# FOURTH ANNUAL REPORT

OF THE

# HORTICULTURAL SOCIETY

AND

# FRUIT GROWERS' ASSOCIATION

OF

## BRITISH COLUMBIA

WITH

# PEST AND REMEDY SUPPLEMENT

1893

VANCOUVER, B.C.
NEWS-ADVERTISER PRINTING AND BOOKBINDING ESTABLISHMENT
CAMBIE STREET.

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BRITISH COLUMBIA

# HORTICULTURAL : SOCIETY

—AND—

# FRUIT GROWERS' ASSOCIATION

NEW WESTMINSTER, February 11th, 1892.

Meeting of Exhibition Committee. Present:—Thos. Cunningham, E. Hutcherson, R. T. Robinson, W. J. Brandrith, A. C. Wilson, Wm. Lewis, and A. H. B. Macgowan.

Prize List was adopted.

Draft Bill—Provincial Board of Horticulture—was considered and adopted, much similar to that of Washington and Oregon.

Section 1.—Board to be composed of six members. Divisions of the Province to be as follows:—

*The First District—*

All between Chemainus and Juan de Fuca Straits.

*Second District—*

All the rest of Vancouver Island and the islands of the Gulf.

*Third District—*

All of New Westminster District south of Fraser River to boundary line as far as opposite Yale.

*Fourth District—*

All of New Westminster District north of the Fraser as far east as Yale.

*Fifth District—*

All east of Yale.

It was suggested that as the time was short for securing legislation a committee of Messrs. Cunningham, Hutcherson, and Macgowan be appointed to place the matter before the Government.

NEW WESTMINSTER, March 4th, 1892.

Meeting of Committee on Prize List of Horticultural Society and Fruit Growers' Association. Present:—E. Hutcherson, Thos. Cunningham, R. T. Robinson, A. C. Wilson, T. R. Pearson, and A. H. B. Macgowan.

The prize list was revised and prepared for presentation to meeting of Directors of Royal Agricultural Association.

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NEW WESTMINSTER, March 4th, 1892.

Meeting of Committee on Packages for Small Fruits of Horticultural Society and Fruit Growers' Association. Present:—Messrs. W. J. Harris, G. W. Henry, E. Hutcherson, R. T. Robinson, Thos. Cunningham, and A. H. B. Macgowan.

After examination of several catalogues and price lists it was decided to recommend ordering from Geo. A. Williams, Thorold, Ont., and to advise him to appoint F. V. Harris, of Hammond, as his agent.

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The Directors of the Horticultural Society and Fruit Growers' Association of the Province met at Chilliwack, at 4 p.m on Tuesday, May 3rd, 1892. Present:—Messrs. John Kirkland, G. W. Henry, Hammond; E. Hutcherson, Ladner's Landing; J. H. Bent, T. Wilson, Harrison River; W. Kipp, G. A. Rashwell, James Kipp, Chilliwack; and A. H. B. Macgowan, Vancouver.

On motion Mr. Kirkland was appointed chairman.

The minutes of the former meeting having been published, were accepted as read and confirmed.

Some correspondence having been read, it was moved by Mr. Hutcherson, seconded by Mr. Henry, and carried, that the Exhibition of the Society be held on the first Tuesday in August, and following day.

Mr. Hutcherson introduced the subject of packages, and Mr. Bent said that barrels were out of the question on account of their cost.

Mr. Henry preferred barrels for winter keeping.

On motion of Mr. Hutcherson, seconded by Mr. Wilson, it was resolved, "That this association recommend that tight or closed boxes be used, and that the lumber for the same be dressed on both sides."

With regard to the matter of making an exhibit at the World's Fair in Chicago in 1893, it was resolved to appoint the following as a committee to

prepare an exhibit: E. Hutcherson, G. W. Henry, J. H. Bent, D. Oppenheimer, G. A. McTavish, T. R. Pearson and the secretary.

At the meeting in the evening there was a large attendance in addition to the directors who were present in the afternoon. On motion Mr. Kitchen, M.P.P., was appointed chairman. By request of the chairman the secretary explained the object of the meeting. Mr. Bent and others spoke in favor of packing in barrels. Several members spoke in favor of no effort being spared to make the exhibit at Chicago a success.

Mr. McGillivray asked what had been done towards grading fruits. He had noticed that no regard was paid to the selection of apples, all kinds being thrown indiscriminately into the boxes. He suggested the holding of public gatherings for instructions in packing. He was in favor of close boxes and suggested that the name of the packer and the grade of the fruit should be branded on them. He also asked whether enough pruning had been done in British Columbia.

Mr. Henry answered that owing to the great growth in the Province he would recommend nipping back in the summer. Early pruning increases the growth.

Mr. Hutcherson said that pruning in spring gives growth and nipping back in summer gives fruit. His system was spring pruning, cutting well back.

Mr. Henry said that in spring he cut back liberally in the case of small trees.

Mr. Wilson considered leaves as manufacturers, and not consumers. The leaf never draws from the tree, but helps it to grow. In fact, leaves act as lungs for the tree.

The chairman said that when he saw old orchards running themselves to death, he started summer pruning, and the trees grew stout. He had not found that summer cutting back injured the next year's crop. His trees kept in good order under that treatment.

Mr. McGillivray asked if "black spots" in apples was caused by disease in the tree, or by insects.

Mr. Henry said it seemed to be caused by atmospheric changes.

Mr. Webb asked if thinning of fruit trees was beneficial.

Mr. Hutcherson said that if you follow summer pruning you will have to thin out.

Mr. Bent asked if a spotted apple was different in flavor from a clear-skinned apple after peeling.

Mr. Webb said that he found that old trees produced spotted apples and young trees did not.

Mr. Hutcherson said that want of vitality in old trees was the cause of the increase of spots.

Mr. Hollingshead said that where the foliage is heavy the fruit suffers.

Mr. Hutcherson said that Red Astrachan trees are great feeders and require food.

Mr. Henry said that unless the fungus was completely removed, it would interfere with the flavor of the apples. Badly spotted apples only reach about half the regular size.

The chairman said that he found that thinning out decreased black spot.

Mr. J. Kipp said that he had an orchard in parts of which the trees died. He had tried several times with the same result.

Mr. Higginson asked what the society was doing towards preventing the importation of pests.

The secretary answered that, at the request of the association the Government had passed an act governing this subject, known as the Horticultural Board Act, 1892, and he had no doubt that this act would prove a great boon to orchardists.

Mr. Hutcherson held that importers should be required to put up bonds that they delivered what they professed to, viz.: Good stock, free from pests. Other peddlers have to take out a license, and why not tree peddlers?

Mr. McGillivray said he had seen trees on Vancouver Island as badly affected with San Jose scale as any he had seen in California or Oregon.

Mr. Hutcherson said we have to fight all pests from everywhere. Good men are particular, for their name's sake, about selling diseased trees. Men who live here and are making their homes here among us would surely be reliable.

Mr. Hutcherson read a very able and exhaustive paper on "The Preparation, Planting and Pruning of Orchards," which was much appreciated, and a vote of thanks was passed to him for it.

Mr. Hollingshead said that, in pruning he found it best to start from one head or sprout. He preferred low-headed trees for convenience in picking.

Mr. Hutcherson, on the contrary, liked reasonably high-topped trees, with hogs in the orchard.

Mr. J. Kipp had also successfully run hogs in his orchard.

Mr. Hutcherson did not like too high trees, but believed in cutting back. The warmer and drier the place the lower you can grow the tree.

Mr. McGillivray moved and Mr. Webb seconded a resolution that the thanks of the citizens be tendered to the association for their consideration in holding their meeting in Chilliwack.

The secretary responded on behalf of the association, saying that the interest manifested, the questions asked by those in attendance, and the information elicited were more than a sufficient return to the association for any trouble taken. He urged the people of Chilliwack to become more interested in the work of the association, which was doing much for the benefit of the country. He desired the association to be placed on record as appreciating the support, financial and otherwise, received from the Government of the Province, and trusted that the people generally would show their appreciation by becoming active working members of the association, thereby benefitting themselves and others.

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## THE PREPARATION, PLANTING AND PRUNING OF ORCHARDS.

ER READ BY ERNEST HUTCHERSON, OF LADNER'S LANDING.

Of all rural occupations it is questionable if there is another which possesses the degree of fascination or yields the depths of genuine enjoyment that tree planting does. Crops of annual production and brief existence may afford a passing gratification, but a few months sweep away all trace of our arduous service and the round must again and again be repeated. In some sort one's life acquires a posthumous lease in the planting of trees, which, whether for ornament or profit, may thrive, continue and wax great through succeeding generations, affording pleasure to the sight and ministering to material necessities.

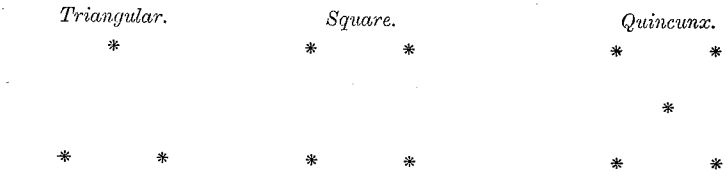
In the early development of a new country, orchard planting, naturally, receives the most prominent attention, and to this department the considerations of this article are directed.

Before entering upon the practical part of the work let me say a word on the question, can the growth of fruit be made profitable in British Columbia? I would say, most emphatically, yes, if you grow good fruit. Our fruit-growers who set one thousand trees and think the work is accomplished, and look upon a 20-acre orchard as the acme of human enterprise, can hardly conceive of the scale of which capital is invested, and the magnitude of the business done in some of the immense orchards of California. There they employ 50 to 75 hands the year around, with double that number during the picking season. Competing railroads throw branch lines through the orchards and packing houses are built so that cars can be loaded from the door. In British

Columbia we can grow better apples, pears, plums, prunes and cherries than can be grown in California. Then why would it not pay?

A commercial orchard, handled on commercial principles, is still a thing of the future in this Province. They are being set but have not yet come to bearing. Those few orchards which are to-day such a source of wealth to their owners are the results of a little time now and then snatched by the proprietor from work often deemed more important. While looking upon the hundreds of thousands of dollars invested and being constantly expended in California, I often thought what would be the result to this country some of our capitalists would invest a few thousand dollars in scientific orcharding here. In all our cities you will find factories with valuable machinery standing idle. And in the interior of the Province thousands of dollars and valuable time are being given to prospecting which pays but little interest on the capital invested. Will anyone contradict me when I say that one-tenth of this money invested in fruit-growing in this Province, handled by skilled labor, under educated management, will pay larger returns than the industries referred to, and would develop our fruit-growing to such an extent that in 20 years our Province would be made the summer resort of wondering thousands and tax our railways to handle the fruit.

Having carefully considered the matter and chosen a location, it is well to plant only such varieties as are adapted to the soil. Plums and prunes do well in most soils and locations; pears are natural to clay land, while early apples, cherries and peaches thrive on light sandy land. The mode of preparation should depend a great deal on the location and nature of the land. I have seen orchards doing well where no ploughing had been done, but this system necessitates a great deal of hard labor. Sub-soiling is not so necessary as in the hotter and drier climates. Good drainage is paramount to success. In purchasing trees three things are indispensable: (1) Varieties true to name; (2) Healthy, vigorous, well-matured trees; (3) careful and judicious packing, without which all may be lost. The laying out of the ground is important. An orchard is an object of public notice, and the neatness and precision of its plan and planting, or the reverse, will generally be taken as an index to the character of the planter. A well laid-out and well tended orchard commands almost universal admiration, while nowhere is slovenliness more conspicuous. In planting there are three methods in most common use known by various names, but probably best distinguished by the geometrical forms into which trees thus planted are grouped, viz.:



Of these the simplest and most frequently adopted is the square. In this the orchard is laid off in lines crossing each other at right angles, with equal intervals of space, and a tree planted at each crossing of the lines. As the roots of a tree are presumed to generally radiate from the trunk and extend an equal distance in all directions, they may be said to occupy a circle of ground. In such a case it is obvious that a disadvantage attends the square system by leaving an unoccupied space midway between each four trees, unless their roots overlap each other at the nearest point of juncture, which in theory should not occur. This can be easily illustrated by laying out four coins in a regular position. Now take three of them and place them in the form of a triangle, with their edges touching. Observe the comparative reduction of this waste space and an idea is given of the superiority of the triangular system. This, of all others, is unquestionably the most nearly perfect. Without crowding the trees any closer, it secures 15 per cent. more than the square to any given extent of ground. The larger number of persons who plant orchards do not fully appreciate this advantage. Let it be further illustrated: By the square system, at 20 feet apart, 109 trees are planted on each acre. Assuming their yield at mature age to be 200 lbs. of fruit to the tree, the crop would aggregate 21,800 lbs. per acre. Planted by the triangular system this same acre will support equally well 126 trees, which at the same estimated yield, would afford a crop of 25,200 lbs. per acre, or an increase of 3,400. Conceding that the fruit is only worth the moderate value of two cents per lb. on the tree, the gain by the adoption of the triangular system is shown to be $68 per acre. This is essentially clear profit, as the cost of land, expense of cultivation and the amount of taxes are the same in either case, the only difference being in the cost of the increased number of trees and the cost of planting. Apply this computation to a 10 acre orchard for a term of 10 years and $6,800 is shown to be the not unlikely sum which a fruit grower may sacrifice, rather than incur a little bother at the beginning. This system is of equal advantage in small fruit plantations and it affords superior facilities in all operations of cultivation. It is sometimes called the sextuple system, from the character of a larger group which it forms, in which six equidistant trees stand in a circle about, and also equidistant from, a seventh occupying its centre. A gross error has occurred in the frequent application of the name quincunx to this method. The true quincunx is described by four trees planted at the angle of a square, with a fifth placed midway between them. It is chiefly used in planting with reference to a future thinning out of the trees of an orchard, when those designed to remain permanently shall have attained a considerable size. In such case the centre tree in each group of five is ultimately removed, having served a profitable season of production, until the growth of its neighbors demands its room. Sometimes a dwarf or small growing sort is thus permanently planted and in occupying the otherwise vacant space partially secures the advantage of the triangular mode. If extensive planting is to be done, the distance between the trees is regulated by the habits of its kind. For illustration, I would plant yellow transparent and Keswic codlin apples 10 feet apart, northern spies, R. I. greenings, Baldwins and golden russets 25 feet

apart. This rule holds good with all the fruits according to the habits of the tree.

By skilful pruning nearly all kinds can be confined to a reduced space and this is advocated by some, but demands more than average qualifications. For example: apples planted 10 feet apart after about five years' growth are pruned like grape vines, cutting back last year's wood to one bud. The greatest pains will scarcely prevent some roots becoming bruised or broken in the taking up and handling of the trees. Before planting, cut all these away to fresh sound wood, using a keen knife. With branched trees shorten the limbs to the third or fourth bud from the trunk. Allow the tree to stand the same depth that it grew in the nursery. Do not put anything whatever but clean earth under or in contact with the roots. Manure, if used, should be on the surface where the rains will carry its properties to the roots in the form of a liquid, which is the only form in which they can take it up.

