoletis cingulata).

Key to Peach Insects.

A. *Attacking the Root and Lower Trunk* :

1. Tunneling in the bark and sap-wood of the root, causing an exudation of gum, which is seen at base of tree mingled with the castings.

Peach Tree Borer (Sannina exitiosa).

B. *Attacking the Trunk and Branches* :

1. In early spring, a minute caterpillar bores into the shoots of new leaves, killing the growing terminals.

Peach Twig-Borer (Anarsia lineatella).

2. Black hemispherical scales attached to the bark.

Peach Tree Lecanium (Lecanium persicæ).

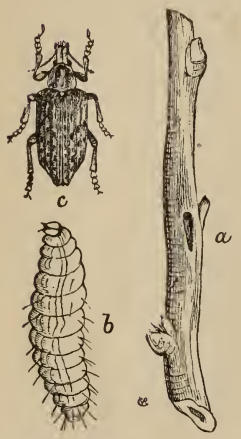


Fig. 103, New York Weevil.
a. Hole in twig made by female.
b. Larva ; *c*. Beetle.

3. A beetle eating the buds, and gnawing into the base of the twigs, causing them to break and fall.

New York Weevil (Ithycerus noveboracensis), Fig. 103.

4. Round scales, gray or black, twigs presenting a scurfy appearance.

San José scale (Aspidiotus perniciosus).

5. Oval scars and longitudinal slits on back.

Buffalo Tree-Hopper (Ceresa bubalus).

C. *Attacking the Leaves* :

1. Plant lice, living in colonies under the leaves, causing them to thicken and curl.

Peach-Tree Aphis (Myzus persicae).

2. Minute round scales, usually along the veins.

San José scale (Aspidiotus perniciosus).

3. *Caterpillars protected.*

a. In a tortuous tube.

Leaf Crumpler (Phycis indiginella).

b. In folded leaves.

Oblique banded Leaf-Roller (Cacoecia rosaceana).

D. *Attacking the Fruit* :

1. Long legged, yellowish beetles eating holes in half-grown peaches.

Rose-chafer (Macrodactylus subspinosus).

2. Large yellow hairy beetles, eating holes in ripe peaches.

Bumble-flower Beetle (Euphoria inda).

3. Small snout-beetles making a puncture and crescent in the young fruit.

Plum Curculio (Conotrachelus nenuphar).

NOTE ON INSECTS INJURIOUS TO PINES.

By W. Hague Harrington, F.R.S.C., Ottawa.

One of the features of Canada is the great forest belt which covers so large a portion of it, and which yields annually so important a revenue to its inhabitants. This magnificent forest stretches far inland from either ocean and northward forms an uninterrupted zone across the continent. Among the conifers which constitute so large a portion of this great forest area the various pines are prominent, and in the past they have been the chief source of wealth to our lumbermen who have already cut them over large areas. For many years I have seen each

summer the rafts of white pine floating down the Ottawa, while the output of sawn lumber along the river has mounted annually into the hundreds of millions of feet.* On all our eastern rivers the same thing has been seen to a greater or less degree. The constant stream of logs coming down all the tributaries has testified to the richness of the limits upon which they are cut. Not to quantity alone do the pines owe their value, the wood of their splendid trunks is surpassed by that of few other trees in general utility. More than one-third of all our forest exports are the produce of the pines, from the sale of which we derive annually several millions of dollars, in addition to all that is used for home consumption.

So lofty and noble are these splendid lords of the forest that it might be thought that they are secure from all foes except the devastating axe and cruel fire. Yet few of our trees are attacked by so many enemies; small and individually insignificant, but occurring in such abundance sometimes as even to destroy and overthrow the forest giants. To enumerate all these would be beyond the scope and bounds of a paper for this report. One hundred species of insects injurious to pine were mentioned in Bulletin 7 of the U.S. Entomological Commission published in 1881, while in the Fifth Report of the Commission (1890) the number was increased to one hundred and seventy, requiring for their discussion, even briefly, one hundred and thirty-six pages. Mr. A. D. Hopkins has also enumerated many species in his valuable "Report on Investigations to Determine the Cause of Unhealthy Conditions of the Spruce and Pine from 1880-1893;" Bulletin 56 West Virginia Agric. Exp. Sta., April, 1899.

My intention in this note is only to call attention to some of the principal species which I have observed myself as infesting these trees, omitting the lepidoptera, of which various species feed upon the foliage, and also a great many members of other orders which do more or less injury. To the trunk and branches the most serious injuries are done by beetles, which belong chiefly to the families Buprestidæ and Cerambycidæ. The beetles of the first family are somewhat flattened and elongated, with short antennæ, and generally are very hard and with a metallic lustre or bright colours. Some of the most gorgeous of all coleoptera are found among the tropical representatives of this family. The larvæ of these beetles are somewhat tadpole-shaped and flattened, and are very destructive to the trees they infest. Fig. 104.

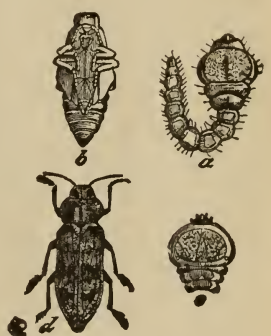


Fig. 104.—Flat-headed Borer (Buprestidæ). *a* and *c*, grub; *b*, pupa; *d*, beetle.

The three largest species upon pine belong to the genus Chalcophora, viz., *C. fortis* Lec., *C. Virginiensis* Drury and *C. liberta*, Germ. All these occur in abundance in spring and autumn either upon the trunk and branches, or in the leaf clusters, where they appear to feed upon the buds. *C. fortis* is the largest species, measuring over an inch in length, and is distinguished by its brighter colour and the more sharply elevated lines upon the wing-covers; *virginiensis* is slightly smaller and smoother, and is duller in colour, while *liberta* is generally still smaller and is more ruddy in appearance, although some individuals may be quite dark. Other species of buprestidæ are *Dicerca tenebrosa*, Kirby, *D. divaricata* Say (Fig. 105) *Chrysobothris dentipes* Germ., *C. Blanchardi* Horn, *C. Harrisii* Hentz, *C. trinervia* Kirby, *C. scabripennis* L. & G., *Buprestis striata* Fab., *B. maculiventris* Say, *B. consularis*, Gory, and *Melanophila longipes*, Say. On our Pacific coast the genus Chalcophora does not appear to be represented, but members of the other genera are common.


Fig. 105.—Dicerca divaricata beetle.

The second group of injurious timber beetles is that of the Cerambycidæ or long-horned beetles; the antennae, especially in the males, being often much longer than the body. The

* The quantity sawn during 1902 in the Ottawa district has been published as 620,000,000 feet.

larvæ of these beetles are generally not quite so much flattened as are those of the Buprestids, but their habits are much the same. The eggs are placed in the bark in crevices or punctures made by the female, and the larva when hatched bores at first in the bark, then reaching the outer layers of the wood it feeds upon them, and gradually as it increases in size it works deeper into the solid wood. The largest and one of the commonest of our pine-boring beetles is *Monohammus confusor*, Kirby, a grey beetle with very long antennæ (Fig. 106). Its larva, when full grown, is about an inch and a half long, and is armed with a powerful pair of mandibles with which it eats its way rapidly through the wood. Standing near a pile of infested sawlogs one can distinctly hear the *crunch, crunch,* of the destroying grubs. This species occurs from the Atlantic to the Pacific and varies little in appearance. Another common species is *M. scutellatus*, Say, (Fig. 107)—a black beetle, with slight white markings which are often nearly rubbed off. It has also a wide distribution, but the western specimens vary slightly in appearance and were described as a separate species (*M. oregonensis* Lec) Other species of the genus are *M. tittilator* Fab., *M. maculosus*, Hald. and *M. marmorator*, Kirby, all found in Canada in greater or less abundance in different localities. These five species often cause considerable loss to our lumbermen, by their depredations upon sawlogs. Logs left in the woods for a year, through breaking up of roads, or lack of water, etc., are often so badly damaged as to greatly lessen their value. This damage can be prevented by removing the bark from the logs in spring, but this means a considerable expense, even when practicable. Other long-horned beetles infesting the pines are *Tragosoma Harrisii*, Lec., *Asemum mœstum* Hald. (Fig. 108), *Criocephalus agrestis*, Kirby, *Rhagium lineatum*, Oliv., etc.

Fig. 106.—Monohammus confusor.

Fig. 107.—Monohammus scutellatus.

Fig. 108. Asemum mœstum.

Another group of destructive beetles is the Scolytidæ. These are quite small insects ; the largest scarcely over one-quarter of an inch long, and some very minute. They are, however, exceedingly destructive, as they occur in great numbers, and attack both injured and healthy trees, some species boring even into the bark of young trees. The mother beetle tunnels a groove an inch or more long under the bark, and inserts eggs at intervals. The larvæ, when hatched, eat outward in all directions, producing in some instances quite regular and effective patterns radiating from the parent burrow. Each colony loosens a portion of bark of several square inches, and when, as is often the case, the colonies are in close proximity to one another, the bark is loosened over large areas of the tree's surface and the sap layers of the wood are destroyed, thus causing the death of the tree. Among common species may be mentioned, *Pityophthorus sparsus*, Lec., *Tomicus pini*, Say, *Dendroctonus terebrans*, Lec., and *Hylurgops glabratus*, Zett.

There are also several destructive beetles belonging to the Rhyncophora (snout-beetles or weevils), which occur abundantly. The most important of these belong to the genera Hylobius and Pissodes, and are very common about millyards as well as upon the pine trees. *H. pales*,

Hbst. and *H. confusus*, Kirby, infest the trunks and limbs, boring under the bark and through the outer wood layers. *P. strobi*, Peck, infests the young shoots, in which the eggs are placed at intervals, and in the pith of which the grubs burrow, causing the shoots to die and wither. The terminal shoot is frequently affected, thus checking the upward growth of the tree, and causing it to become forked, or to have a crook in the trunk. *P. affinis*, Rand., is another common species.

Besides all the beetles that infest the trunk, branches and twigs, there are many insects preying upon the foliage. They include the caterpillars of various moths, and the young of several bugs, known as spittle-insects, also beetles, plant-lice, etc. Several sawflies belonging to Lophyrus and Lyda live upon the pine leaves, and sometimes occur in such numbers as to seriously defoliate them. A kind of gall, or swelling of the twigs is formed upon the red pine by the larva of a little snout beetle, *Podapion gallicola*, Riley, and the cones of both red and white pines are infested by the larvæ of a scolytid, *Pityophthorus coniperda*, Schwartz, which cause them to become aborted and prevent the development of the seeds.

Mention has been made of only a small number of the insects infesting our valuable pines, and in the briefest way, but even these few notes will indicate the great number of enemies they possess, and the vast amount of injury which is effected in the aggregate, by these individually insignificant little foes.

A TALK ABOUT ENTOMOLOGY.

By J. Alston Moffat, London, Ont.

It has been said by a wag, "That Entomology is the science that gives to insects long names, short lives and a pin through the middle." That bit of humour with its absence of correct information, its jocular misrepresentation, and its implied disparagement of the subject, reflects, fairly well, the condescending attitude assumed towards it, by the great majority of every community, who seem to regard it as the frivolous pastime of a few harmless lunatics, that might be better employed, but who are yet more to be pitied than blamed. Such being the common view of entomology entertained by the multitude, it is not surprising that so few should be found willing to turn their attention to it, either as a science, or for its economic bearing on the prosperity of the community, or as a recreation. Indeed, it requires a firm conviction of its value and importance in the world by those engaged in it, or the great pleasure derived from a study of it which it brings to themselves, to make them willing to endure the faintly disguised wonder and disdain they are exposed to. Many a youth with a fine appreciation of the beauty of insects has been driven from following out his inclinations by the jibes and jeers of his less favored companions.