So many theories have been entertained respecting the objects to be sought in pruning orchard trees and the practice to be adopted, that I almost hesitate to express an opinion. Several eastern writers on this subject condemn all pruning except to remove dead or crossing branches. No less an authority than A. J. Downing says, and puts the lines in italics: "Every fruit tree grown in the open orchard or garden should be allowed to take its natural form, the whole effort of the pruner going no further than to take out all weak and crooked branches.". On the other hand both Thomas and Barry advocate the free use of the saw and knife, even upon bearing trees. "When doctors disagree, who shall decide?" I remark the subject of pruning trees is one of much importance. Whatever may be the practice on the other side of the continent, where orchard trees are much slower in growth than here, it is essential in the management of orchard trees in this country that they be carefully pruned and trimmed, during several years at least, after being planted in the orchard. The future usefulness, to say nothing of the beauty and symmetery of the trees, depends much upon the judgment with which they are treated when young. For just as the twig is bent the tree is inclined. In British Columbia fruit trees are commonly transplanted into the orchard at the age of two years from graft, with such I have had the best success. They are generally from four to six feet high and without side branches, or, if any, but few near the top. These trees should be cut back before beginning to grow to a point from which the owner wishes to start the foundation of the superstructure, so to speak. This point may be at a height of 16 or 18 inches, or 24 or 30, according to the taste or judgment of the proprietor. It is desirable on several accounts to start the future head of the tree as low as practicable. The point at which the young tree is cut back should be carefully chosen so as to leave a good butt. A very little below the cut, and on the windward side of the tree, several branches may be expected to start out near the top of the stump. About five of these ought to be selected to remain and so chosen to balance the growth on all sides of the tree and all other sprouts may be rubbed

off. The chosen branches may be allowed to grow until the next winter when they are all cut back to, say, 12 to 16 inches from the main stem. As before, this cutting should be made just above a good strong bud. But another principle now comes in for notice. If the tree to be pruned is of a variety whose natural habit is to make a broad and spreading head, as the Rhode Island greening apples for instance, the branch should be cut so as to leave the upper bud on the inner side of it. But if the tree is one whose nature is to form a close, upright head, the cut should be immediately above an outside bud. As in the previous year, so, now, several branches may be expected to start out upon each one of the stems so cut back. Two of these should be selected to remain, and others early destroyed. From year to year the same general system will be pursued, until the trees come into bearing, and as much longer as they continue to throw out long branches of several feet in length. The foregoing rules in pruning are not intended to be dogmatical, but only suggestive. No doubt some may prefer to leave a larger number of branches at first and second pruning and to cut back more or less than is above suggested, but probably it will be generally agreed that the main idea is correct, viz.: that all young trees should be so pruned and trimmed that when grown they should have low, open and spreading heads.

Map the orchard immediately after planting, for if delayed, labels will become lost and confusion result. Do not allow any wire or string attaching a label to remain about the trunk or a large branch as it is frequently overlooked until the ruin or serious injury of a tree calls attention to its presence. Bind up any bruises accidently made on the trunk in cultivating, or otherwise, with a mixture of clay and fresh cow dung. Post yourself regarding noxious insects that you may detect their first appearance and stamp them out before they overpower you.

Finally, study your business and seek information from all sources, especially your orchard, and be assured that nothing can supply the want of personal vigilance and industry.

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NEW WESTMINSTER, August 10th, 1892.

Meeting of Directors of Horticultural Society and Fruit Growers' Association. Present:—Thos. Cunningham, vice-president, in the chair, Thos. A. Sharpe, G. W. Henry, E. Hutcherson, T. R. Pearson, P. Latham, H. Ferguson, H. F. Page, A. C. Wilson, and A. H. B. Macgowan.

Matter of postponed Exhibition was discussed. It was decided to abandon the same for the present.

Moved by Mr. Sharpe, seconded by Mr. Henry, "Resolved that at least $200 be appropriated toward preparation of an exhibit for World's Fair, expenditure of same to be made by a committee of this association."

Moved by Mr. Sharpe, seconded by Mr. Pearson, "That following be committee on World's Fair Exhibit, viz.: G. W. Henry, Thos. Cunningham, John Jessop, E. Hutcherson, and A. H. B. Macgowan."

The following were named as local collectors of exhibits for the districts mentioned:

New Westminster—Thos. Cunningham, D. S. Curtis, Ald. Smithers; Victoria—Okell Morris Canning Co., John Jessop, D. R. Ker; Nanaimo—E. Pimbury, J. Davis, Ed. Bone; Vancouver—J. M. Browning, R. E. Gosnell, A. H. B. Macgowan; Salt Spring Island—J. P. Booth, Joel Broadwell; Maple Ridge and Mission—G. W. Henry, H. Ferguson; Chilliwack—G. Melhuish, A. L. Paisley, Knight Bros.; Harrison River—Tom Wilson; Langley—J. M. Drummond; Spence's Bridge—John Murray; Lytton—Thomas Earl, Thomas Seward: Ashcroft—Hon. C. F. Cornwall; Kamloops—H. McCutcheon; Cache Creek—C. A. Semlin; Pavilion Mountain—R. Carson; Vernon—Eustace Smith.

Those gentlemen are requested to communicate with the secretary, A. H. B. Macgowan, Vancouver, regarding packages, preservations, etc.

The committee on the Royal Agricultural and Industrial Exhibition, co nposed of Messrs. G. W. Henry, E. Hutcherson, and A. H. B. Macgowan, reported that naming, classification, judging, etc., of fruit at the New Westminster show was being arranged for and it was understood that any exhibition managers wishing the assistance of this committee at their shows would receive such by notifying the secretary.

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VANCOUVER, November 1st, 1892.

A meeting of the Directors of the Horticultural Society and Fruit Growers' Association of British Columbia, was held in the Board of Trade rooms. Among those present were:—R. E. Gosnell, in the chair; A. C. Wilson, Westminster; T. A. Sharpe, Agassiz; G. W. Henry, Port Hammond; E. B. Madill, R. T. Robinson, and Secretary Macgowan, of this city. After routine business was disposed of, it was recommended to hold the annual meeting in Vancouver, on Wednesday and Thursday, January 25th and 26th, 1893, and the following was suggested as the programme:

President's address, from W. J. Harris, of Port Hammond; Secretary, Treasurer's report, and the following papers: "Experiences of a Fruit Grower, with Remarks on the Climatic Advantages of British Columbia," by Mr. Thomas Cunningham, of New Westminster; "Varieties of Fruit Best Suitable for Canning and Preserving," by Okell & Morris, of Victoria, Walter Taylor, of Vancouver, and G. A. Melhuish, of Chilliwack; "Apple Culture," by Thos. G. Earl, of Lytton; "Pest and Remedies," by E. Hutcherson, of

Ladner's; "Native Fruits and Shrubs," by T. Wilson, of Harrison River; "Bee Culture in British Columbia," by R. S. Codd, of Hatzic; "Lawns and Their Management," by A. C. Wilson, of New Westminster; "Forestry," by T. A. Sharpe, of Agassiz; "Marketing Fruit," by W. A. Dashwood Jones of New Westminster, and R. V. Winch, of Vancouver; "Flowers for the House," by R. S. Robinson, of Vancouver; "Grape Culture," by John Murray, of Spence's Bridge; "Hop Growing," by William Shannon, of Vancouver; "Cranberry Culture," by E. B. Knight, of Popcum; "Drainage," by Thomas Kitchen, of Chilliwack; "The Garden," by Mr. Davis, of Nanaimo; "Vegetables," by V. Davis, of Victoria, and John Kirkland, of Ladner's; "Plum and Prunes," by G. A. Henry, of Port Hammond; "Bulbs," by G. A. McTavish, of Victoria; "Pears" by Thos. Steward, of Lytton.

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VANCOUVER, B.C., January 25th, 1893.

Annual meeting of Horticultural Society and Fruit Growers' Association of British Columbia. Present:—W. J Harris, president, in the chair; R. T. Robinson, B. Wintemute, M. J. Henry, and D. McRae, Vancouver; G. W. Henry, Hatzic; E. Hutcherson and H. A. Hicks, Ladner's: T. A. Sharpe, Agassiz; P. Latham and Thos. Cunningham, New Westminster; N. Bucherat, Port Moody; T. Wilson, Harrison River; J. W. White, Hammond; B. Hill, Burnaby; A. Postill, Vernon; P. C. Walmsley, Nicomen; S. M. Okell, Victoria; W. Knight, Popcum; R. M. Palmer, Hall's Prairie; W. R. Austin, New Westminster; W. J. Brandrith, South Vancouver; J. M. Browning, Vancouver; F. Cooper, Picton, Ontario; with others from different sections, and during the several sessions a large attendance of members and visitors was present. Previous minutes having been published were taken as read, and on motion confirmed.

## THE PRESIDENT'S ADDRESS.

Mr. W. J. Harris gave his annual address, which was a short *resume* of the association since its institution. The society, he said, was formed in 1889, when Mr. D. Oppenheimer, then Mayor of Vancouver, sent out circulars to all interested in fruit growing, and the outcome of this was the formation of the society, with J. M. Browning, president, and A. H. B. Macgowan, secretary. A show was held in Vancouver, and since then two other shows have been held each being a greater success, the second being at New Westminster and the third at Victoria Last year no show had been held on account of the visitation of small pox, and it was, perhaps, as well, as the year had been a very poor one for fruit. Amongst the work done by the association was the adoption of a standard box for apples and pears, and last season the packages had been much better. The extension of the fruit area was largely increasing and a great deal of fruit, especially plums, pears, peaches, and cherries had been shipped to the Northwest, although they could not at present grow

enough for this Province. They had also had a commission appointed to enquire into pests, and an inspector was appointed, whose duty it was to visit the various orchards, and would destroy the pests. The Government had been very liberal in their donations, and had done all in their power to assist the association. The society had secured a large exhibit for Chicago, and considerable zeal had been taken, and there was no doubt that they need not be ashamed of their products, and that they would not be behind any other Province.

Last year the secretary had suggested that the list of pests and remedies be added to the report, which was adopted, and had undoubtedly proved useful. So far there have been very few fruit pests, but they are very prevalent in Washington and Oregon, and the best thing was to start early and keep them out of the Province. So far the markets had not been overstocked, and several canneries had been erected. Fruit growing he thought was advancing in the Province, and in a short time it would be one of the chief industries.

Mr. Hutcherson stated that as the question of pests had been raised by the president, he would make a few remarks on the subject. He did not have the privilege of entering any man's orchard and destroying the pests as had been thought.

The chairman stated that if he was asked to go, he was supposed to do this.

Mr. Hutcherson replied that such was not the case. His duties were to see that people killed the pests. The law as it now was enabled a man to bring a civil suit against another if he did not kill the pests. An idea had got out that he was going round with a spraying outfit, and charge each man so much a day. They were, however, supposed to procure these outfits, and do the work themselves. A man should notify the commissioners of the prevalence of pests, and they would notify the inspector. He would like this matter discussed at this meeting. Mr. Hutcherson continuing stated that he was over in Oregon last fall, and found that the orchards were badly infested, the wooly aphis being especially prevalent. They were importing a large number of trees and it had been said that they should not put any obstacles in the way of commerce. In Washington dealers had to notify the inspector if they were shipping any trees from Oregon, but at the same time private individuals were shipping them in direct. Trees were also being shipped in here, and they should be inspected, and the insects killed, but so far they had no place for this purpose at the ports of entry. In California there were probably more pests than anywhere else, and nowhere are they so particular. An importer has there to make an oath before a magistrate that they are not infected. He wanted to get the voice of the meeting on this matter, and thought that nurserymen should put up bonds.

Mr. J. White said he was glad the matter had been brought up. The inspector he thought should make people burn their pruning instead of leaving them laying round.

Mr. T. Wilson said that he had seen the woolly aphis and tent caterpillar were in the bush so that it would be difficult to kill them.

Mr. G. W. Henry then read Clause 8 of the Horticultural Board Act, 1892, which stated that the duties of the inspector were to visit the various orchards and inspect them, and report on the condition to the Board.

Mr. Hutcherson stated that it had been reported that he was coming round with a spraying outfit, and would charge nurserymen $5 a day. The board had never met so far as he knew, and thus had no rules. Practically there was thus no board, but only an inspector. He had travelled all round the country in order to make a report to the Government. A meeting had been called when two members were present, and that was all that had been done. Mr. Hutcherson thought that it might be well to unite this board with the association.

The chairman thought that they should discuss this Act some time during the coming session.

Mr. Macgowan stated that he thought the whole trouble had arisen out of the appointment of the board. The Government had requested the association to name members for the board and they had done so, but some misunderstanding had followed. The inspector had done good work, but he thought the Act needed amending.

Mr. Hutcherson said that they had started early so as to make a good exhibit at the opening of the World's Fair. In many places he had been refused fruit by the farmers and even had to buy it.

He next touched on the remark of the president that a good exhibit was being prepared for the World's Fair. He said he had found a great lack of interest on the part of the fruit growers in contributing to this exhibit. Messrs. Henry, Macgowan and Okell & Morris were the only ones who had taken any active part, and he could count the number of exhibits sent in on his fingers.

Mr. Sharp suggested that the farmers should be notified as to where they could leave fruit for the fair. He thought that the association should make arrangements for sending an exhibit of fresh fruit to Chicago, as they would look much better than if preserved in acid as preserving in acids had proved as great a failure here as elsewhere.

Mr. Henry said he had had the same experience with regard to the acids, but he thought it more the condition of the fruit. He had put up 150 jars, and when last he looked at them 100 jars were good. The raspberries were in

good condition, but some of the apples and plums had shrivelled up. He thought arrangements might be made to ship fruit in a refrigerator car every week during the fair.

Mr. McCrae complained of the lack of energy on the part of small fruit growers in getting ready the exhibit; and Mr. Sharpe added that he thought the mistake was made in the people not knowing where to send the fruits.

Mr. Okell stated that the rendezvous for all exhibits had been duly mentioned by the papers, but it had had but little effect, for on the Island he had received but one dozen samples. What he had preserved had kept well. He thought that May and June fruits should be preserved as they could be made to look well for several months.

The further discussion resulted in Messrs. Henry, Sharpe and Hutcherson being apointed to consider the question of amending the Horticultural Act, and also on the World's Fair exhibits, they to report at the convention in the morning.

Messrs. Henry and Hutcherson were appointed auditors.

It was resolved that the election of officers be deferred to 10 o'clock Thursday morning.

Mr. Henry stated that as the association had a surplus on hand he had suggested to the secretary to write to New York in reference to the cost of the Horticulturists' Rule Book, which he found to be of great assistance not only to himself, but also to fruit growers in the Province generally, as it treated upon all subjects.

Inspector Hutcherson referring to the surplus, said that he thought it should go towards getting up an extra exhibit of fruit for the Province. Mr. Henry defended his course, but the inspector said that he thought the members should pay up their subscriptions.

Mr. White contended that the members had received no benefit from the association and he felt that the Horticulturists' Rule book would be an inducement to bring in new members. The distribution of plants was also a failure.

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Secretary Macgowan after presenting his annual statement said: Since last annual statement the following meetings have been held:

February 3rd.—Meeting of committee on annual report at New Westminster, when form was adopted and ordered printed.

February 10th.—Meeting at New Westminster of Exhibition committee, which, after doing their regular work, took up the Horticulturist Board matter. Prepared draft of bill in line with bills from Washington and Oregon and appointed Thos. Cunningham, G. A. McTavish, E. Hutcherson, John Kirkland and A. H. B. Macgowan to present draft to government.

March 4th.—Meeting at New Westminster of Prize List committee. Passed list for submission to and approval of Royal Agricultural Association, who had requested this association to take charge of their fruit department. On same date committee on packages met and after examining several catalogues, decided in favor of G. A. Williams', Thorold, Ont., and he was advised to appoint Mr. T. V. Harris of Port Hammond, as his agent.

May 3rd.—Chilliwack. Meeting of directors took place. The proceedings of this meeting were published as also a most interesting paper read by Mr. Hutcherson on the "Preparation, Planting and Pruning of Orchards."

June 16th.—At Victoria. The committee on World's Fair Exhibit met and progress was reported.

August 10th.—The directors met at New Westminster, when it was decided to abandon exhibition for present. Committee on World's Fair was appointed and a list of probable collectors were named.

November 1st.—Directors met at Vancouver. The principal part of the work done was the arranging programme for annual meeting.

I think it but fair to say that while in many lines the past year has been one of comparative dullness, I believe I am right in claiming that it has been one of progress for our association. A great amount of interest has been taken in its workings, our publications have been sought after at home and abroad. Letters from England and Scotland tell that the annual reports are most highly thought of there and lent about from one to another. One letter notes, "thousands of such valuable pamphlets should be published and sent round." The correspondence now placed on the table is too voluminous to detain you with the reading of it, suffice to say that the number of letters gives some evidence of what is being done by the association. The reports have been distributed widely and, I believe, a great amount of good has arisen through them. The instruction on packing, shipping, etc., and the pest and remedy supplement have proved most serviceable.

Notices have been received of regret at inability to prepare papers from Mr. Knight, Popcum; Mr. T. E. Kitchen, M. P. P., and Mr. A. C. Wells, Chilliwack; Mr. John Murray, Spence's Bridge; and Mr. J. Kirkland, Ladner's.