The ever-ready excuse for avoiding entomology as a subject of earnest consideration, is the long names in a language they do not understand. That will be no obstacle in the way of anyone really desirous of understanding the subject. Names are a necessity. The design of names is to distinguish between things that differ. The value of scientific names is that they are all in unchanging language that makes them uniform the world over, regardless of what the vernacular may be. Such a condition is necessary for the systematic arrangement and classification of the objects named, without which science could not exist. The name of any object in any language must be learned before it can be known and remembered. But once the object and its name are associated together in the mind, all difficulty with the matter vanishes, and it matters comparatively little what the name may be, so long as the object is familiarly known by it. Its meaning, if it has one, will come in due time. What some seem to want to get is a name that will give them the size, form, colour and general appearance of the insect, so

that they will know it when they see it, without having learned it—an impossibility in any language, especially where there is such a multitude of slightly differing forms as there is in entomology.

Great diversity has been, and is being displayed by describers in giving names to insects. Some have had the faculty of choosing names for their species that are short, pretty and appropriate. Others have so multiplied syllables in their names, as to make it difficult even for an expert to pronounce them ; yet even with these a little familiarity makes it easy. Visiting at a friend's one evening, a lady and her daughter were present. The Walking-stick insect, *Diapheromera femorata*, was brought up in conversation. For their amusement, I went over the encyclopedic description of the creature. "Filiform and linear, entirely apterous, without elytra and destitute of stridulation." "Dutch," said the daughter. "Not at all ; excellent English," said I. The mother, who had been attentively listening, and who understood German, remarked : "I knew it wasn't Dutch, but I didn't think it was English." So the trouble is really in unfamiliarity with the terms used, rather than in the language in which they are given. Some of the older heads in entomology are at present suffering great inconvenience from the changing of scientific names, in obedience to the demands of the law of priority, which is causing so much confusion, as to make them think that permanence in nomenclature, which gives opportunity for becoming familiar, is of far more importance than the names themselves. In this connection I copy the following paragraph from "The Introduction to the Report on *Ophiuroidea*," by Theodore Lyman. In the voyage of H. M. S. Challenger. (Vol. V, Page 5).

"In the description of this monograph, I have tried to use simple words as often as possible, and not to add to the jargon in which zoology is now smothering In addition to a gigantic classification, to form which the dead languages have been torn up and recomposed, there is an ever-growing crop of anatomical and embryological terms. No callow *privat docent* but thinks he does good service in adding a score of obscure words to define his ephemeral theory. Doubtless he is not aware that his work has two faces. First, as regards himself, these new words of his have become familiar and convenient in a subject he has long studied. Secondly, as it regards his readers, not only have they never heard the new words, but have perhaps known the parts referred to by other names. They must therefore, go through three painful processes : - (a) Commit to memory, with dreary labour, like sawdust-swallowing, the novel words. (b) Learn to what parts they apply. (c) Carefully forget the old terms."

"The result of this system has been, not a language, but a jargon, such as Moliére would scarcely have ventured to put in the mouths of the medical faculty in his Malade Imaginaire."

There are more than two hundred thousand different kinds of insects known, described and named even now, and the work is not yet nearly complete, so there are many new names yet to be got for new species. Then there are the varieties to cognominate ; and in some instances these are numerous. In one case it takes sixty-two distinct names to label the species. And when we consider that duplicating of names is to be avoided, we get some insight to the difficulty of providing suitable names for such an host. The effect produced by those long and mysteriously high-sounding appellations upon people with vigorous imaginations is often quite surprising. They are inclined to picture to themselves a creature proportionately formidable to the name as it appears to them. Many amusing instances of this might be given.

On one occasion when exhibiting my collection at a fair, a young man with his female friend came along ; but their tastes appeared to run in opposite directions. He called her attention to the butterflies, she said she could see butterflies any day. Then look at this grasshopper he persisted himself scrutinizing it closely. Seeing that he was an interested observer

and wishing to detain him, I said, call that a grasshopper? 'Yes. What do you call it?' *Conocephalus ensiger*. There now, said the girl, you go home and see if there is anything like that about your place. Oh no, he replied. If there was, I would sell out and leave!

Being on a visit one evening to a place where some attention had been given to collecting, a *Polyphemus* cocoon was placed on the table to interest the company. A young man eyed it suspiciously, reached out towards it timidly, and as his fingers were coming in contact with it, I called, hah! which caused him to draw back suddenly. This raised a laugh at his expense, and he then prepared for an exhibition of boldness; when I remarked, "The man does not know the risk he is running." Turning to me in all seriousness he enquired: 'What is it anyway?' Confident in the ignorance of the company in regard to names, I said, 'Why it is a *Boletotherus cornutus*.' "Oh, bejove, I won't have anything to do with it then." And he didn't.

The accusation that entomologists shorten the lives of a few insects in the pursuit of their science is quite true. But this profession of sympathy for insects is usually made on behalf of some beautiful and seemingly harmless butterfly, overlooking the fact that the handsome creature may produce an offensive looking and destructive grub. I have yet to hear the first expression of regret for the death of a potato beetle, but I have heard a lady taking credit to herself for stepping on every one she saw on the pavement. And yet the lives of each are equally valuable to the owners thereof. Upon one occasion I secured a prize in a place of public resort, and was taken severely to task by an elderly lady, for my cruelty in depriving of life such a beautiful and harmless creature. I defended myself by asking a question: Suppose you saw a caterpillar crawling on your dress, what would you do with it? "Oh, the nasty thing. I would knock it off and put my foot on it." In so doing you would be taking the life of just such a beautiful creature as I did, only in a different form. That did not change her opinion of me. Thus, feelings are allowed to control reason and judgment. A poet has asked: What's a butterfly?" And answered: "At its best, 'tis but a caterpillar drest."

It is no unusual thing to hear individuals when looking at a case of butterflies, go into raptures over their beauty, and extol the marvellous works of the Creator; but when confronted by one of beetles, they will express their horror and disgust at what they regard as most objectionable creatures; and yet they were originated by the same inventor, and are products of the same workshop, and the one exhibits as much wisdom and beneficence in their construction, and as perfect an adaptation to their requirements in nature as the other. And our duty is to endeavour to discover and disclose wherein that lies, so that we may be able in some measure to give an answer to that oft repeated question: "What were insects made for anyway?"

When Topsy was asked "Who made her," she said she wasn't made, she grew; and in any correct use of language Topsy was right. Its a long while since any living thing was made in this world, and yet there was a time when no living creatures existed on this globe. Therefore, they must have been originated at some time, and in some way. And the accumulated evidence strongly vindicates the belief that they were originated by design, for a purpose. And ever since, those who have survived the fluctuations of time, have kept on propagating their kind in accordance with the laws of their being with which they were originally endowed. Moulded and modified in many ways by external conditions and altered circumstances, the better to fit them for performing their part in assisting to maintain the balance of nature. Man being, preëminently the disturber of harmony in this world.

As to the "Pins" which are so much in evidence in a collection of insects, they are a necessity for the handling of specimens without injury when under examination, as well as to carry labels and fix them firmly in place for future observation and study. Many observant persons when looking at a collection of insects, will express great surprise at the number of kinds therein displayed that they have never seen before, and wonder that it should be so. But it is just what might be expected, as a great many insects cannot be distinguished from

one another when flying about. It is not until they are captured, killed, pinned and spread, that the difference between them can be discovered. Yet many people see nothing in the pins but an evidence of cruelty on the part of collectors. No intelligent collector of the present day would think of pinning an insect before killing it, when there are so many approved methods of giving them pleasantly and instantly everlasting sleep ; and thereby secure his specimens in perfect condition by preventing fluttering. Much misinformation prevails even amongst educated persons about the suffering of insects, which is not quite creditable to them. Suffering is the result of being possessed of a nervous organization. The more highly this organization is developed, the more sensitive to suffering is the creature possessing it. All creatures are not thus equally endowed, therefore all creatures are not equally liable to suffering. The human race is supposed to stand highest in this respect, and yet there are wide differences between individuals of it. A highly cultivated and refined woman is far more liable to suffering, mental and physical, than one who has been exposed to rough conditions all her life. Insects have a very low organized nervous system, and therefore are not, and cannot be, liable to acute suffering. Apart from the science of life in that respect, it has been abundantly demonstrated. As an illustration : A moth asleep in day time on the side of a tree, has had a pin passed through its body, and firmly fixed to the tree without disturbing its repose. It remained in that condition without showing signs of its discomfort until evening came, when it wanted to fly about, then it fluttered vigorously ; which might have been mistaken by an observer as an evidence of suffering, when it was only the result of its eager desire to indulge its nocturnal habit. I have cut half the abdomen off a mosquito that was feeding, and it did not injure its appetite in the slightest. But it is our nature to associate suffering with injury, therefore it should not be wantonly indulged in. Children especially should be taught to deal mercifully with every living creature, even a mosquito, and dispatch it as expeditiously as possible, to save others from suffering. But I have heard boys condemned as wicked and cruel when chasing and capturing butterflies, and peremptorily ordered to stop it, which was intended as a fine exhibition of tender consideration for the feelings of the insects, whilst it showed none whatever for those of the boys. Surely a boy is of more value than many insects. Sentimentalism, however lofty, is not edifying.

Man's prerogative in this world is to dominate nature, and make the powers of nature subservient to his advancement, and all modern progress and improvement in horticulture, agriculture and stock raising, is founded on the principles of man's ability to improve upon nature for his own benefit. But to accomplish that, man's work must be in harmony with the laws of nature, else disaster may follow. Nature when left to the operation of its own beneficient laws, succeeds in establishing and maintaining an exquisitely adjusted balance between the numerous conflicting elements in its own vast domain. But man in his eager desire for large profits and quick returns, thinks he can accomplish his ends by more direct methods ; ignorant of those finely adapted harmonies, he goes to work in his own way to bring them about, but often discovers to his sorrow, that he has started some of nature's machinery in motion that is working in an opposite direction to his intentions, and is threatening his ruin rather than his advancement ; so he has to call a halt, to reconsider his methods, and with patient labor, observation and research try to discover where he has gone wrong, what he has overlooked and how to do better. When Henry Ward Beecher undertook to be a farmer, he met with so many unforseen and unexpected hinderances to success, that it seemed to him as if all nature had joined in a league against him, and he was ready under the influence of such feelings to give that reply which raised such a storm against him at the time. When asked how to get rid of Canada-thistles, he said, "Cultivate them for the market. Then the bugs will attack them and the mildew will blast them. Then the grubs will eat their roots, and the caterpillars will devour their leaves. Their stocks will rot, and their blossoms fail to

produce seed. The frost will cut them by night, and the sun will scorch them by day, and you will soon have no thistles." And this conflict between man and nature, is from his violation of the laws of nature, always going on ; and will, until he more thoroughly understands nature's laws and how to obey them. And the more artificial man's methods become, the higher is the intelligence required to make them successful.

The community may be divided into the rural and the urban, or such as live and work in the country, and those that make their living in towns and cities. It is the products of the rural workers' labour that are most exposed to insect depredations ; and, as a rule, it is they who give the least attention to such matters. The cause for this condition of things is not far to seek. The rural workers' labour and leisure are very unequally divided. Summer is short, and the work is pressing. The crops must be got in ; and the crops must be got off. And during the process there is little time and less inclination to give attention to the operations of their insidious insect foes, that may be robbing them of half the profit of their labours. In the winter time they have the leisure to gain information, but it is not the season to put it in practice to any extent ; so with the next summer's advent the usual rush begins, and their time as well as their inclination for that kind of work disappears, and their attention to the depredations of insects is put off to the future.