I think that one of the most important questions for consideration at this meeting, ought to be the preparation of exhibits for the World's Columbian Exposition, at Chicago, where all nations of the earth will present their best

products for exhibition, and where representatives of the different countries of the world will congregate to examine and criticise those exhibits. Canada has agreed to take part, British Columbia falling into line. It certainly becomes the duty of this particular association, to do its best in an effort to make a creditable showing for this Province, from which much will be expected. The horticultural interest is to-day one of the most important factors in the development of our country, and one that will produce the best results for years to come. A good showing at the World's Fair of fruits, carefully selected, properly cared for and well exhibited, will be of incalculable benefit in demonstrating the capabilities of this favored province.

A lot of work has already been done. Considerable quantities of apples have been shipped for cold storage at Chicago; hundreds of jars of fruit put up in acids are ready to forward, together with some fine samples in sugar syrup. I have great confidence in the keeping of the latter. It has been found difficult to exactly equal the density of the preservative to that of fruit juice, which is done by the addition of glycerine or syrup. If the preservatives are too thin the fruit bursts; if too thick it shrinks. It is believed by many that the best results are secured by acids, viz., color and form. In the heated sugar syrup preserving, what we lose in color we gain in flavor; besides having the better all round keeping qualities, which is a decided advantage, particularly when exhibits have to undergo lengthy transportation. The heated sugar syrup preserving, although more troublesome and expensive at the start, will, in the end, be the most satisfactory. I believe that the loss in fruit through failing attempts with the acids will more than meet the extra trouble and expenditure. From time to time during the Exposition glass jars can be substituted for those that have deteriorated, and we are assured that we will be permitted to renew and increase our exhibits of fruit and vegetables whenever it is necessary. Keeping good form in this way will take a large quantity of fruit, and involves a great amount of work, and the success in doing this will depend largely on the hearty co-operation of the members of this association and their friends. The requirements will be for the best samples of fresh fruit, something that visitors at the fair can see, handle, smell and taste. Commencing with small fruits, early berries, etc., we should follow the fruit season through as late as possible, shipping each day and week as necessity requires, such exhibits as are to be procured. Now, in this work, careful personal attention by the membership of such an associatian as ours, will do more than the expenditure of large sums of money, and the extent and quality of our showing will therefor depend to a great degree upon the interest taken in, and the assistance rendered by the producers.

The necessity for having as many as possible of our exhibits tasteable is brought about by the fact that many people get the impression that because our fruits grow to immense proportions, that they are simply tasteless monsters. Much of this is prejudice, and we find that even professional judges of fruit have their prejudices, and that these are hard to move even by tasting. Part of my former business was handling large quantities of eastern

American and Canadian apples, and I think I know whereof I speak when I assert that the apples that I have been using the present season, and during the past five years of my experience in this Province, were in size far advanced and in flavor fully up to the best I ever handled. I need scarcely call attention to any particular kind, but at the moment I think of the magnificent show of most of the leading varieties at New Westminster and Victoria last autumn such as would be hard to beat in any part of the world, and would be well worth a place on the tables of any show, no matter where held.

The World's Columbian Horticultural building is one of the finest ever erected for a fruit and flower show, the dimensions being as follows: Length, 1,000 feet; width, 287 feet; square feet of ground floor, 235,000. Space for some 60,000 plates of fruit will be obtainable for September display. How many of these will be representative of British Columbia depends to a great extent upon our association. I think I am safe in saying that no reasonable assistance will be refused by the Provincial Government, providing we show a willingness to co-operate.

The modes of exhibiting will be of the most approved kind and everything will be arranged to show products to the best advantage. Vegetables should also be well represented all through the continuation of the exposition, and the assistance of our association will be of great benefit in this line.

Let me, in closing, urge the necessity of a careful consideration of this important matter by our members. Let us show that we are a live institution, willing, ready and even anxious to assist in anything that tends to our country's good.

The president noticed the benefits of our exhibitions.

Mr. White—"The show is all right but there is not a great many exhibiting. The general run of members are not in a position to exhibit. There has not been a distribution of plants properly." He contended that there was no inducements to get new members.

Mr. Hutcherson replied that he thought the best way the society could give value for the money was to distribute plants, something valuable as well as new. He had distributed two plants to each member. Mr. Henry also distributed to those who sent for them, that was as an individual but not for the association. This was a question that required some discussion and he believed in taking some system of getting new varieties and having them worked up by some person for the society. That would be a good scheme.

Mr. White said that each member of the society was supposed to receive a plant from Ontario. Why should not the society do that? He had received his plant every year but he had never got a plant alive.

Mr. Henry.—There are a number of plants offered by the association and each member is supposed to take his choice; all that was required was to drop a card to Mr. Wolverton and they would get them.

Mr. Latham said it would take some time before members could see the results of the association. Those who do not attend the meetings cannot see the results. He thought if the books were sent out it would be a good thing as a great many did not know where to get the books.

Mr. White moved that the association get enough books to distribute to each member, seconded by Mr. Hutcherson, and carried.

Mr. Wintemute wanted to urge two or three remarks upon the members with regard to the advantages of the society, and the complaints which some made. He considered that the views of those who complained were very limited and they had only looked at it in the dollar view. There was a wider view to look at it. There had been information disseminated through the reports and circulars with regard to pests, etc., which were invaluable to the fruit growers of the country. Through their recommendation the legislators of the country had established a commission and appointed an inspector, and he thought every one would agree that this was a move in the right direction and of greater benefit than a few plants or books which could be distributed. People should look at things in a broad light and not at the immediate advantage which might be had.

Mr. Wilson asked if Mr. White undervalued the knowledge gained by interchange of thought by the members in the discussions carried on.

Mr. White replied that he was satisfied but the members wanted to see something besides.

Mr. Macgowan said with regard to the distribution of Ontario plants he thought the simplest way to receive the plant would be to write a post card stating what the member wants and these are sent to them direct, generally by packages. He was afraid the changing here would cause loss of time and damage to plants and there would be difficulty in selecting to suit each member. Mr. Henry complained that a great many did not attend the meetings.

The business before the meeting being concluded, Mr. Hutcherson proceeded to read a paper on—

## FRUIT GROWING IN THE DRY BELT ABOVE THE FRASER CANYONS.

BY THOS. G. EARL, LYTTON.

I set out some fruit trees as early as 1864, and kept adding some each year, until in 1875 I had 300 bearing nicely. I sold the fruit at nine cents per lb. In the following winter I lost 260 trees. The only reason I can give for the loss of the trees is that there was no frost until about the 5th of November to drive the sap down. At this time, about November 5th, the thermometer went down to 7° below zero in one night. This cold lasted about ten days, and then the warm south wind came and thawed the trees out as quickly as

they were frozen. As a consequence the tree tops were as dead as if they had been put into a cauldron of boiling water for the same length of time. I then ordered other trees, dug up my dead trees and replaced them, which was a bad move as the roots were not killed. I should have allowed the shoots to grow and then destroyed all but one, which should have been grafted, and soon I would have had fruit-bearing trees, as all the old roots would have grown tops very quickly. I dare say some of the early settlers in the lower country may remember this frost, as it destroyed many trees all over British Columbia. Such sudden and severe cold as I have mentioned, may not occur again in centuries. In the autumn mentioned there was not the slightest frost until it suddenly turned so cold, and then everything was frozen solid. It would not have been so bad had things thawed out gradually, but as before stated, they thawed out as quickly as they were frozen. When the cold came everything was as green as in mid-summer. Since then I have had no serious losses. I am well satisfied that all over this upper country the best of fruit can be grown, as we have but very little rain or fog in the autumn and plenty of sunshine to color the fruit nicely. Apples, pears, plums, and peaches do well, although the peach is apt to be killed in winter, unless very carefully attended to and well mulched. This must be strictly attended to by all who wish to succeed with the peach, or any other fruit in the upper country, where we are liable to sudden changes of temperature and where the snow does not lay on the ground to protect the trees. It is the sudden change that hurts the trees more than severe frost, which does not affect the trees so much where the ground is covered with snow all winter.

As we have so much wind to contend with in this locality, trees set out in rows 25 feet apart, or 25 feet each way, do very well. I consider that here or in any other locality where there are heavy winds, it is best to have all the protection that can be had. If two rows of trees are planted quite close together this will greatly protect the other trees. The sun has a fair chance on the outside row and the fruit will do very well. Even one row planted close together is quite a protection, and this I think much better than setting out rows of cottonwoods or hedges, which, of course, are an expense with no returns. Purchasing trees and setting them out is apt to be all that is considered necessary by many beginners, when, in fact, the work has only begun. Each tree must be carefully attended to, all insects destroyed by spraying. All suckers not wanted should be pinched off as soon as they appear, and startings from the roots should be cut off close, as well as the other suckers. The heads of the trees should be kept low, and open by judicious pruning. The ground ought to be kept clean by the cultivator, and to secure the best results no crops should be planted in the orchard, as the trees require the whole strength of the soil, unless it is well manured, a necessity which is apt to be neglected. The cultivator will not hurt the roots, and a careful man can cultivate close to the trees, while by going over the ground three or four times a year all weeds can be kept down and the soil kept mellow.

When the first severe frosts set in, protect the trees from sudden changes

by mulching around the roots with any well-rotted manure or coarse litter, straw or leaves. This will be good if left on all summer. In this locality trees must be irrigated, which can easily be done by ploughing a light furrow near the trees, going down on one side and coming back on the other. Light, loamy, sandy soils require water once a week in midsummer when it is very dry, but none after September 15th. Heavy clay land will do well irrigated twice a month, and none after September 1st. In regard to setting out trees, I consider a paper in the third annual report of the Fruit Growers' Association, by W. J. Brandrith, North Arm, all that is required, if the directions there given are strictly followed. The kinds of summer fruits that do well here are :— Red June, Red Astrachan, Early Harvest, Yellow Transparent; autumn apples, Gravensteins, Duchess of Oldenburg, Blenheim Orange, Gloria Mundi; winter, Northern Spy, Waxen, Baldwin, Spitzenberg, Yellow Newton Pippin, Yellow Bellflower, Blue Pearmain, Vandevere, Max Pepper, Ben Davis, Rhode Island Greening, Golden Russet, Hubbarton's Nonesuch, Smith's Cider, Peewakee, McIntosh Red Ribston, Pippin, Roxbury Russet. These all do well, but the best keepers are Yellow Newton Pippins, Max, Pepper Russets, Blue Pearmains and Vandeveres. Cherries and other small fruits do well; also melons, which ripen in August. Tomatoes and all kinds of vegetables do real well. Grapes do splendidly and there can be enough raised to supply this Province. Grapes can be grown along the Fraser from Lytton to Big Bar (nearly 100 miles), along the Thompson from Lytton to Kamloops (90 miles), and all along the Bonaparte Valley. The flavor is unequalled, or not excelled in California, but, of course, they can beat us in quantity. The kinds that do well here are : Niagara, Jessica, Elmira, Warden, Brighton, Concord, Delaware, and Wyoming Red.

Last winter my family and self spent three months in California, and we found no grapes that we considered as good as those of our raising. In the autumn of 1889 I went east to my native state, New Jersey, and took with me samples of Northern Spy, Vandevere, and Blue Pearmain. My samples were tested by some of the largest growers and dealers in that section. They said that for size and quality they never saw better and very seldom as good. I there met a Mr. Marshall, who had been a wholesale fruit dealer in New York city for over 30 years, and had retired from business with an ample fortune. Mr. Marshall said that in all experience he had never handled better apples, and he thought never as good. Boxing is one of the greatest disadvantages we have to contend with If we could get barrels from the east on reasonable terms they would be better than boxes. If a barrel and box factory were started here it ought to do well. Then again the freights are so high that we cannot contend successfully against the Americans, who ship carloads of fruit to Winnipeg, and from that city the fruit is distributed throughout Canada. As yet British Columbia orchards and vineyards are small, few and far between so that at present we cannot ship by the carload. It is to be hoped the C.P.R. will see the propriety of reducing the freight and express charges, which, in the long run, would be a great help to all. Now, I would recommend all

fruit-growers, whether experts or amateurs, to join the Fruit Growers' Association of British Columbia for their mutual benefit and advancement.

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Mr. Hutcherson then suggested that Mr. Postil read his paper, which he did at the invitation of the president.

## OKANAGAN AS A FIELD FOR HORTICTLTURE.

BY A. POSTILL.

I wish in this article to point out some of the advantages possessed by the valleys contiguous to Lake Okanagan as fruit growing districts, and also one of the ways by which natural advantages can be neutralized by outside influences. To those who have not visited the Okanagan country, and to others who may have passed through, simply glancing at the scenery or idly speculating on its capabilities as a field for sport or pleasure, the latent wealth of those valleys, with their sunny hilsides and warm benches, as rich fields for the horticulturist, has never dawned upon them—and if asked their opinion on the subject would laugh at the idea of anything more valuable being produced than bands of cattle or horses and hay and grain to feed them. But if the matter be looked into a little more closely, it will be found that the most essential requirements for the successful production of fruit are possessed in a remarkable degree by the valleys of which I write; and experiments that have been made abundantly prove that the favorable conditions, in so far as fruit raising is concerned, have been found reliable.

As a foundation for the propagation of fruit-producing trees and plants, let us take a glance at the Okanagan valleys and those near by. Spallumcheen valley, with a length of about 30 miles, is, strictly speaking, an agricultural district, but within its borders is an area of 15 or 20 square miles that does not require irrigation, and is eminently adapted for the successful raising of fruit, which has been demonstrated by experiments carried on in different parts. The lands around the head of Okanagan lake and along its western shore is an extent of country that is favorably situated, and capable of producing fruit in great abundance. Between Penticton and Osoyoos there are locations for hundreds of orchards and vineyards.

The Similkameen valley, about 25 miles west of Penticton, contains a vast extent of rich bottom-lands and benches. Mission valley is fast being planted with fruit trees. The valleys around Vernon are Swan lake, Arm of Okanagan, Creighton, Coldstream, White and Blue Springs, and, with their benches, contain many square miles of country capable of supporting a large business in horticulture. Lord Aberdeen has purchased a large tract in Coldstream as well as in Mission valley, and is greatly improving both places, and adding to their value and that of the whole country by planting orchards and otherwise improving his properties.

The lower levels of all the valleys named contain soil of great depth, variety and richness, and the benches rising like shelves one above another are composed of all the different kinds of soil from terraces of broken rock to the finest loam. While all the lands within the area named are not good, there are thousands of acres capable of being brought into a high state of cultivation, and only need the application of intelligent industry to make them produce fruit—not only of fine quality, but of almost unlimited quantity.

The valleys near Vernon do not all require irrigation, but Mission valley, the country lying along Okanagan lake and river, and the Similkameen valley, require irrigation for the full development of crops of any kind. In these places, however, the mountain streams would supply an abundance of water if properly applied. The creeks have such a rapid descent into the valleys that the hills and benches can be watered with little more trouble than the lower levels.

One of the principal ingredients that go to make up a fruit-growing country, and one that cannot be dispensed with, is climate. British Columbia has long been famous for its delightful climate, and when the Province was called "a sea of mountains," it was laughingly said that "we could not live on climate." It is known, however, that the climate is the wizard's, and that it transforms what would otherwise be bleak and dreary wastes into comfort and health-producing material, and I call every British Columbian to witness that whatever this soil and climate undertakes to do is done well, whether of the highest or lowest form of produce, I might add, from a spring chicken to the latest diminutive addition to the world's great army of men and women.

In the part of British Columbia of which I write the four seasons come and go with singular regularity, spring, summer, autumn and winter, following each other in due course, without encroachment, except it be on the part of autumn in the beginning and spring at the end of winter, autumn being loth to quit and spring in a hurry to begin. Bright sunshine and clear nights are the rule, there being no fierce electric storms in summer, and the icy blizzards and terrific cold of less favored climates being unknown in winter. The thermometer seldom registers below 24° below zero, and that only in occasional winters. The "cold snaps" are of short duration—not lasting, as a rule, more than three days, and accompanied by the clearest skies and calmest of weather. In summer the mercury rises to 100° in the shade, and has been known to reach 105°. Wild fruits are plentiful and consist of strawberries, service berries, red and black raspberries, gooseberries, and a species of wild black currant. In wet localities the high and low bush cranberry grows, and the mountain huckle berry is found in high altitudes in great profusion. There are different kinds of berries used by the Indians, the names of which are unknown to me. Of the cultivated fruits, apples, pears, plums, cherries, prunes, and all the small fruits are an unqualified success, the dry and sunny climate adding greatly to the flavor and preserving qualities of the fruit Currants

will hang on the bushes from the beginning of July, when they first ripen, away into September, retaining their brightness and flavor unimpared.