An idle man out for a stroll, and a delightful health-refreshing converse with nature, reached a projecting point of the Niagara escarpment, situated about four miles east of Hamilton, from which, on a clear day, Toronto can be seen. The landscape below, once lake bottom, but now dotted with human habitations that are surrounded by regularly laid out and well cultivated fields, orchards and vineyards, their dimensions reduced by distance, until they look like flower-beds in a well kept garden, with Lake Ontario shining bright and calm beyond. A prospect of charming loveliness. A woman came out of a harvest field near by, dressed suited to her work, but quite different from what she wore when he had met her in the city. She thought it necessary to apologize for her appearance, and kept it up to his discomfort. So to change the subject he remarked, "What a magnificent view you have from your place." The reply was, "Troth then and its much we care about the view, working like the slaves we are all the day." He could but bow to the justness of her rebuff, and ponder on its widespread and far-reaching applicability. No time—no inclination for such indulgence. Severe and continuous toil is not conducive to mental cultivation.

Amongst those that live and work in urban locations, where labour and leisure are more equally divided, there always have been some who were fascinated by the beauty of insects and their intensely interesting habits of life. Many of these in the pursuit of their favourite study have seen, realized and become impressed with the thought of what tremendous loss the rural workers are sustaining from the depredations of insects, and have persisted in calling attention to it, and urging that measures should be taken to prevent it. Their thoughtful consideration has not been without result. Governments, which have the interest of their country at heart, having had their attention called to the matter, and seeing that those most directly interested were, from want of time, knowledge or inclination, doing nothing, and that the whole community was suffering loss thereby, have taken hold of the matter, and are looking out for persons qualified in some measure by previous observation on the subject, and are appointing them to give their whole time and attention to that work. Such action is in perfect accord with the established principle of the division of labour for the attainment of the highest results with the least expenditure of time, money and labour. And the rural workers realizing the advantage of such an arrangement, will be willing to sustain the procedure, when they find it is profitable to have that done for them, which they may not have time or capacity to do for themselves ; and the whole community will be benefited thereby. So now the time has come when attention to the work and ways of insects is getting acknowledged to be of real

importance in the management of rural affairs, which cannot well be done without, and work in that line will become an established profession. Men being educated for it, and their services having been found to be profitable will soon become necessary, when they will be called for as regularly and paid for as willingly as those of any other profession. Thus entomology has vindicated its claim to recognition as a science useful and important to the community.

The educational authorities are now alive to the great advantage that would result to the whole community if it were in some measure informed upon natural history subjects, and to that end have placed them in the lesson course of schools. But it is doubtful if a more effectual method could be taken of turning children against natural history than by making it one of the tasks they have to learn, and which the most of them will look back upon with dislike, and be glad to have done with. Whereas, if they were encouraged to make natural history collections, themselves choosing the department, it would be in harmony with their natural inclination to collect something, and would at the same time form a safe outlet for their surplus energy, which would produce such an agreeable impression on their minds as to go with them in after-life and induce them to take it up again whenever opportunity presented itself. A consummation much to be desired and which may be realized when parents and teachers themselves have acquired a real love of the subjects.

Mankind is instinctively utilitarian, and this is reputed to be the most utilitarian age that has been. The disposition of the race is being intensified in the individual, by the tendency of the times in which he lives. So everything is tested by the standard of: How is he, or they, to be benefited thereby? and to what extent? But the great majority of mankind have no choice in life, they are controlled by necessity, the necessity of making a living. And this so occupies their attention that they have little time for anything else. But constant application of mind or body to one particular vocation becomes monotonous and depressing. So for the health of body and mind, relaxation is necessary. Many suppose that such is only to be obtained by an entire absence of occupation; this is a mistake, the most refreshing relaxation is often found in a mere change of occupation. The most tiresome day of many a man's life is a holiday; simply because he has nothing to do. Activity is conducive to happiness. Many who have been successful in business, and have got over the necessity of working for a living, yet remain in business, because they have no other way of pleasantly and profitably occupying their time. Now here comes in the immense advantage which those possessed of some knowledge of natural history subjects have over those with none. A means of healthful recreation is always within their reach. All they have to do is to open their eyes and they find objects of interest liberally strewed around them. So that, whether it be the weary toiler with only his tiresome holiday to spend, or the successful man who has got beyond the necessity for labour, and has much time to spare, they will find in it a never-failing means of profitably occupying whatever time they wish to give to it. When the eyes are opened to the beauties of nature, the pleasure of a walk or a drive is immeasurably enhanced by the ability to intelligently recognize the diverse objects that are constantly presenting themselves to view. The enjoyment of rest and repose in the shade on a hot summer's day, is quadrupled by observing the different forms of the trees, with their characteristic manner of growth; and the kind of birds and insects that frequent them. And to be able to distinguish them by name as recognized acquaintances, is a yet greater addition to the pleasures of life. One great advantage of taking recreation in the observation and consideration of natural history subjects is, that it requires no elaborate preparation to begin with. Every one is able to appreciate in some measure the beauties of nature and the faculty will increase and strengthen with exercise, so that all that is required of anyone is to begin to observe. Observation excites curiosity, curiosity leads to enquiry, enquiry tends to increase knowledge, and the more one knows, the more one desires to know. And natural history subjects are so diverse in their manifestations, as to provide something suited to

every taste. Then they are not the monopoly of the rich or the learned, but are open to all wh have an eye to see, and a mind to perceive. They are educational in their influences, leading to habits of thought, observation and self-control. They are elevating in their tendency, leading away from that which is base and ignoble, to that which is pure, beautiful and refining. Physically they are healthful ; most departments requiring those out-of-door activities that brace and strengthen. And they are perfectly inexhaustible, and such a source of enjoyment, as only those engaged in them have the slightest conception of. Thus satisfying man's utilitarian disposition to the utmost.