The dry climate does away with moss, scab, and rot, giving trees and fruit a healthy and bright appearance, and adding much to the fruit's value for shipping purposes. Besides the kinds of fruit named, grapes have been tried in Mission valley, and on the west side of Okanagan lake, and have produced good samples of fruit. Peaches have been tried in Mission valley with encouraging results, the trees last year being loaded with fruit of fine quality; while at different points along the west side of Okanagan lake, down the Okanagan river to Osoyoos, and in the Similkameen valley, peaches appear to be, wherever tried, a sure and heavy crop.

In the past two years thousands of fruit trees of every known kind that grow in the temperate zone, and some of the more tender kind that are only successfully grown further south, have been planted in our valleys and up to the present have done well; while tomatoes, melons, citrons and cucumbers thrive and produce fine crops, adding unimpeachable testimony to the value of our district as a fruit-producing country.

How are all these advantages to be turned to account and made a wealth producing power in British Columbia? The answer is: cheap and easy access to those on either side of us. The C. P. R. has done great things in opening up our country and showing us its capabilities, and now that we see what we can do, we want the opportunity of doing it. Let them give rates that will stimulate the development of a country second to none on the Pacific coast, not excepting California.

It is useless to talk about inducing people to embark in enterprises dependent upon cheap transportation when freight and express charges are from four to nearly five times as high as in the east. So long as this state of affairs prevails so long will our hills and valleys remain uncultivated, and empty cars be the rule. Let freight and express rates be reduced to the eastern standard, and in a very few years our land will be a smiling garden, and our public carriers busy as nailers, delivering our fruit to thousands who would otherwise be deprived of it, and giving happiness to other thousands in providing homes for them where to-day there is not a vestige of civilization. Nor do I despair that this state of affairs will be brought about. The C. P. R. is managed by men of keen intelligence, who must see that the country's advancement means their prosperity, and that both should go hand in hand. We have only to look about us to see substantial evidence of the wisdom of those who brought the C. P. R. into existence and it seems to the writer that the wisdom shown in the past by the management of that road will certainly be supplemented by an enlightened policy towards districts such as ours, and that the progressive policy of the Northern Pacific management, who provide refrigerator cars for fruit growers along the line, and carry commodities at a very low rate, will be followed by our own railway company. In this way the most serious drawback to the rapid extension of the cultivation of fruit will be removed, and

horticultural pursuits will take the place they should occupy in Okanagan and surrounding valleys.

Mr Hutcherson said he would like to ask what was the system of taking care of the trees to protect them in winter.

Mr. Postill replied that they succeeded without any protection, no mulching was necessary.

Mr. Hutcherson said that from what he had seen of the country that grapes would be one of the fruits that would be a success in that country, say, from Lytton to Okanagan Mission and from Big Bar to Kamloops. He was not particularly struck with the Spillamacheen. If you get down to the Okanagan Mission they will tell you of the man who fed his hogs on peaches. He believed there is a great future for that country around Penticton and Okanagan for peaches and apricots. He congratulated Mr. Postill on his paper.

Mr. Postill was asked if the English cherry would succeed in his country.

Mr. Postill said he had tried one or two cherries on the range where he grew hay. They irrigated heavily there. The cherries do all right enough until they drew the water off when they did not do so well. He knew of two large trees, four years planted, that seem to be doing well. As for grapes, he was of the opinion of Mr. Hutcherson, that it was a great country for grapes. He experimented with grapes, nectarines, quinces, plums and cherries. This was on a bench 200 feet above the flat land. Everything did well except celery. It was too high for celery. They had ripe tomatoes from the 1st of June to the 10th of September. There was no sign of frost on 1st of September. The first frost was on the 28th of October. Tomatoes all ripened beautifully. Grape vines did well. The deer had eaten leaves off the vines two or three times. Every time the new leaves came on. As far as hogs being fed with peaches Messrs. Ellis and McCoogan had done so simply because they had no means of getting them to market.

Mr. Henry said he had had considerable experience in planting all kinds of fruit trees at the Coldstream Ranche, Vernon. As far as soil and climate during the summer is concerned no better soil or climate could be found. He had planted 1,500 trees in May. The trees all did well with the exception of a few. Where they could get water they had an immense growth. The peaches grew from three to four feet. They had no sign of the curl leaf. Of course he did not know how the winter would effect them. The soil was deep loam just adapted for them.

Mr. Hutcherson asked how the Bartlett pear would succeed. Would they stand 24° below zero?

Mr. Henry replied that he thought they would succeed if they could stand the frost. The trees should be planted in the spring and get the sum-

mer's growth there. Planting in the fall there would be dangerous work. They could plant there about the 1st of April.

On the question of early planting some of the members stated that they had planted out on March 17th.

Mr. Latham said that the reason he asked about the cherry was that in Ontario when they had it 20° below zero the trees burst.

Mr. Postill said that he had known of a pear tree bear for the past 18 years and it was doing well.

Mr. Hutcherson said some pears were hardy but the Bartlett pear was very tender He noticed that Lord Aberdeen had 1,000 trees at Mission. If the frost should strike that country it might hurt the fruit growing industry, if you take into consideration that one variety is tender and the other not. Bartlett pears should be tested.

Mr. Wilson said that it would be interesting to know down at the coast and up there.

Mr. Henry said it would all depend upon the condition the tree is in.

Mr. Okell, of Okell & Morris, Victoria, then addressed the meeting, as follows, on the subject of "Variety of Fruit Best Suited for Canning and Preserving:" Mr. Pesident, I am not accustomed to writing papers, unlike Mr. Morris, who is away in England at the present time. I think the best plan I can take is to read correspondence bearing directly upon the fruit the company is sending to England. I have had the pleasure of placing different kinds in England upon the Manchester, London, and Liverpool markets. I think the best plan would be to show you that British Columbia fruit occupies a very important position in the old country. I want to show you that the fruit of British Columbia is wanted in England as well as California fruit and you need not be at all afraid of planting trees."

"I am from the old country and when I was there was a member of the Liverpool and Manchester Corn Exchange for over twenty years. I am personally acquainted with many of their members and have sent samples of fruit home and you shall hear what they say. British Columbia was already known for its salmon industry. By and by you will find it will have another important industry, and that is the fruit industry. California exports to the old country no less than 180,000 cases of fruit for which England sends back $100,000. Now I want to prove to you that British Columbia fruits are superior to California so that no person need be afraid of planting out trees and especially the Bartlett pear; that is the favorite pear in England and for canning purposes is unequalled. And if you plant apricots, peaches, green gages, and golden egg plum you will find the right market.

They had sent these samples to England and the following were the replies :—

The first reply that came was "We have opened your cans of Bartlett pears and plums, etc., and find them fairly good. We hope you will send all you have for sale on commission."

Another—"I have opened them up and put them side by side with California fruit and shown several large merchants. They state they are the finest they have ever tasted. . . . . I enclose you an order for 5,000 cases."

Again, the same gentleman writes me only last week saying that he has tried our fruit and shown them to different merchants. I have found three men and they are capable of handling 20,000 cases per year.

Here is a letter from a very reliable source (Mr. Okell here explained that these letters were not intended for publication).

"The samples of fruits were really good, especially the apricots, peaches, and pears, the latter are far superior to any other fruit we have seen on the English markets. I find your climate is favorable to the production of fruit of all kinds, and all I can say if your farmers can grow fruit equal to these samples they can grow fruit second to none in the world. I would not plant any trees. What England wants is *quality*. We do not want any kind of fruit which cannot be disposed of. The poor fruit tells all kinds of tales. We do not want poor fruit. We want quality. It would only in the long run prove disastrous to yourselves and us. They want fruit of the very finest quality and if the fruit was of the best quality success must crown the efforts of the grower. First quality takes well and is never a drag on the market. Impress upon your growers, the best, THE BEST, THE BEST."

The same gentleman writes again in another letter :—"I have had a look at the fruit (green gage plums) and think a tremendous demand would be created if it could be supplied. We must say they are certainly of the first quality."

Mr. Okell further said he contemplated extending their works and if apricots could be grown they could take 100 tons per year. 5,000 cases of fruit meant from $5,000 to $6,000 and from $1,500 to $2,000 spent in wages, and he thought if the society would look at it from the right standpoint they would see that this was going to be one of the finest and best industries in the Province. Grow fruit second to none and British Columbia will stand first and foremost.

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Mr. G. W. Henry, of Hatzic, then read the following paper :—

## WHAT TO PLANT.

BY G. W. HENRY, HATZIC.

Before giving any advice as to what varieties of fruit trees to plant, or what particular branch of that industry the most attention should be devoted to, or likely to prove most profitable, it might be well to consider whether the farmer should plant trees at all or not; that is more than is required for his own use. In all old settled agricultural countries or localities it will be noticed that as a rule they become famous for the production only of one or two certain kinds of products for market or exportation. The soil and climate of the locality seem to be specially adapted to these things, and the surroundings favorable for their market and export. It is important then for us, if possible, to decide upon what products of the soil this portion of our Province is to become noted, for what our exports are likely to be, or in what direction our greatest capabilities lie. In these days of railways and steamboats it is not of so much consequence for us to supply the requirements of our own people, excepting with the most perishable and bulky articles, as it is for us to produce such things as we can to the best advantage, even to excess of our own wants, and supply those countries in other parts of the world, where such things cannot be grown as successfully, taking in exchange their products which we cannot raise to advantage. That the soil and climate of this portion of British Columbia are adapted to fruit growing has been clearly proven by the ready growth of trees and plants, and the enormous yields of fine fruit. This applies more particularly to our highlands or benches and well-drained lowlands. There is no doubt that we are also well situated for dairy farming, and such of our lands as cannot well be utilized for fruit may best be turned into dairy farms; and thus a choice may also be given to those who intend farming. It is also quite true that the yield of nearly all kinds of grain, to the acre, has in many instances been enormous, and perhaps can scarcely be equalled in any other part of the Dominion. But the heavy expenses connected with bringing the land into an arable condition, the small portions of land that can be cultivated adjacent to each other, as well as the inconvenience and cost of transportation being so great, all operate against the growing of grain for market here, or for stock farming alone, in comparison with such places as our prairie provinces and others similarly situated. As a few acres in fruit often prove more profitable than larger plantations, and as the returns per acre are so much greater than from grain, the above conditions do not interfere so much with fruit raising. The productions of the soil and the suitability of the climate for fruit far outweigh any of the drawbacks. Therefore, an enlightened fruit grower who plants out an orchard in this Province, and attends to it well, need have no fear as to the ultimate success of his enterprise; and if he is so situated that he can combine dairy farming with it, so much the better for the two go well together. Even with all the advantages of soil and climate our Province possesses for fruit growing, it is not to be supposed that we merely have to plant the trees, and then leave Nature to do the rest. The planting of the trees, although a very important part of the work required to

secure an orchard, is by no means all there is to do, it is the smallest part of the work, only a beginning of what should be a constant watchful care on the part of the fruit grower, during the existence of the trees. There is no use for any man to plant out fruit trees if he does not take care of them; it is only a waste of time and money and a constant source of worry for ever after. Too much of that is done already. I do not suppose one-tenth of the trees planted ever come into profitable bearing, nor is there one man in twenty who takes care of them as he should do. So while we point out that fruit growing is to prove the most profitable kind of farming to be done here, and advise the planting of fruit trees, yet we must warn all who do so, if they do not take care of them they will never meet with that success that awaits the enlightened fruit grower. There is no branch of farming that requires the same amount of skill and study, and none in which there is so great a difference caused in the balance of the profit and loss account, by the reason of carelessness and neglect, as in the production of fruit. No fears need be entertained as to the over production of fruit, for we are only a small part of the world anyway, and we have most of it for a market. It is when we get to producing it in large quantities and become noted for our fruit exports that we need expect a ready demand; for then shippers and dealers in less fruitful countries, will look to us for their supply.

Favoring the idea, then, that the farmer, or tiller of the soil on ever so small a scale, cannot as a rule do better than turn his attention to fruit growing; then comes the question—what *kinds* of fruit can be grown most profitably? The same rule, to a certain extent, should apply here as in the first case, that is, such kinds as seem to be best suited to the soil and climate in general. No doubt there are certain kinds of soil better adapted to certain kinds of fruit than others, in the same locality, but the climate has so great an effect that we find some kinds succeeding on almost any class of soil, while others do not seem to do well even where the soil is most favorable. Of all the *tree fruits*, there is but little doubt that the plum family thrive the most luxuriantly and bear most abundantly in this district. We may perhaps include cherries with them, and I feel satisfied that these, if grown and handled properly, will, as a rule, give the largest returns of any kinds of fruit trees planted. Yet we could not recommend the planting of these fruits only, for in *some* cases other kinds may pay quite as well, or better, and an assortment of fruit makes each variety more valuable. There is also so much depending on the circumstances and conditions of the case, that what is best for one might not be best for another. It is necessary, therefore, in the first place to divide the fruit growers into at least three classes, and when the person decides to which of these he belongs or is likely to belong, then he will be in a better position to decide upon what to plant. In the first class we should put such individuals as are possessed of small holdings of land and are conveniently near a market with a view of confining their attention almost exclusively to fruit growing. In the second class we should include such as are possessed of larger holdings of land, not so convenient to market, but who

propose to follow fruit growing as a business. The third class would be made up of farmers, who intend to carry on several branches of farming, and consider fruit growing as only part of the whole.

The person who belongs to the first class would, without doubt, make more money to plant out principally small fruits, such as strawberries, raspberries, etc., for he would get both quicker and larger returns than from anything else. If he had sufficient land it would be well to include some trees of plums, cherries and pears, also a few peaches, but not many apples, only a few of the fancy kinds. The man who includes himself in the second class should thoroughly enlighten himself on the management of and best methods of putting up and handling all the varieties of tree fruits. Then he will no doubt make the most money out of plums, prunes, cherries, pears and a certain number of summer, fall and winter varieties of apples, with perhaps peaches in an experimental way. The third class composed of the ordinary farmer, who plants fruit trees because he is in a fruit country and not because it is his chosen profession, should, after planting a family orchard composed of different kinds of fruit for his own use, plant good keeping and shipping winter apples.

As to what varieties of the different kinds of fruit to plant, this paper is sufficiently long without entering upon them. A list was prepared by a committee appointed by this association for that purpose some two years ago, and reprinted in our last year's report, which sets forth the varieties best adapted to this district especially, though perhaps that might be improved on a little now that varieties have been tested longer, and I should recommend that that committee, or another, be appointed to revise the list and have it reprinted in this year's report. From the fact that I considered it one of the most valuable things we can publish I would like particularly to call your attention to the importance of making your selection from this list or to choose varieties for planting that have proved themselves valuable and are known to be good here. The want of care and knowledge in doing this has been the cause of the failure of a great many who have attempted to grow fruit. The annual introduction of some wonderful new fruits with flattering testimonials and marvelous account of profit from them, has induced many to waste their money in trees and plants at high prices, which prove to be in most cases of less value than the old well-tried varieties which could have been had for much smaller prices nearer home, for most of these wonderful fruits come from a distance, and even if they are valuable where they originated are often not at all suited to this locality. Avoid those new varieties for general planting. There are too many chances against your favor. I do not by any means wish to discourage the introduction of new fruits, every one that has any claim to favor should be tested, but as a rule it is better to leave that to nurserymen, or others whose business it is and who expect to take their chances on them. When we look over our fruit list and see how very few of our best varieties are really new, we can thus form some idea of the danger of going much into new varieties;

especially those which are brought out with such glowing colors, for those which finally prove themselves valuable usually work themselves up by degrees on their own merits.

Let me also before closing caution you against planting too great an assortment of varieties, for there are only a few of the best, and in order to make a large assorment you must plant inferior varieties, and you will also find when you come to market them, you will have much more trouble to do so. Of the kind of trees to plant—select young thrifty ones in preference to the older trees which are more injured in transplanting, and if possible get trees which are topped about 3½ feet from the ground. They will bear more fruit and will be easier to gather than from taller trees. Trees with tops nearer the ground, especially when they are close together, when they grow older will produce much inferior fruit on the lower branches, through which the sun and air get no chance to circulate, which is very important in this damp climate.

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Mr. Hutcherson asked: "What do you consider the best winter apple for the lower part of the Province?"

Mr. Henry replied: "That is a rather difficult matter to say. We have not tested all the longest keeping varieties and a person can hardly tell which is really the best. The Ben Davis has done well, is a long keeper but the flavor is against it. We have to take different varieties for long keepers."

Mr. Harris said he had intended to bring some samples of Ben Davis that he had grown. They were the most delicately flavored and finely grained apple of any he grew. They are not a handsome apple but the flavor, grain and texture of the apple is very good.

Mr. Wilson enquired in what kind of soil it was grown.

Mr. Harris replied, sandy soil, with no stones.

Mr. McCrae queried in reference to the soil for planting in, especially bench land, and whether it needed manure. Mr Henry said he thought bench land, well cultivated, would produce satisfactory results without manure. Mr. Wilson spoke in the same strain.

Mr. Hutcherson said in regard to the winter apple, the apple that will keep up to this time (January 26) was certainly a winter apple, Mr. Henry was astray in regard to the best apple on low land. The Baldwins, in his experience and opinion, were the best apple on low lands. He had been reading an article by Mr. Henry a short time ago stating that Baldwins were overgrown and would not keep. The sample was in good shape as far as keeping was concerned and it was kept in their living room 18 days. He had packed all the fruit for the Chicago World's Fair. They had some fruit from Earl's and Penny's and it was very fine fruit indeed. One box of Baldwins he considered superior to any apple as they would keep till spring in better shape.

Mr. McCrae asked Mr. Henry about the lowlands of the Fraser. It certainly grew better timber.

Mr. Henry said that it was on account of so much more moisture that larger fruit was in some cases grown on the lowlands. But the prize apples were always grown on the benches.

Mr. Wintemute said as to the adaptability of the Baldwins upon low lands, he had been noticing a good deal in his travels around and his opinion coincided with Mr. Hutcherson's. The Baldwin was the best winter variety, handsome in view and was the most successful winter apple, as it had produced the best crops and given the best results. This was also the opinion of parties on Lulu Island. A year ago he was in Sweet's orchard and the Baldwins were altogether as far as productiveness, size, freedom from spots, etc., the best. The Ben Davis could not compare at all with the Baldwins, and he had noticed it in several other places.

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The meeting adjourned till half-past seven in the evening.

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At the opening of the evening session, at which there was a splendid attendance, secretary Macgowan read the auditors' report of the receipts and expenditures as follows :

# HORTICULTURAL SOCIETY AND FRUIT GROWERS' ASSOCIATION OF BRITISH COLUMBIA

IN ACCOUNT WITH

A. H. B. MACGOWAN, - - SECRETARY-TREASURER.

| 1891. | | | |
|---|---|---|---|
| Dec. 1. | By Balance on hand | $ 149 54 | |
| July 18. | " Government grant | 1000 00 | |
| | " Membership fees | 121 00 | |
| | | | $1270 54 |
| To | Bills, printing and ads | $388 20 | |
| " | Cuts for report | 16 50 | |
| " | Stationery | 1 20 | |
| " | Expressage on books | 6 05 | |
| " | Postage | 23 40 | |
| " | Subscription to Canadian Horticulturist | 33 60 | |
| " | World's Fair grant | 200 00 | |
| " | Secretary's salary | 360 00 | |
| | | | $1028 95 |
| | Balance | | $ 241 59 |

(Signed) W. J. HARRIS, President.

A. H. B. MACGOWAN, Sec.-Treas.

Audited and found correct,

(Signed) G. W. HENRY,

E. HUTCHERSON.

Vancouver, B. C., Jan. 25, 1893.

The president said with regard to the duties of the commissioners appointed by the Government, certain statements had been made, and he would like Mr. White to state the case before the members of the association what he knew about the commissioners.

Mr. White stated that there were trees cut down and dumped on vacant blocks in New Westminster. He did not know if it was the commissioners who removed the ant caterpillar trees or not but he had made the remarks to several parties and he did think that they should be attended to, and also other places as well.

President Harris said that the question had arisen; the commissioners, according to the Act, were to order their destruction as far as possible. It seemed from what Mr. White said that the pests were only being removed in a way that would spread them. The society had taken up this question of destroying these pests and they would want to know if the commissioners were doing their duty. Prevention was better than cure. In New Westwestminster the tent catterpillar had a strong foothold. Mr. Cunningham was present and he would like to hear from him.

Mr. Cunningham said he supposed every member present was conversant with the steps taken to enact the law relating to the destruction of pests. The action at that time had been reported pretty fairly all over the Province. The commissioners met pursuant to the call of the Minister of Finance, who is also Minister of Agriculture, and organized very imperfectly. Only a few of the commissioners were present. The Government appointed an inspector of pests who had authority to order the destruction of all pests. The inspector considered the Act imperfect. It is not far-reaching enough to enable him to discharge his duties. He (the inspector) was supposed to go from orchard to orchard and order the destruction of pests. It is only the duty of commissioners to see that this is done. The inspector was present.

He considered that he had not the requisite authority to enforce the penalty as set down in the Act. It is not the duty of the commissioners to inspect nor did he think they had the authority to order the destruction of trees personally. He had advised parties to rid their trees of pests and he had given all the information he could to anyone who would hear him or listen, or take any steps to protect their trees. The Act is crude and imperfect and he thought it would have to be amended and all difficulties as to the authority of the commissioners removed.

Mr. Harris, the president, enquired what were the duties of a commissioner.

Mr. Cunningham read a lengthy extract from the Act on the duties of commissioners and the inspector.

Mr. Cunningham said he might as well explain that there was a difficulty when the Board met on account of the personnel of the Board. It was found that three members of the Board were members of the House, and there was a doubt in his mind as to the legality of the appointment. He thought there was also a doubt in the mind of the Minister of Finance, inasmuch as these members of the Board were in receipt of salaries from the Government. One of the appointees was absent in England all the year so that the working of the Act had not been a success the past year. There would have to be new appointments made this year. He spoke to the Minister of Finance and also to the present Premier, and so far as he was aware the Act would have to be revised and made to suit the wants of the case.

The inspector said he would tell the members what he had done in the discharge of his duties. So far as he (Mr. C.) was concerned he had to sit alone on the Board. It had been an unfortunate year for the enforcing the provisions of the Act.

Inspector Hutcherson said that he was not in a position to enforce the Act. His duties were to report to the Board.

Mr. Henry asked if his duties were not to receive instructions from the Board.

Mr. Hutcherson quoted from the Act "he was to report the fact to the Board." He would have authority were he a member of the Board.

President Harris thought that as a committee had been appointed further discussion was not necessary until the committee reported.

Mr. Hutcherson thought it would be well to have discussion before committee met.

Mr. Henry asked if the Board had done all that it was empowered to do by the act.

Mr. Cunningham said as far as the Board was concerned it was a dead letter except in two cases, so that the act had not been in force this year. An officer would have to have authority to destroy and order the destruction of pests.

Mr. Hutcherson would like to see the Board put in working condition. The act was all right as far as the meaning goes. He thought the fault was in the Board. In the first place the Board had no rules or regulations, in fact, they have never had any made. They had not carried out the letter of the act at all.

Mr. Cunningham said they were not in a position to do it.

Mr. Brandrith said it appeared a rather strange way of doing business that the inspector should have to report to the Board who were selected for the

whole Province as they appeared to be. He thought it would be better to have no commissioners at all. The inspector should be under the Minister of Agriculture. He was merely supposed to report to the commissioner for the district.

Mr. Hutcherson said if the inspector had to do all the work what did they want the Board for? The Board was very necessary if they took a pride in keeping their district clean, but if they won't do anything there was no necessity for them.

Mr. Cunningham said suppose the commissioners ordered the destruction of pests in Chilliwack. The inspector should have absolute authority to order the destruction of those pests.

Mr. Cunningham thought the inspector should have more power, so that he could destroy pests wherever found, or see that it was done.

In reply to a question from the president, Mr. Cunningham said that the Board had only been partially organized.

President Harris thought that as the idea of the commission had originated with the association, that body should see to the revising of the law. He would like to see the association and Board work hand in hand in all matters to their mutual benefit.

Secretary Macgowan explained the incidents surrounding the actions of the committee of the association which led to the appointment of the board.

The matter was then left in the hands of the committee, they to suggest such a revision of the law as they saw fit.

Mr. Cunningham was called upon for his paper on "Experiences in Fruit Growing." He, however, stated that business had prevented him from completing it, and he would crave the indulgence of the association for about thirty days, so that he could get it together for submission to the secretary to be printed in the general proceedings.

T. Wilson, of Harrison River, was then asked to read his paper.

## THE FUNCTIONS OF THE LEAF.

BY THOS. WILSON, HARRISON RIVER.

At a recent meeting of the fruit growers there arose a little discussion on the leaf. There was no serious disagreement between the parties, but such as it was it gave me a subject which may give rise to a few remarks by some of the members present.

I think that the title of this paper has been misapplied as there is very little really about the leaf. Before coming to that little, however, let us glance for a moment at the sap and its ascent. As all the materials which go

to nourish and build up a plant must be either in gaseous or liquid state, nothing solid, no matter how minute its subdivision, can be taken in, it will be seen how important a part is played by the sap in the economy of plant life. This fact also, gentlemen, is important to know and remember when we consider the question of manuring. This however does not come within the scope of the present paper. From whatever source the nutritive fluid is taken into the plant from the medium in which the roots are placed it constitutes the sap. The rapidity of the ascent of the sap is at first very great, but it varies with the heat, cold, amount of moisture in the soil, and the dryness of the atmosphere. The leaves assist by evaporation in the rapidity of the ascent of the sap though they themselves, contrary to the common belief on this subject, are not organs of absorption of moisture from the air, though, if bathed in water they will by *endosmose* absorb water mechanically. However, while growing in free air, they only favor the plant in the way of moisture by arresting evaporation, and not by directly absorbing, but the more leaves there are so in proportion is the activity of the sap. A rise in temperature will also accelerate the flow. Take for instance a grape vine growing in the open air, if a shoot of this be introduced into a hot house the leaves will expand owing to the increase of temperature and the sap will immediately begin to rise as if the leaves had expanded naturally. The nutritive fluid enters the delicate cellular tissues of the roots by *endosmose*, and having entered the rootlets it commences its circulation under the name of sap. It is, in fact, only the water of the soil in the vicinity of the root with the inorganic materials there found dissolved in it. Here it describes two courses, an ascending course to the leaves where it is submitted to certain influences which fit it for the nutrition of the plant, and the descending course from the leaves in a condition fitted for that purpose.

Regarding the path of the ascent, there are two theories, one held by most of the older botanists, that sap ascends in the vessels, and the other, that the vessels are reserved for the conveyance of air, while the sap ascends through the cellular or woody tissue, and I daresay the truth lies between the two. Wood that is not over two years old conveys sap, but wood that is harder and more endurated takes less share in its conveyance.

In a paper like this, however, we must greatly curtail the description of the flow of the sap, and only mention a few of the causes which help it its flow. The principal are these: 1st, Endosmose. 2nd, Capillary attraction. 3rd, Evaporation. 4th, Waving of a tree or other plant; this has been shown by Mr. Herbert Spencer to assist mechanically in the flow of the sap by alternately compressing and relaxing the vessels. 5th, Diffusion of liquids. I daresay there are more but these are some of the chief agents.

Let us suppose that the sap has reached the leaves and it has now to undergo a certain process of elaboration. There is a process called respiration goes on in the leaf. Perhaps this is not a very correct term to apply to the

phenomenon of the plant decomposing the atmospheric air, retaining certain portions of it to build up its tissues and exhaling others by means of its leaves and green portions under the influence of light, while it performs a contrary operation in the dark—in fact, a double respiration.

The composition of the atmosphere, approximately, nitrogen 79, oxygen 20, and a small portion of carbonic acid, a compound of carbon and oxygen $C O_2$. This $C O_2$ is being continually imbibed by plants during the day and exhaled by animals, while volcanoes, the decomposition of organic matter, etc., are continually supplying it to the atmosphere. The *Stomata* or little mouths on the leaf surface and the epidermis when not too thick allow the air to enter, the young branches, scales, twigs, etc., all act like leaves, absorbing the air which ramifies through the plant, probably by means of spiral vessels and into cellular passages. This operation assists essentially in taking in $C O_2$, decomposing it under the action of light, sending out the oxygen and retaining the carbon to assist in building up the tissues. The chief agent in this process of decomposition is chlorophyll, the green coloring matter in the leaves and other parts of a plant. In darkness the plant absorbs O and gives out $C O_2$, but in smaller quantities. This $C O_2$ is derived from the combination of the O with the C of the plant. From this it will be easily understood that plants are great purifiers of the air when it is light, but at night they have a contrary effect, hence it is highly deleterous to sleep in a close place crowded with plants, as they give off this poisonous gas. The sap has now undergone certain changes in the upward course and in the leaves. From a crude liquid incapable of nourishing the plant it has by admixture with the sugar, starch, etc., in the stem, become a highly organized fluid, and by evaporation from contact with the atmosphere thick and concentrated. It is now prepared to subserve its function in the vegetable economy by nourishing the plant. To do this, however, it must descend, and it does so in a slow stream continuous with the ascending stream. The path it takes is through the cellular layer of the bark and the liber, right down to the root, forming, in fact giving birth to the *Cambium* layer, from the inner circle of which the annual layer of young wood is formed, and from the outer circle of which the bark receives its yearly increase. To demonstrate those facts let a ligature be applied round the stem of a tree and watch the result. Very soon a swelling will appear above the ligature, showing that the sap has been stopped in its downward flow, while there has been no impediment in its ascent. Sometimes the knowledge of this is taken advantage of by gardeners to increase the size of fruit, only instead of a ligature a ring of bark is taken off, (girdling the process is called), vines are very often so treated and the fruit above the girdle will ripen earlier and be of larger size than that below the wound, because the sap having ascended and been elaborated in the leaves is then prevented from leaving on account of the wound in the bark. We have not by any means exhausted the subject, but in justice to other members who have papers to read, it would not be fair to encroach on their valuable time. Some other time we may take up the subject of assimilation of nutriment.

Secretary Macgowan read a paper that he had received from J. Melhuish, of Chilliwack, who had been prevented from attending the convention, as follows :

## VARIETY OF FRUIT BEST ADAPTED FOR CANNING AND PRESERVING.

BY J. MELHUISH, CHILLIWACK.

The able and exhaustive paper read by Mr Morris at your last annual meeting, leaves little or nothing to be said under this head, but in the interests of fruit canning, I wish to remark that the success of these industries in this Province lies in a great measure with the fruit growers themselves, and a society like the one now sitting cannot impress too strongly on its members the necessity of growing only the choicest varieties of fruits. At the present time it is not so much the lack of quantity as the poorness of quality that we have to contend with. There are thousands of bearing trees scattered all over the Province, the fruit of which is utterly useless for preserving purposes. These trees should be replaced by standard varieties suitable to the climate and soil in which they are grown.

The varieties of fruit best suited for canning and most saleable on the market are the Golden and Red Egg plums, Coe's Golden Drop yellow peaches, apricots, Greengages, Bartlett pears, Royal Ann (or Napoleon Bigarreau) cherry, etc. In small fruits for jams and prsserves the strawberry stands pre-eminent, and it is a very profitable crop to grow when properly attended to. Berries with a sub-acid tendency are best for preserving. We also require large quantities of gooseberries, raspberries, red and black currants. The true English Damson is also a great favorite for preserving. Growers would do well to import the Farleigh, which is the best known variety. The so-called damson of this Province is a very inferior and semi-wild plum, it has no resemblance in flavor or preserving qualities to the excellent little plum grown in England.

Now that we have such reliable men as Messrs. E. Hutcherson, G. W. Henry, and others, from whose nurseries good, sound trees of every variety of fruit can be purchased, at a moderate price, and whose names are a sufficient guarantee of the genuiness of the trees supplied, there is no need to be any longer gulled by unscrupulous outside agents who every year stump the country with some hitherto unheard of phenomenon that is going to eclipse everything that has yet been grown in British Columbia.