In nothing of all that, does entomology fall short in interest and importance to any othe department of natural history. There are four times as many different kinds of insects in the world as of all other kinds of animal life put together, and their powers of increase may be reckoned at fifty times as great. Then insects have four separate stages of existence to investigate before you can be certain that you have an exact knowledge of their life history. Whilst the simple question, "What constitutes a species," amongst them, remains as yet wholly unsettled. If it is the beauty of nature that attracts your attention, you will find in insects the equal of flowers, with the added charm of animation ; combining in colour and form the highest art with the poetry of motion. It is the strange and wonderful that excites your interest ; no where in nature can be seen such marvels as in the transformations of insects such departures from the ordinary course of life in other creatures ; such contrasts in conditions ; from the lowly and grovelling, nourished on garbage ; to the elegant and refined, revelling in the sunbeam and sustained by nectar. In their individual instincts along the lines of natural capacity, excelling in correctness the most cultivated reason of man. In the perfect adaptation of parts to their uses, they are far in advance of the inventive powers of a human genius, and in many instances they exceed in grotesqueness, the imaginative creatures of the wildest romancer. And whilst they are considered to be the ephemeral things of a day, their pedigree can be traced to the remotest antiquity ; and no where else can be found such beautiful illustrations of natural theology. Thus providing abundant scope for the exercise of every faculty of the human mind.

THE NORTH-WEST (CANADA) ENTOMOLOGICAL SOCIETY.

ANNUAL MEETING.

On Wednesday afternoon, Nov. 5, 1902, at the High school, Calgary, was held the fourth and last annual meeting of the North West Entomological Society. The meeting was one of very great interest, for it involved the extinction of the Entomological Society and the founding in its stead of the Territorial Natural History Society.

ENTOMOLOGICAL SOCIETY.

The chair was occupied, until the burial of the Entomological society, by the Right Revd., the Bishop of Saskatchewan and Calgary. The large room was crowded and among those present were Chas. W. Peterson, deputy commissioner of Agriculture, Regina ; T. N. Willing, Regina ; Dean Paget ; Percy B. Gregson ; N. D. Sanson, curator of Banff museum ; F. H. Wolley-Dod ; A. G. Wolley-Dod ; C. Marker ; Principal J. B. Boyce ; Messrs. King, Tomlinson and about forty other residents of Calgary and district.

Letters in support of the meeting were received from the Mayor of Calgary and other gentlemen.

After an interesting opening speech by the chairman, Mr. Percy B. Gregson, as president of the Entomological Society, was called upon to address the meeting.

PRESIDENT'S ADDRESS.

Mr. Gregson said that the Society was now in its fifth year of existence and explained some of the difficulties that had to be overcome in the course of its establishment. Very early in the society's existence, botany was made a complementary subject with entomology, and by constantly hammering away, holding meetings and by pointing out on every possible occasion the manner in which agriculture was affected by insects and plants, farmers were interested in the welfare of the society.

One difficulty to contend with has been, not so much the prejudice of the young people against insects, but the prejudice of the parents, which however was passing away. The president then proceeded to describe the formation and operation of one of his field clubs. At first two or three boys would join for the fun of the thing—perhaps one of them might be in earnest—and a girl or two. In the afternoon they would go out, and from the varied assortment of things taken (bugs, beetles, spiders, caterpillars, butterflies, etc.) a caterpillar obviously parasitised would be selected, and the circumstance and importance of it explained. Then perhaps on another occasion the attacks of a small fly on the common prairie aster would be noted, and the young people asked to find one free of attack. They would by that process learn how very few plants there were which had no insects of any kind attacking them. The membership of the Lacombe Field Club now numbers 22, all filled with a sense of responsibility as naturalists. Three out of four who have gained prizes this year are members of this field club, and these prizes were gained against a competition open to all the Territories.

There is now also being organized at the Red Deer school a field club for that district on the lines of the Lacombe Club, so that next year (if all is well) there will be two such clubs in full operation.

Speaking as to the use of the study of entomology, or botany, or any other subject of natural history, Mr. Gregson said that even looking at it as a hobby there is this value in a hobby, that of a definite purpose in view. But there are other uses. Botany is the study of the life history of all plants. It teaches us their modes of growth, habits, natures, localities, etc., so that we learn just how they affect the farmer for good or bad, and in the prize competitions for this year it was made a special condition that the collections should specify these particular features. Then take entomology. This means the study of the life history of all insects. It is not enough to simply know the names of the insects, though that is a good step forward, but their habits and life history from the time they hatch from the egg until they undergo their final change must be learnt as far as possible, and as we learn so our interest grows and our collections should show this life-history.

Another use of the study of natural history is the remarkable development it induces of the faculty of observation—in the young especially. It is extremely interesting to watch this development. About two years ago one of the young folk to whom Mr. Gregson is teaching entomology came to him and said : "Mr. Gregson, I shall never get a collection, there are so few insects." He was told to persevere, and this summer he said : "Mr. Gregson, there seem to be insects everywhere."

This is a young boy—a boy 12 years old—who has gained the first prize in entomology this year. His collection was handed around the room and excited much interest. Another is the love of nature which these studies cultivate—one of the most valuable possessions one can have, and it is well that this should be cultivated while we are young.

As an almost natural corollary with the work of the entomological society, plans have been formulated for the establishment of natural history museums at the schools of Red Deer and Lacombe, which the pupils are intended to collect for and augment every year. These museums

are designed to include every subject of natural history (plants, insects, fossils, minerals and other geological specimens, birds, shells, etc.) a few cases for each school have already been ordered to be constructed as a start.

Such, then, is the history of the North West Entomological Society up to the present day.

Letters were then read from J. A. Calder, deputy commissioner of education, Regina ; Professor C. C. James, deputy minister of agriculture, Ontario ; H. H. Lyman, late president of the Ontario Entomological Society, etc., expressing the most favorable opinions with regard to the course adopted.

PRIZE WINNERS.