An impression exists amongst some farmers and fruit growers that "anything is good enough for a cannery," but this idea should be dispelled as entirely erroneous. The cannery is a very useful factor in using up a large quantity of fruit when too ripe or in an unfit condition for shipping, but for our brands of table fruit we require the choicest varieties obtainable and as this fruit is sent to all parts of the world it is imperative that the quality should be of the highest standard of excellence. It is an acknowledged fact

that British Columbia fruit properly canned is superior in quality and flavor to that of California, and in spite of the invidious remarks made by certain eastern canners, re the success or non-success of these industries here, a few years will suffice to prove that the demand for British Columbia canned goods locally and in the Northwest Territories, will far exceed their "limited imaginations." Then our "late" competitors will be reluctantly compelled to retire to the "frozen east." But to attain this result fruit growers and canners must work hand in hand, and thus establish the fact that British Columbia has become the finest fruit-growing province in the Dominion.

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Mr. W. J. Brandrith read a paper sent in by Mr. A. C. Wilson, of New Westminster, who was unable to be present.

## LAWNS AND THEIR MANAGEMENT.

BY A. C. WILSON, NEW WESTMINSTER.

Small city lots are frequently prepared in but a superficial manner. As long as they present a good appearance to the eye and to those ladies and gentlmen who are not acquainted with the *modus operandi* of facing up, for the time being, are satisfied. The earth should be moved 18 inches, retaining the top soil for the finish, when it is found to be of a better quality than that underneath. Previous to this being done the necessity of drains will have to be considered and these should be laid down to suit each given slope. Drains for garden walks should be near the surface so that in case of a stoppage they can be easily got at. For draining other portions of the ground the depth should be from 18 to 24 inches. In forming a new lawn the soil will require a little manure with it. It should be perfectly level or an even grade as the case may be, but the former has its advantages for tennis, croquet, etc. It is presumed the ground has been dug to the given depth and well rotted, then comes the most particular point: See before the seeding that the ground is perfectly even from one given point to another, then rake after the roller and fill in any little holes you may find, as these will tell the tale in time to come if left undone. Procure the very best lawn seed obtainable. A very good way, though rather troublesome, to be sure of having the seeds grow, is to procure a load of moss, rub it through a half-inch sieve and sow this on the lawns after seeding, then roll and await results, which I am sure will be satisfactory. The best time to seed a new lawn is in the month of March, for lawns already made commence in the fall as soon as the grass ceases to grow. Get some very rotten manure—farm yard manure is best—give the lawn a liberal dressing. Then after a few days' rain break up any lumps that may remain; the rain will do the rest. In the spring rake off all sticks, stones, straw, etc., and sweep the lawn clean. As soon as the grass commences to grow mow it once a week at least; then you will have a good lawn. The oftener you cut the grass the thicker and greener it will grow and in time will speak for itself.

E. Hutcherson, of Ladner's Landing, then submitted his paper on

## HORTICULTURAL PROBLEMS,

When we speak of horticulture we refer to the process by which we arrange and classify that which we find in nature. The contemplation of nature leads the mind by natural transition from results to causes; from the known to the unknowable; from all the wealth of tree and grass, of bird and blossom, of sunshine and cloudlet, to the Creator whose wisdom has formed for us this wondrously beautiful and fertile land. Many of the grand improvements in horticulture that bless the present age might have been enjoyed a thousand years ago if man had entered and studied this field more carefully. I enter this field only as a student, but let anyone enter as the careful student and he will soon be surprised at the results.

We find ourselves confronted with problems so new that that guide of established rules or time-honored precedents affords but little assistance to their solution. But they are before us, and must be solved. Every year we hear of the failure of young peach trees to grow, and last season the complaints were unusually numerous so as to attract general attention. Since first noticing it, I have intended to attempt tracing out some of the causes, and in my travels this subject has been kept constantly in view. From close observation, I believe these failures may be traced to one or several combined causes—bad drainage, climatic conditions or the nature of the trees themselves. It is perhaps rare that under ordinary circumstances bad drainage alone will cause the death of a tree, but if it be coupled with peculiar climatic changes it will often be a most fruitful cause of death. In this connection another important point to be considered is that, owing to our peculiarly mild seasons, the resting period of our trees is of short duration. The roots of a tree once started, it is impossible to stop the rise of the sap; indeed, it is through this powerful action that the whole machine is set in motion. To understand its great importance a few words on the subject of sap circulation will be found of interest. It was once contended that the foliage or trees, by evaporation, started a sort of pumping process, from cell to cell, reaching to the roots; in fact that the part of the tree above ground instead of the root parts started the work of growing. The asmose has been made also to account for the various movements of the sap. While the latter undoubtedly plays an important part, it has been proved, and that not many years ago, that the rise of the sap was caused by a real live power in the roots forcing the flow upwards with an astonishing power. We are familar with the bleeding of vines, and have noticed the rise of sap in our trees, but that the roots exert an enormous pressure has not been known until the interesting experiments by Prof. Clark and his assistants, at the Massachusetts Agricultural College, were published. By inserting pressure gauges in the trunks of trees such as the black birch, sugar maple and others, it seems that, in the case of the black birch the pressure reached the astonishing figure of nearly 85 feet. To ascertain with certainty that the pressure was caused by the vital power of the root alone

a pressure guage was put on a root of a black birch, cut off 10 feet from the trunk, the guage being put on the root a foot under the surface. This was done on April 26th. The pressure at once became evident, and with slight fluctuations constantly rose, until the next day it reached the height of 85 feet.

I have cited the above instance to show how important a part the sap from the root must play and how important that its supply be kept up constantly. It is through these young fibrous roots, or rather through the minute root hairs upon these, that everything enters the root. If these are killed by any cause, is it any wonder that the tree receives a sudden check? and if foliage and young wood are joining, it must inevitably cause the death of the tree. Now, let us look at the condition that may exist and bring about such an effect. If, after a warm rain and consequent soaking of the ground, warm weather sets in, there is apt to be a very early start. The older roots, particularly in cold soil, which had been partially dormant, now begin to put out feeders or fibrous roots, and simultaneously the foilage is developed and growth commences. We know that all roots, as well as seeds, require a certain temperature to grow in. Let that temperature be sensibly lowered at the time of its starting and while it is very young, then decay and destruction are sure to follow. The exact temperature at which such disaster will happen depends, of course, on the nature of the tree or seed. Apples, plums and pears will naturally endure a much lower temperature than the trees of the warmer temperate zones, as apricots or peaches. Now, for the past two seasens, we have had peculiar conditions, of a nature similar to those we have just spoken of. In February, after warm, copious rains, we had a warm spell of unusually long duration. This brought forward nearly all kinds of trees, notably the apricots and peaches. Closely following upon this, in March, we had cold weather of considerable severity. Soon after I noticed the failing of our young peach trees, those of one and two years of age in particular. What happened here was simply this, I think: the young fibres which were supplying the new growth were killed or partly killed, thus causing a sudden stoppage of the sap flow and a consequent collapse. The foliage and young parts were found to have withered away on examination, and while the older roots were alive all the young fibres were dead. While I believe that nearly all the cases of dying trees which have come under my observation may be attributed to the cause mentioned above, yet there seem to be cases where it is difficult to account for the failure of the trees.

But what, will be asked, shall we do to alleviate the trouble? We may avoid badly drained land, but such climatic conditions may come as will be impossible to govern. I cut back several of my peach trees severely, and this had the desired effect. It saved the trees and they have made a good strong growth this year. This instance strengthens my theory that most of the failures of trees are due to the simple part of the decay of young fibrous roots, and planting such varieties as are better adapted to its soil. The hardiest tree

by far to plant in undrained soil, particularly if it is clay is the pear. And one of the best instances I recollect is at the Jubilee Farm, where a row of pears, cherries and peaches were planted side by side, 25 trees to each row. At the present writing there are two peaches and 13 cherries left, while the pears have all lived and are doing well.

The placing of a heavy mulch about the trees after the ground is frozen, in order to retard the growth in the spring, I believe is a fallacy. Even though a part of the roots is say a foot below the surface and is encased by frozen earth, the sap will circulate if the limbs or part of them are exposed to the warming influence of the sun or atmosphere. This is shown by the sugar and other maples. While the ground is still frozen or thawing and freezing, February's sun starts the circulation in their rigid bodies, and from every wound the sweet sap flows copiously. Another example I once saw was an out door vine trained through a small opening into a green house, where it leaved out while the roots outside were clasped in winter's icy embrace.

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T. A. Sharpe, of the Experimental Farm, Agassiz, dealt with

EXPERIMENTAL WORK.

As a large number of farmers own more or less mountain or bench land, it is desirable that we should know how such lands can be made profitable. In the spring of 1890 we planted about 100 fruit trees—peach, plum, apricot, nectarine, cherry and figs—and also a number of grape vines, on the bench lands on the Experimental Farm. For a portion of these the land was carefully prepared, by removing all timber and loose rocks, and grubbing the soil to the depth of about 18 inches before planting the trees. For the remainder we removed the trees and logs, and mowed all brush, etc., and grubbed a small plot four or five feet in diameter, took out all roots and moveable stones to a depth of about 18 inches, and in this plot planted the tree.

The first year the peaches did not make as strong growth as the same varieties planted in the valley, but sufficiently strong to show a healthy condition of the tree. The plum, apricot and cherry trees made as good growth on the bench as in the valley, and in 1891 so did the peach and nectarines, while in 1892, owing to the curl leaf not being so bad on the bench, most of the trees there made a stronger growth than those in the valley. American walnuts and chestnuts appear to do well from the start, and on the higher or steeper benches it might be well to plant these trees.

As to the two methods of preparing the ground if the planting is well done and the weeds and brush around the trees is mowed off two or three times each summer, there does not appear to be very much in favor of grubbing the whole surface, except in case of low bench lands, or those easy of access. In such cases the land, for a year or two, can be made useful in growing strawberries, green peas, early corn and potatoes. We have found an advantage of from

six to 14 days in those crops planted on benches over the same planted on the same day in the valley. We have now three orchards of apple, pear, peach, nectarine, plum and cherries, at elevations from 250 feet, the highest point on the first bench, to over 800 feet the highest point on the highest bench, and containing over 500 trees.

Drouth appears to be the chief danger feared by most people for orchards on the bench lands, but if the trees do well through the first two seasons, I think there need be no apprehension on that score, for, owing to the free character of the soil, the roots penetrate very deeply and will always find sufficient moisture in deep crevices to carry them over any drought likely to be felt in this climate. I would call your attention to the fine, mellow, loamy qualities of the soil generally found on the bench lands, and also to the earlier start of vegetation in the spring, owing to the warmer air, which is an almost certain protection from spring frosts.

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A discussion followed in which Mr. Sharpe expressed his preference for bench lands for peaches or nectarines. At the Experimental farm the difference was noticeable. The ground had a western aspect. He had not tried grapes on the level land nor had he tried the Snow apple on the benches. One could plant trees closer together on the hilly land. The trees are not more than 10 feet apart if taken on the level. The nectarines were not fruiting. A great many fruited last spring but the frost killed them. The growth of nectarines was about as strong as most peaches make on clay soil and low lands. He was of opinion that the nectarines and apricot were going to be a success. He had not the slighest doubt but that they would mature their fruit were it not for the frost.

Mr. Wilson said he had planted 150 trees upon the highest part of the planting and they were the trees that brought the earliest matured fruit last summer. They were fully a week earlier. The others had not made such a good growth.

Mr. Sharpe said they had tried table corn at the Experimental Farm and they had it a week or fourteen days before they could get it on the level land. They had strawberries seven days earlier and much finer though of the same variety.

Mr. Henry said in regard to peaches, apricots, nectarines, etc., he was of opinion that the loss was due to moisture in winter. The land is very damp all the winter though there is no water standing there. He had a row of 500 on low lying land in his nursery last winter and they were all killed, the bark being all black about a foot from the ground up, they were perfectly dead and the roots were dead. Those planted at his Hatzic nursery were all doing well He had lost apricots every time on the low land.

Mr. Cunningham said that would point out the necessity of close drainage. Mr. Henry concurred but was doubtful if that would remedy the matter.

President Harris asked the cause of bursting of bark.

Mr. Henry thought it due to too vigorous growth.

Mr. Sharp said they should be relieved by the incision of a knife, scoring them a little to increase the hard bark, say about 1/32 of an inch. The pressure should be only sufficient to make a scratch and just go round the outside. He would like to have the experience of the members of what variety of peaches had escaped the curl leaf.

President Harris asked if any one had used nitrate of soda. He had heard of it being recommended.

Mr. Sharpe had tried fresh guano but he would not like to state the results until he had tried different amounts. Next year he intended to try some grapes on some levels and then they wonld be able to do better. Cencentrated lye would kill lice on trees. It should be used in weak solution. The kind he used was an English brand "Gillett's 100° proof." He thought it was caustic potash. He recommended to use it pretty weak and applied it with a brush. In general use he would take one can to 65 gallons of water.

Mr. Cunningham asked if a fine spray would have the same effect.

Mr. Hutcherson said the branches would have to be sprayed. Wherever the lye touches it turns the moss black and washes off with rain. It will also kill the green aphis. One needs to be careful in putting it on not to splash it in one's eyes or on a cut.

Mr. Sharpe said they had no remedy as yet for canker on trees. He could not say whether it appeared most on flat land or on high sloping land.

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Mr. Sharpe read the following paper the author not being able to be present.

## DAIRYING IN BRITISH COLUMBIA.

BY H. F. PAGE, MATSQUI.

Possibly there is not any section of country in this Dominion of Canada which offers greater inducements for carrying on the dairy industry than does the valley of the lower Fraser river, British Columbia, where the humid and moist climate affords ample pasture for at least eight months of the year. All kinds of grasses yet tried, as well as roots and grains of all kinds, except Indian corn, yield far in excess of the Eastern Provinces; also here we do not

have the extreme heat and cold to contend with, and the prices to be obtained would seem to an eastern farmer simply big. But I do not think there is a section of country in the Dominion where these facilities are more abused. Not that a fair proportion of the farmers are not more or less engaged in dairying, but in such a way, barring a few enviable exceptions, that it does not yield any profit to the producer, and in many cases makes an unfavorable impression on the consumer.

I propose to deal with butter alone. I think there are none but will admit that the market for a good article of butter is far from being supplied in British Columbia. A few weeks ago I was informed by one house in this city that they had $15,000 worth of eastern imported butter on hand. I have been also informed that over $100,000 worth of butter is annually imported into British Columbia, or, at least, Vancouver alone. This should not be. We have the raw material in abundance, and this should be turned into a manufactured product and the money kept at home. It can be remedied, first, by making up our minds to the fact that a remedy is required, and then, I think, the rest is easily obtained—by first improving the quality of our cows by grading up with the very best bulls of the different dairy breeds. Do not be satisfied with a bull because he is a pure-bred; but require that his dam and grand dam, at least, on both sides, are heavy producers of dairy products.

Farmers have for some time concluded that a cayouse is not the horse for heavy farm work and have sought to improve their horses by using pure-bred sires of the different draft breeds. Still, many of the farmers are satisfied to milk cows which are on a par with a cayouse, with no attempt at any improvement. Raise your heifer calves, feed them so as to keep them in a growing and healthy condition, and breed them at 15 months old to the best bull obtainable always keeping the object sought in view for a few generations with liberal feed, and we will have cows that will treble the average product of today. The average of New York state was a few years ago only 3,000 lbs. of milk per cow in a year, while in that state there are a number of herds that average 6,000 to 16,000 lbs. What must it be in British Columbia where cows are only milked, I think I can safely say in most cases, not more than six months of the year. I think there are cases enough in British Columbia, which are known to many, to demonstrate that dairying has been made profitable. Such a thing as failure in the dairy business is scarcely known.

Grain growing seems to have lost many of its charms, since the advent of the Northwest product, which can be put upon the market cheaper than we can produce it. With butter, this is not the case; the market demands a fresh made article, which cannot be obtained except at or near the place of consumption. It might be said that the market is limited, and if everybody went into dairying the market would be overstocked. I will venture to say that if a first-class article was made, the present population would double the amount consumed, but if a surplus should occur, China offers a market at prices

that should be satisfactory to all. Possibly few have ever considered that the amount of feed required to make a pound of beef will make a pound of butter, the former being worth eight cents and the latter 30 cents; while the skim milk and butter milk will pay for the labor.

Again, butter dairying does not impoverish the soil, by consuming on the farm the by-products, for all that is of manurial value is returned to the land. I think winter dairying offers the greatest inducements of all practices. It distributes the work of the farm more evenly, puts your product on the market at a season when the supply is always short, and cows calving in the fall and well fed during the winter will yield a larger product annually than when calving in the spring. To carry on dairying successfully, a silo is necessary, but where clover grows to the extent of three to five tons per acre, and roots yield from 30 tons of carrots to 50 of Swedes and mangolds per acre, as they do in British Columbia, and even greater yields than these have been reliably reported, the silo can be dispensed with to a great extent.

The farmers should turn their attention more to dairying and study their business thoroughly, not only how to produce a good article at the least possible cost, but also the requirements of their customers, by studying their whims, if such, in some cases, they have. Do not get your back up if you are told that your butter is not A1, but find out the fault and endeavor to remedy it. Remember that all are liable to mistakes sometimes. If farmers attend to this, I venture to say that in a very few years many of the thousands of dollars now sent south and east for butter will find its way into the pocokets of the farmers of the lower Fraser valley.

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Mr. Sharpe said that he thoroughly endorsed what Mr. Page had said. If a man had a fondness for a certain breed of cattle, he should stick to it.

Mr. Sharpe said in reply to a question that the breeding when fifteen months old depended a great deal on the man who cared for the cattle and whether he ever let his beast lie down hungry.

Messrs. White and Harris thought that an eight months grazing would be a little overdone.

Mr. Hutcherson said there would be two months that the cattle would be brought in at nights. Three years out of five the cattle are turned out in March.

Mr. Harris said he had seen a growth of 6 or 8 inches high in March. He had made a pound of cheese from six pounds of milk.

Mr. Henry said cattle could stay out on a reserved piece of good grass land till snow came.

The President said that coxcomb was one of the longest growing grasses we have. There was no question about the dairying industry being a profitable one. Wherever you could get 200 cows it would be well to start a creamery at the present prices of butter.

Mr Cunningham thought one could not do better than to feed cattle in the barn on silo.

Mr. Hutcherson said he fed a milk cow on silo altogether off a piece of clover, but he did not know how it would work on a large scale.

Mr. Sharpe said in reference to silo and siloing a great deal depended on conditions. If a man has a small area of land he could do better by siloing. In this Province where a good many of the farms are restricted in area it would be the best plan. He would make up a great deal of the expense in manure, and the indirect increase in products of the land, if it were carefully saved. A great many farmers overlooked the fact that the best part of the manure is the liquid manure. He thought that in this climate it would be quite an object to collect the liquids with dry straw, etc.

Mr. Austin stated the beneficial results he had using dry moss to soak up liquid manure. He used it on gravelly land with subsoil and it produced very good hay.

President Harris said dairying was not carried on with system in B.C. It had made immense strides in the East. The first Dairymen's Association was begun in '66 or '67. One could scarcely believe the strides that industry has taken in those counties where it is carried on. A statement of the Minister of Agriculture showed that in 1868 Canada shipped butter and cheese amounting to about 600,000 lbs. Last year the value was £106,000 chiefly cheese.

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As W. Shannon, of this City, was unable to be present, W. H. Whibley kindly read a paper from that gentleman dealing with—

## HOP CULTURE IN BRITISH COLUMBIA.

In submitting this paper to you I am sure that you will concede that the subject, at least, is of great interest to us all as British Columbians. When we consider that about half of the hops produced in the United States of America come from the three western states, Washington, Oregon and California; and when we consider also that the conditions of our soil and climate are similar, if not superior, to those of our neighbors on the Pacific slope, it is very desirable for us to estimate our opportunities for producing the commodity which has yielded so much profit to the growers on the other side. It is not

only in this Province that the inception and progress of the hop industry is watched with interest—our friends "over the line" are aware of the fact that we are entering into friendly rivalry with them—but the possibilities of successful culture of the hop in this Province have called forth several important enquiries from the Old Country, evidence of which I shall show later on.

I will first of all give some particulars of the plant which is the subject of this paper, and, if I am merely repeating what is known to the majority of you, I trust you will bear with me for the benefit of others who are not so familiar with the facts. The hop, then, grows in a manner different from most plants, inasmuch as the male and female flowers are produced on separate and distinct vines. The appearance of the male flower is green in color, and about the size and somewhat resembling the wild currant blossom of this country. The function of the male is to fertilize with its pollen the female flowers, but further than this, it appears to give weight and quality to the female flower, as well as to furnish the latter with that property called "lupuline," which constitutes the chief value of the marketable hop; indeed, it is held by good authorities that this same lupuline is merely the unappropriated pollen, which has alighted on the scales of the female. It is therefore perfectly clear that a certain number of male plants are necessary in the hop grounds to fulfil the purposes mentioned. Opinions differ as to the number desirable, about 1 in 100 of the male plants in proportion to the female being considered ample by the Sound growers. It is a good plan to plant a certain number of male plants on the outside rows, especially in the face of the prevailing wind, so that the pollen may be blown and distributed over the females A stake should be driven deeply to mark the male plants on the hop ground and to keep them distinct. The female hop is the hop of commerce and requires no description, as it is well known to you all.

Soil.—In hop culture the first condition to be attended to is that the soil be of a suitable character. Hops will flourish in a great variety of soil, other conditions being favorable, but the ideal soil is a rich, deep, alluvial bottom land. The botanical name of the hop plant indicates "fresh earth," the hop growing only in rich soils. A mixture of clay with the loam, or a clay sub-soil, will not be amiss, but land should be chosen which is either naturally drained or can be readily drained artificially. Next in order is the selection of a proper site for the hop ground, since climate and exposure exert much influence.

Protection from the wind, especially those winds prevailing at the flowering season, is one of the principal considerations. A valley protected by hill lands from the cold or violent winds, the land sloping slightly so that it may drain easily, should be our first and best choice. On hill tops the climate is generally too cold, and the produce comparatively small, though free from blight and mildew. Flat, low-lying lands, though generally of high quality in respect of soil, more productive and less exposed to wind, are more subject to blight than the higher situations, and offer less facilities for drainage. The

class of site first named is, therefore, the best, as offering facilities for drainage, protection from wind, and a fair amount of sun.

The variety of hop to be grown is also a matter calling for special attention, inasmuch as the coarser kinds may be cultured where the finer may not. If the soil is deep and rich and climatic conditions favorable, the East Kent Goldings, or the Farnham, or Canterbury Whitebines should be selected, as being of a high grade and commanding the best prices. But they are the deepest rooted and require deep loamy soils, so deep as to have practically no subsoil for the roots to reach, or, if having a subsoil, it should be of a pervious rubbly character, so that the land may drain easily and the deep-growing roots not rest in water. Mr. Sich, of Agassiz, has made some successful experiments with Sonoma Valleys, and I will refer to his results hereafter. This variety may be particularly suitable for the low-lying valleys.

The site having been chosen and the variety to be grown determined, the preparation of the ground is next to be attended to. The object to be attained is that the soil should be deeply tilled and "cultivated," that it should be in high condition in a finely divided state, and free from any stagnant or surplus water. The last condition is that which demands our first attention, deep and thorough drainage where the land is wet must be secured, or all others may be rendered entirely nugatory. The class of soils usually selected on account of their depth and porous substrata for hop grounds should possess a natural drainage, and should rarely need artificial aid. Those lying on alluvial bottoms, in valleys and along the course of rivers generally admit of drainage —where drainage is necessary—being carried sufficiently below the surface to allow of a good deep soil for the roots to feed on above the water level. As a matter of experience certain of the soil in the Puyallup Valley, a rich alluvial deposit, is known to be over 100 feet deep, and as there is, therefore, practically no sub-soil there, the hop-roots penetrate deep into the soil and to moisture, which they desire, but they abhor wet lands. Such hop roots would be abundant at four feet deep and even at a greater depth. There is no doubt that we have similar soil here in this Province to that of Puyallup. Some of ours is the best in the world, new, rich and deep; and this, coupled with a favorable climate and care in culture, should place us in a position to produce the heaviest crops and the finest qualities at a cheaper rate than are produced in the older hop-growing districts.

After drainage is secured, the deep tillage necessary has to be effected, this with the object of preventing the sub-soil, if not at a great depth, clay or what not, becoming hardened and impervious to the roots. In plowing and sub-soiling the furrow should be 12 inches deep, and the subsoil plough following takes a depth of six inches more. E. Meeker, the well known grower of Puyallup, states that he has had the best for a first year's crop in planting on sod land. He says take a 14-inch plow and turn a light furrow of sod; then follow in the bottom of this with a 12-inch plow, as deep as the plow can be made to run. This should be done not later than February, but better earlier

The sod thus turned soon decays and furnishes good manure to the crop. As much as a ton to the acre has been raised the first year from such land, with good roots, liberally planted.

PLANTING.—The ground being properly prepared, the next step is to set out the poles before planting the slips or cuttings. After marking out the rows each way, usually in squares seven feet apart, giving 888 hills to the acre, and setting the poles, the planting begins. One pole to the hill is now considered sufficient in this country. Two roots on strong land, and three on land not so strong, should, in the first year, be planted to each hill, about one foot apart, with the pole in the centre, and with good fortune the first crop should in this country produce some marketable return. Cultivation or, as in England, hand grubbing with a nidgett, must be resorted to early, often, deep and thorough, in order to aerate the land and remove weeds from the growing crop. The horse cultivator, as is generally employed in this country, should be discontinued when the bloom appears, for if continued beyond this time heavier crops may follow, but they will be later, off in color, and more "chaffy," owing to the excess in foliage.

Cultivation should be as level as possible. We do not now hill up hop-plants as formerly. And when spraying is to follow, the clodmasher should be run before the sprayer to secure a level surface, otherwise the sprayer to jets will "miss fire" in many places, leaving the lice unattacked. Simultaneously with the cultivation the training requires the most constant vigilance, first to see that the pole is stocked with the requisite number of vines, and after the first year to fight down the excess always ready to take to the poles. With new yards all the vines are allowed to go up the poles that start early enough to bear a crop, but with the old yards the case is different. The first move then is to prune the plants early. All "runners" should be removed and the crown of the plant cut back where growing above the surface. Care must, however, be taken not to cut too near the last or lowest buds or "eyes." Whilst pruning, all weeds and grass should be cleared from the hill, and the ground around for about 15 inches from the centre of the hill stirred up with a four-pronged hoe.

TRAINING THE VINE.—After the first year, when three or four vines may be trained to the pole, the tendency is to reduce the number. Two vines, or at most three, are usually quite enough in consequent years. Though in England the practice still appears to prevail of having poles 16 or 18 feet long, the experience of this country shows that poles 9½ feet are long enough, and these planted firmly two feet deep. They are cheaper than the longer poles and when the yard is stringed as is now recommended, at a height of seven feet above the ground, they are of sufficient length. The poles should be set before planting and never taken up. Tying the vines to the poles is usually done with ravellings of coarse burlap, or cotton twine. The tying must not be too tight, nor the vines when winding round the pole is done too taut, otherwise the tender vine will be bruised or broken. "Squat hills," when the

vine slips down from weight of growth later in the season, require attention and must be propped up or the lower growth will be spoiled.

HOP DISEASES.—Most, if not all, the growers in this Province have hitherto taken "God's luck" as an incursion of disease, with the result that it is reported that all the grounds have been infested with lice to the great detriment of last year's crop. I learn that E. B. Bushell, who was last fall instructed by the Government to visit the known yards of the Province, reported disease in every one, and so serious that the contemplated display of British Columbia hops at the World's Fair was abandoned, though the Government was willing to give facilities for such display. Our hop-growers are, I believe, now thoroughly alive to the fact that the outlay and labor required to fight the hop disease will be amply repaid by heavier and better crops.

So far as I can learn the only disease of serious import to us at present is the hop-louse, or fly, and this and its method of attack are so well described and figured in the last annual report of your Society (page 91) that it is unnecessary for me to repeat such description. Various remedies have been suggested. In England they have tried a solution of tobacco leaf, even the artificial introduction of the "lady-bird," which is destructive to the fly, has been proposed. Formulae are given in the article contributed to your Society before mentioned, and some of these are the same practically as are recommended by Mr. Meeker. As the mode of making, cost, etc., of the emulsion, solution of quassia chips with whale-oil soap, given by Mr. Meeker, are somewhat lengthy, and as they are fully detailed in his hand-book, a copy of which is at the disposal of the members, I do not propose to furnish them now.

I may say that Mr. Bushell, who, I understand, has had practical experience of hop-growing in England and elsewhere, was sent at the instance of the Provincial Government to interview Mr. Meeker and to examine the process. He reported that it appeared in every way successful and accomplished what was claimed for it. I conclude, therefore, that Mr. Meeker's method of attacking the disease, by means of the quassia-whale-oil-soap emulsion, distributed by the roller sprayer, is the cheapest and most effective known to us. To his hand-book I refer the British Columbia grower as furnishing the latter with all requisite knowledge on spraying, as well as much other terse and useful information on hop culture.

The limits of my paper are nearly reached, for I proposed merely to deal with hop culture, and I fear I have been only able to do this in a sketchy manner. I cannot profess to be an expert, but I have collected some information and the result of various experiments made in this country, which may contribute something to the general store of knowledge which we must, as practical growers build up by degrees. The questions, when to pick, how to pick, drying, baling and packing must be reserved for another time and another hand. In the meantime, there are doubtless members of this society who can give us some particulars on these topics, and there are fortunately some good

books and pamphlets dealing with them. I would like, however, before closing to ask the question, "is the cultivation of hops in British Columbia, under proper conditions, likely to be successful and profitable?" and to give some reasons for my answer. To that question I would reply, most emphatically, "Yes," provided we are willing by our own care and industry to avail ourselves of the advantages with which nature has so bountifully furnished us.

It is well known that in certain parts of England (the home of the hop), the culture of that plant is the staple agricultural industry, and so profitable has it been at certain times, that in certain years the tenant farmer has been enabled to make sufficient money from his crop to purchase the freehold of his grounds, and that at a price which out here would make us stand aghast. The cost of raising a crop in England is, however, considerable higher per acre than in this country, whilst the produce per acre is much less. Not only is the item for rent, or interest, larger there, but much more manuring is required than on our virgin soils; poles, too, are more expensive there than here. The variety of diseases attacking the plant are more numerous, whilst with our labor-saving appliances we can doubtless compete successfully with the cheaper labor of the Old Country.

Here is an approximation of the average cost of raising hops in a well-chosen British Columbia hop ground, per acre: First cost, plants, $20; interest on same at 10 per cent., $2, the plants being practically perpetual; poles delivered, $20; interest and depreciation thereon, $3; rent or interest on land, $12; taxes, fertilizers, etc., $8; labor, teaming, picking, etc., say $80; spraying and materials, $20; interest and depreciation on hop house, machinery and utensils, $50; total $175. This, as far as can be ascertained, is a fair annual average cost of cultivating an acre, spread over a series of years. The return at a moderate compensation would yield, say 1,500 lbs. per acre, at say 25 cents, per lb., equal to 375, or $200 per acre profit. Of course the expenditure the first year would be heavier than in subsequent years, and the yield far less; but the fairest way to make our calculations is to assume that the hop ranche will work continuously and to distribute costs over several years.

In the first year of planting the hops, little, if any, harm is done by growing between the rows such vegetables as potatoes, carrots, peas, or the like, thereby increasing the income from the soil. The outlay, as given by Prof Wilson, of Edinburgh, on an acre of hops in the Old Country amounts to £55 or $220 for each of the first two years, with a very trifling return in crop. The cost of subsequent years is stated by him to be close on $200 per acre, while the proportionate yield is equal in England, on an average, to not more, probably less, than two-thirds the weight from our lands. The experience of the Eastern States of America in regard to production is very similar to that of England, but rent and taxes would be less in the former case.

The acreage under hops in England is between 50,000 and 60,000 and not increasing; in the states it is about the same. There is, therefore, little or no

fear of over production at this end of the world, considering the magnitude of the markets. English hops have up to the present, on the whole, fetched somewhat higher prices, and we have to allow a trifling sum per lb. for freight, shrinkage. etc., but the item would be so inconsiderable as not to affect our main calculations. I think that we can safely conclude that we have in our highly productive soil, in our lower price of land, in our comparative immunity from hop disease, every advantage over our English and Eastern competitors.