Mr. Gregson then announced the names of the winners of the prizes in Territorial competition for insects and plants. The winner of the prize of $2.50 (given by Dr. James Fletcher, Ottawa), for best collection of injurious and beneficial insects is Master D. Tipping, Blackfalds. The prize given by the society for best numerical collection of insects was won by Master Benjamin Howell, Lacombe. For best collection of plants, the prize of $2.50 (given by Dr. Fletcher) was won by Miss Lucy Howell, Lacombe ; and second prize (given by the Society) was won by Miss Mary McDonald, of Urquhart.

The balance sheet was then read, showing a deficit of $40. (A special donation of five dollars has since been received from Mr. H. H. Lyman of Montreal).

DISSOLUTION OF THE SOCIETY.

Mr. Gregson then stated that he had now arrived at one of the saddest episodes in the history of the Entomological Society, namely, its suicide. He proposed that the Entomological Society should be discontinued, and explained that this did not mean oblivion, for that from its ashes would arise, he trusted, a society with greater scope for work, on the lines of a natural history society for the Territories and on this basis he understood that the existing members would transfer their allegiance to the proposed new society.

Before proceeding with the new business, Principal Boyce expressed his desire to assist in the formation of a museum at Calgary and Mr. Tomlinson offered to help the young collectors and others in every way he was able towards that end, and Mr. Gregson promised his advice and cooperation.

Moved by T. N. Willing and seconded by C. W. Peterson, that a vote of thanks be extended to the officers of the Entomological Society for the energetic and untiring way in which the affairs of the Society have been conducted. This was carried.

Moved by Mr. Gregson, and seconded by Mr. A. G. Wolley-Dod that a vote of thanks be extended to the chairman, His Lordship the Bishop of Saskatchewan and Calgary.—Carried.

TERRITORIAL NATURAL HISTORY SOCIETY FORMED.

Moved by Mr. Gregson and seconded by Mr. A. G. Wolley-Dod that a new society be formed under the title " The Territorial Natural History Society " with fee of one dollar for Membership.—Carried.

The following are the objects which this society has been organized to carry out, viz :—

(a) To instruct farmers how to recognise beneficial and injurious insects, weeds and birds, and how to combat those that are injurious.

(b) To promote an interest in and the study of the economic and scientific phases of the various branches of Natural History.

(c) To establish one or more Natural History Museums at central points, and Collections in connection with Schools throughout the Territories.

Mr. Chas. W. Peterson was then elected to take the chair, with Mr. T. N. Willing as secretary pro tem. for the proceedings.

Moved by Mr. N. B. Sanson, and seconded by Mr. F. H. Wolley-Dod that the Divisions of Entomology, Botany and Ornithology be at once established.—Carried.

A draft of the constitution of the Territorial Natural History Society was then considered section by section and finally the same was adopted.

The following officers were then elected :

President	Percy B. Gregson.
First Vice-Pres.	C. W. Peterson.
Second Vice-Pres	G. Wolley-Dod.

Directors, Entomology, F. H. Wolley-Dod, Calgary, and Rev. J. Hinchcliffe, Red Deer ; Botany, Mr. Nivens, Prince Albert, and Mr. Hutchinson, Regina ; Ornithology, Dr. Henry George, Innisfail, and F. Dipple, Calgary, and T. N. Willing, Regina, Secretary-Treasurer.

It was decided that the report of the president of the late North West Entomological Society should be included in the first annual report of the Territorial Natural History Society, and also inasmuch as the excellent work done by the Entomological Society led to the formation of the Natural History Society, that the liabilities of the former be assumed by the latter.

It was resolved that three official Museums should be established, one at Blackfalds for the district north of Calgary, with Mr. Percy B. Gregson as Curator ; one at the Territorial capital (Regina), with Mr. T. N. Willing as Curator ; and the third at Calgary, with Principal J. B. Boyce as Curator.

A resolution was adopted unanimously urging the Territorial government to provide at the earliest possible moment the necessary accommodation for a public natural history museum, such as is maintained in all the provinces.

After a vote of thanks to the Chairman, a motion to adjourn was adopted. It was decided to hold the next annual meeting at Calgary, during the Convention week of the Agricultural Societies in May.

WILLIAM E. SAUNDERS.

In this issue of our Report, we have pleasure in presenting to our readers a portrait of the Secretary of the Entomological Society of Ontario for the last fifteen years, Mr. Wm. E. Saunders, who is well known as a prominent member of the fraternity of Canadian Naturalists. Mr. Saunders's home is in London, where he was born and where most of his life has been spent. His father, Dr. Wm. Saunders, Director of the Experimental Farms of the Dominion, has always been devoted to the study of the natural sciences, and hence the son's attention was in early years directed to similar pursuits, interest in them being maintained by the making of collections in the different departments. Geology, Botany, Entomology and Orinthology all in turn provided object lessons for study, training the mind to habits of close observation, and filling the leisure of later years with delightful employment.

After a few years of miscellaneous collecting, Mr. Saunders turned his attention more exclusively to Orinthology, and as soon as the use of a gun was permitted, he commenced a scientifically arranged collection of our native birds, showing male and female in summer and winter plumage, with any variations from the type, also the nest and eggs of each species. Year by year the collection is added to, until now it numbers over one thousand specimens. Mr. Saunders's birds are his intimate friends, and whether in his own house or on the public platform, his "Bird Talks," illustrated with specimens, show to his audience that he speaks of what he has learned by personal experience in the fields and woods. His enthusiasm for this study is such that he counts it no hardship to walk miles into the country in time to hear some favorite songster greet the dawn. He has also been known to spend a night in the woods in the depths of winter, just to see what he missed by spending his nights in bed !

About two years ago, Mr. Saunders accompanied his father on an official visit to Sable Island, a place he had long wished to go to in order to see the only known breeding place of the "Ipswich" sparrow. The impressions of this trip were given to the public in an article in one of our local papers, which has since been adapted for some of our scientific magazines. Mr. Saunders was able also to enrich his collection by several specimens of the rare sparrow, as well as some other beautiful birds, which have their habitat on that interesting island.

Although Mr. Saunders is kept fully employed in looking after his business interests, he finds a change of work sufficient to afford him the rest he needs, hence he has employed his leisure time in many pursuits, and while Ornithology may be called his principal "hobby," he has gone rather extensively into gardening and horticulture generally ; extensively, considering the size of his lot on Central Ave., but the amount of fruit and flowers there produced is a surprise and a pleasure to all his summer visitors. His well known love for these pursuits, and his knowledge of horticulture generally has occasioned his recent election to the chairmanship of the committee who have in charge the care of the street trees in London.

Mr. Saunders received his education principally in London, though two or three years were spent in boy's colleges elsewhere. As it was considered best for him to enter the drug business so long conducted by his father, he was sent for two years to the Philadelphia College of Pharmacy, where he graduated with the highest honours. Soon after his return to London, he was taken into partnership with his father, but on the latter being appointed Director of the Experimental Farms of the Dominion, Mr. Saunders retired from the retail business, and entered the wholesale exclusively.

On the establishment of the Western University he was appointed to the chair of Chemistry, which he held until the claims of his own business forced him to relinquish the position.

EDMUND BAYNES REED.

The older members of the Entomological Society of Ontario will, no doubt, welcome with much pleasure the portrait of Mr. Edmund Baynes Reed, which is prefixed to this volume. He was one of the small band who originated the Society on the 16th of April, 1863, and is one of the few survivors who may expect to commemorate its fortieth anniversary a few months hence.

Mr. Reed came to Canada from England when a young man and took up his abode in London, where he for some time practised his profession as a lawyer. Later on he became Secretary-Treasurer of the Synod of the Diocese of Huron and continued to occupy this position till he left London for British Columbia in 1890. He was always devoted to Natural History and especially to the collection and study of insects. His leisure time was largely given up to these pursuits and to the work of the Entomological Society, in which he took the warmest interest. He and Dr. Saunders were instrumental in forming the London Branch of the Society and keeping up the enthusiasm of its members. When the head-quarters of the Society were removed to London and there was in consequence no further need of a Branch, Mr. Reed took an active part in everything that was done and gave most material help in the formation and increase of the library and collections. He was Secretary-Treasurer of the Society in 1871-2-3 and from 1880 to 1886 ; Vice-President in 1874, 1877 and from 1887 to 1889 ; member of the Council from 1874 to 1876 and in 1878 and '79 ; and during many of these years Librarian and Curator in addition. The following extract from the report of the Council for the year ending August 31st, 1890, bears testimony to his usefulness and services :

"In consequence of the removal of Mr. E. Baynes Reed from London to British Columbia, to take charge of the Dominion Meteorological Station at Victoria, it will be necessary to make

some new arrangements for the care of the library and collections, and the performance of the official work of the Society. . . . . The Council desire to place on record their feelings of deep regret at the removal of Mr. Reed from this Province and the loss which the Society thereby sustains. Mr. Reed is one of the original members of the Society and for more than a quarter of a century has been one of the most active and zealous of its officials, filling at different times the positions of Vice-President, Secretary-Treasurer, Librarian, Curator and Auditor. To him it is especially due that the library has grown to its present dimensions and value, and that so much progress has been made by the Society in many directions. The Council beg to thank Mr. Reed for his services in the past and wish him all possible success and prosperity in his new and important sphere of labour."

Mr. Reed was a constant contributor to the pages of the *Canadian Entomologist* from the very first volume, in which appeared five articles from his pen. His papers, largely collecting notes, records of rare captures, etc., were always interesting and valuable; he also furnished descriptive articles on larvæ, an accentuated list of Canadian Lepidoptera, a report to the Department of Agriculture (jointly with Dr. Saunders) on the Colorado Potato-beetle which had then invaded Western Ontario from the neighbouring State of Michigan, and popular papers on common insects.

In the preparation of the early annual reports of the Society he took a large share and contributed elaborate and valuable papers, as follows: Insects affecting the plum, Report I. (1870), pages 53-63, and Report II. (1871) pp. 22-26; Insects injurious to the potato, *ibid*, pp. 65-81; Insects attacking the cucumber, melon, pumpkin and squash, *ibid*, pp. 89-92; Insects affecting maple-trees, Report III. (1872) pp. 35-43; Insects affecting the peach, *ibid*, pp. 44-47; Insects affecting the potato, *ibid*, 48-50; Some common insects which affect the horse, ox and sheep, Report IV. (1873) pp. 34-41; Entomological contributions, Report V. (1874), pp. 11-16; Sphingidæ—Hawk-moths, Report XII. (1881), pp. 48-70; Diptera—Two-winged flies, Report XIII. (1882), pp. 45-53; and short articles in several issues. From the above list it will be seen that Mr. Reed gave much attention to economic Entomology and did some very excellent work in that department. It was quite fitting, therefore, that he should have been one of the company who, in August 1889, formed the Association of Economic Entomologists and signed its original Constitution.

Another valuable and important work that Mr. Reed performed for the Society was the compilation of a General Index to the first thirteen Annual Reports, 1870-1882, which proved of the greatest use for many years to the members of the Society and others who had occasion to refer to these publications.

For some time before he left London, Mr. Reed took a great interest in Meteorological Observations and in connections with the Observatory at Toronto established a local station and installed the necessary instruments. His anemometer and vanes were placed on the top of the Cathedral tower and connected by wires with his residence on the corner of Park and Queen's Avenues. The work that he thus performed was so accurate and satisfactory that he was selected to take charge of the Pacific Coast Division of the Dominion Meteorological Service, and since 1890 he has continued to fill the office of Superintendent of the Observatory at Victoria, B.C. Though his time is fully taken up with his official duties, he continues to be interested in Entomology and is a member of the British Columbia Natural History Society. His many friends will, no doubt, heartily join with us in the wish that he may enjoy the blessings of health and well-being for many a year to come and retain the vigour and vivacity which have always been his characteristics.

C. J. S. B.

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