I must apologise for occupying so much of the time of this interesting meeting, but before closing I would like to read you a letter from Messrs. Sich, Lane & Co., of Agassiz, which appeared in the widely circulated paper in England called *Land and Water*.

December 10th.

"Your valued paper of October 22nd has just reached us, and we are much interested in the letters of your correspondents Cumtax and a Farmer on hop growing and farming in British Columbia. As they remark, few have so far experimented in hops, but we predict that before long this country will produce hops second to none in the world, We started by putting in 20 acres this spring ('92) of East Kent Goldings. They did wonderfully well, being all we could desire in color, size and quality, but being the first year the yield was not sufficient to pick. We also put in some Sonoma Valleys (tiny slips) as late as May and to our surprise we averaged 500 lbs. to the acre, a sample of which we beg to send you as we believe this to be the first sample of British Columbia hops ever sent to England."

In the issue of 24th December last, *Land and Water* inserted the following reply:

We forwarded the sample of hops sent us by Messrs Sich, Lane & Co., of Agassiz, B.C., to the eminent brewers, Messrs. Peter Walker & Co., Limited, and a member of the firm kindly sent us the following report thereon: 'I have examined the British Columbia hops carefully and have compared them with Americans, Californians and Pacific. They are a good color, have a very delicate aroma, and have been very well managed. The only fault that I could find is that they are rather small, but no doubt experience would soon enable the growers to show an improvement in this respect. I should like very much to try them in one or two trial brews.'"

This I think must be satisfactory to us as British Columbians, as indicating the good name for our hops that is likely to be shortly attained in the greatest market in the world for them. I am myself somewhat of an experimentalist in hop-growing and this is my excuse for coming before you to-night Less than a year ago a small company was formed, under the name of the Squamish Valley Hop Raising Co., of which I am now the president. We were so assured of the future prospects of hop-raising here that we decided to embark in the business. The land we were fortunate to secure fulfils all the

conditions laid down, both as to soil and site. The soil, rich and loamy, has a depth below which we have not reached—it must be many feet. Sloping gently towards the south, and protected at the back from the northerly or Squamish winds by a considerable eminence, it has every facility of drainage by the neighboring river. It cost us about $100 per acre to clear and stump and last year, being the first of our experiment and the season so advanced when we commenced work, we were able to experiment with only two or three acres. The grounds are under the care and supervision of an experienced, practical man from Puyallup, who has given his opinion that he has seen no better soil or site in that far-famed valley. The small crop raised was of course not large enough for marketing, but the sample was most satisfactory, and has been pronounced by experts to be excellent in quality, color and condition. The lice apparently did not injure the hops, but we propose to be in readiness to attack them, should they show any signs of approaching this coming season. I shall be surprised if on our present acreage we do not harvest 15 or 1,600 lbs. to the acre, judging from last year's appearances, and as we push forward further clearances in the coming years, we hope to have several hundred acres producing heavy crops. I mention these circumstances to indicate what I believe may be done, and also as some evidence of the confidence which I and my friends have in the future prospects of hop-culture in this Province. If in what I have said I have directed attention to an industry which I hold will have a most important bearing on our future progress from an agricultural point of view, and if I have contributed anything in information to those of you who have already embarked in the business, I shall feel that this paper has not been wholly in vain, and your time I trust not altogether wasted.

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Mr. Hutcherson stated that he hoped that the members would not all rush home and plant hops. He had been in all the yards this year, with the exception of the Squamish, and they were all affected with lice. It was something tremendous the carelessness exhibited by the hop men. The fruit growers were no place alongside them. They did not seem to care a cent. With the exception of Okanagan Mission, the lice were just pouring off the hops. He thought, at Okanagan Mission the hops must have got the better of them. The yield must have been a thousand pounds to the acre. He was at Mr. Broe's ranch. They were the only ones who seemed to be fighting them. His crop was alive with them. He had seven men spraying the vines, and he was fighting them in good shape. At Sich's they did not know their vines were affected till he told them. At Chilliwhack they had one-third of the yard to pick, and it was pretty bad there too. A great many things which Mr. Shannon said were true, but growers must make up their minds to fight the green aphis. There were different kinds of sprayers and they were being continually improved. If a man would fight the aphis there would be lots of money in hops. One gentleman gave his yield at 1,200 lbs. per acre per year, and they were attacked by the lice. In spite of this he informed him he got

27 cents per lb. If these precautions were taken a good yield could be secured and at pretty remunerative prices. He took no precautions at all. At one yard he would think they had fully a ton to the acre and indeed at the Denville a ton and a half; they grew away up and hung in big clusters and at first you could not see the hops for the aphis. He was the only man that was spraying his hops. He believed he used a roller sprayer. He could not see how it would work and be successful.

Mr. Wibley said one must go over the work of spraying by hand also it required about eight or ten sprays.

Secretary Macgowan exhibited some cuttings from currant bushes, affected by the borer, accompanied by a short note from M. J. Henry of this city, which was as follows: The cuttings handed you and infected with the white grub, or currant borer, were cut from Black Naples and Moore's Ruby, which were on my place when I bought it, and which are claimed to have been brought out from the Fonthill Nurseries, Ont. At present about one-tenth of all new wood is affected, including cherry and Versailles currants, and also gooseberries. I find from one to three grubs in each stalk, and the only remedy I can find is to cut them off and burn the wood. Do any of the members know of any remedy or preventative? In regard to insect pests, what are you going to do about destroying the apple-tree worm or tent caterpillar, which infest the wild crab, which are literally covered with these pests on Sea and Lulu Islands, in the month of June, so much so as to clean the foliage entirely off the trees?

Following upon this the members decided that though by no means a new pest, the only way to get rid of it was to cut off the affected parts of the bushes and burn them.

The meeting adjourned till following morning.

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MORNING SESSION.

Mr. Schou then spoke on the subject of "Small Holdings." He apologised for not preparing an elaborate paper but would throw out a few points which he had noticed. Unlike the majority of the members he was not a practical farmer although he had begun to work up a small fruit farm. He had observed very closely the conditions under which large and small holding were needed and had formed a very decided conclusion. It might be a very wrong one but he saw no reason to doubt the conclusion arrived at. His first view was that if we are to have any large development of mixed farming it is absolutely necessary that the average size of holding be considerably reduced. He referred to the present system by which a man holds about 160 acres one-fourth of which is only cultivated. It was doing a great deal to retard the general progress of the Province at large. Everywhere you find even in the

most favored districts that justice is not being done to the land. It is not the fault of the occupiers but the natural circumstances, difficulty of clearing and cost of cultivation. Most of them were not able to employ a large amount of labor and it was doubtful if they could clear very large areas. He would have his remarks applied to that class of land which occupies a very large portion of the Province. He was not speaking of the prairies where larger areas were capable of cultivation. He referred to the system of Government grant of a quarter section as pre-empted in the wooded districts of the country. If instead of 160 acres the allottment were 80 or 40 acres a much larger area of land would be capable of clearing and more headway would be made. Now, you have a few men scattered all over the country unable to co-operate. In many instances a grant of 160 acres would be less advantageous than half of the quantity with a neighbor ready to co-operate with him. With smaller grants the work of clearing would be proceeded with much more rapidly. He was of opinion that a 40-acre farm would be more than sufficient for the fruit growers of the Province, or even for mixed farming. He thought certainly that seven out of eight who would enter upon that kind of farming would clear a good living out of 40 acres. In an admirable report by Prof. Robertson of the Experimental Farm, Ottawa, that on 40 acres of land by varying crops, they were able to keep twenty-five cows. This is very much larger than five out of six of those who are in the dairy-farming at present can do. An excellent case can be made out for a man to show that he can make an ample living out of 40 acres devoted to mixed farming particularly, provided if the situation is good and land rich. If near a market it is then granted that it should be the policy of the owner to hold it but the policy of the average man should be to have only 40 or 50 acres. Many hold on to their land from year to year hoping to gain some portion of the unearned increment. Prosperous men were no exception and you would find men holding on year after year not merely to 160 acres but often to 300, 400, 500 and 600 acres, so encumbered as to mortgage them heavily thus burdening themselves and in many instances paving the way for a complete break up. One would be amazed to go into one of the agency offices of these land investment companies not 100 miles from this town which has the district maps of the country hung up, and that map is dotted all over showing that farm after farm is mortgaged, some to such an extent it would be very difficult if the interest were to fall in arrears to realize very much on them. Not even the amount advanced for interest.

Many of those who have mortgaged their land are able to dispose of part on as reasonable terms as they will get in the hands of the mortgage companies provided they are not mortgaged to such an extent that they lose ownership altogether. The question of the increase of farm mortgages is going to be a very serious one, indeed, unless the occupiers take time by the forelock and contract their holdings. He believed that this tendency to mortgage was driving many of our small cultivators into almost bankruptcy Thus a man went on year by year and many of them give up the struggle leaving the Province, and certainly in such instances they were apt to give a very bad

name to B.C. and its prospects. This tendency to cultivate a very large holding was keeping the Province back. If an association such as this were to endorse such a policy to the hundreds and thousands of men who take up land in this Province; if men knew that this association advised them to contract their land to 25 to 50 acres he thought a great deal of good would be done. Even if these men took up a 160-acre holding as they probably would they could from time to time dispose of by sale the superfluous portion of it which they were unable to manage.

Another idea which had occurred to him was, how may the change be brought about, and one which was certainly within the range of practical business application. A great field was open in the Province for land improvement companies ready to gain a substantial dividend and ready to give fair play to investors. In many parts of the Province where land could be improved a large holding could be divided in 10 to 40-acre blocks and sold to responsible men, the value of the land being repaid by instalments spread over from 10 to 15 years. Land investment companies could clear for themselves at least 8 per cent. on the capital invested and 10 per cent. on the repayment of the loans. He knew that in England land companies working on farms could get all the capital they wanted. In this Province, by similar methods, provided there were capable management, it would be easy to obtain 10 per cent. Each year the payments would reduce the total sum due to the company and they could be so arranged so as not to burden the farmer. In England he knew the British capitalists were advancing the whole purchase money of farms to tenants and allowed them to repay the money and interest by instalments. The result was the tenants in a short time became the owners. If a thrifty farmer were aware he would have a little time to pay for his holding, he thought that many a man who turns away from the task of clearing the forest would make the best of the opportunity ready at his hand. At present the man who goes into the forest district has in many cases to go out to work because of his inability to provide the necessaries of life on his own place.

Now, here, he thought, was a splendid opportunity for property companies. At first the suggestion occurred to him—he hardly liked to put it as one which is absolutely capable of being carried into effect, because he knew of the monetary difficulties in the way of the Finance Minister—but would it not be possible for the Provincial Government, in some way, to advance to settlers, on reasonable terms, by, say instalments, on a certain amount of improvements affected on their holdings. The West Australian Government were offering to settlers tracts of land conveniently near to growing towns and in many respects valuable tracts, on very easy terms. They were practically given to the settler. To begin with, the payments were nominal. When he had erected his house and made improvements on the property, the Australian Government lends him one half the amount, equivalent to $500 of our money, and while he is working on his holding improving it he is able to get advances.

from the Government. It seemed to him that these points would afford matter for discussion profitably, and that the great problem in connection with the agricultural circumstances of the Province is to increase the small holdings and at the same time to diminish the mortgages on the farmers' premises.

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Mr. Okell said he had many enquiries from people in England asking if they came along with capital, say £500 to £1,000, would they be able to maintain themselves and families. They said again and again the agricultural outlook was very dark in England. They had to pay $3, $4 and $5 per acre for their land and also taxes. They had enquired the cost of land here and when told the price to an Englishman it seemed fabulous. He was sure some of the best farmers in England would come along with capital and encourage their sons to come if the price of land were not so high. The English farmers would come out here if an opportunity to better themselves were offered them.

Mr. Henry said it was not a question he had thought a great deal about. We have not been in the habit of renting land in this Province until within the last three or four years. He was renting a small place himself. In England they pay as high as £4 or $20 for land. He was paying $10 an acre for agricultural farming land, and he knew of farmers who were paying for 160 acres of land as high as $900 to $1,000. This meant hard work, and the land was falling back upon the owners as they could not make it pay. He had seen men try to figure it out that you could make it pay by raising cattle. It may be done by some system of siloing, but to graze cattle, he could not see how it could be done, There were a great many things in Mr. Schou's paper that he thought affected the Province at the present time. He thought a man could pay a pretty good price for land if it is adapted for a certain class of farming. A man from England would meet with many difficulties. He must have experience in the country before he could put himself right for the work. It would all cost money and he knew it.

Mr. Cunningham said he had revolved many of the points in Mr. Schou's paper in his own mind and in many things he was on the right track. Fault was found with the high prices of partially improved land, but if any man would figure out the cost of clearing and bringing into a state of cultivation a few acres of bush farm land he doubted very much, when he came to sell it, whether he would obtain reasonable daily wages. The suggestion offered by Mr. Schou of creating companies to clear large tracts of land was worth consideration. If capital could be obtained very easily and at lower rates and the interest fixed at a reasonable living rate, he thought a man could be accommodated and do a great deal of good, in buying a small farm in small instalments. Money was in great demand. Hundreds of enterprises could pay a dividend if capital were available. He was glad to know that one company was doing a great deal that way in reclaiming Pitt River Meadows, who were offering the land at a reasonably cheap rate. He thought the prices obtained

at the sale the other day reasonably cheap compared with the cost of clearing bush land. We labor under many disadvantages as compared with Manitoba. A poor man in Manitoba can take his plow and start to cultivate the soil. We could not do that here. It takes time to start well. We might find fault with those who have taken up a quarter section for not selling, but they were often laboring under serious embarrassment and absolute poverty, but it should not be done when we consider that they would hardly obtain daily wages for their labor. Such was the practical experience of many of the bush farmers of this country.

Mr. Henry agreed with the speaker, too, in regard to dividing into small holdings. Land could not be sold cheaply if we consider the cost of putting it into improved condition, clearing off stumps, etc. The very fact of it being so expensive showed the importance of having a small holding. Very few men could take up a large tract of land in the natural condition. He did not think this a grain growing country. The location had a great deal to do with the high price of land. He had taken a field of land and the amount he got from an acre was really wonderful. Such a piece was very valuable. But throughout the country generally a man must look at favorable situation, and the natural advantages the land possesses for their business.

Mr. Okell asked the value of an acre of cleared land.

Mr. Cunningham replied that depended on what the clearing cost. It could not be answered definitely. He had cleared land that had cost $200 an acre to clear but he doubted if he could get that for it if he sold it. He knew of a farm sold not long ago and when the bill for clearing, which was kept, was reckoned up it did not pay him ten cents a day for his labor and grub. The owner had barely made a living on his farm. He knew this was a fact and this man had often to work out. When we find fault with poor fellows who have endured privation and suffering, we ought to consider the other side of the question too. In Manitoba oats often sold at 12½ to 17 cents, we could not begin to do that here. We could not raise wheat at 40 cents. The best we can do is to raise roots and feed stock and make butter. Stop the sending out of capital for importation of butter. Confine ourselves to dairying and fruit growing and sheep culture and that will be the only solution of the problem. There is not a dollar in grain-growing. We have to much scrub farming. We must improve the stock and do better farming on the land we have cleared.

Mr. Austin said that he began working about three-and-a-half miles from Port Moody from New Westminster and tried an experiment in spending money clearing land. He now endeavored to get the land into pasture. The land could be cleared for pasture for about $36 to $50 per acre. The land which seemed to be poor responded very readily to the application of manure and gave good returns. Siloing and feeding green food will not be attempted till the country is cleared more. One place, about six or seven acres, was very mossy. This moss was mixed with manure and it had a good effect on gravelly

land. He had planted it around trees and found it kept the moisture well. He would prefer the moss as it absorbed the moisture.

Mr. Butchart submitted the following table of yield of five varieties of apples.

Maiden Blush—yielded 1 1/9 of a box to the tree. He considered this year a failure with him. He received $1.75 per box, making $1.94½ to the tree.

Golden Russet—5/9 of box to the tree, at $1.25. making 97½ cents to the tree.

Ben Davis—2/9 of a box at $1.50, making 38 8/9 per tree.

Wealthy—3/18 of a box at $1.75 per box, 29 1/9 cents to a tree.

Haas—1/9 of a box at $1.50 = 19 4/9 cents to a tree. Sold in Vancouver market less 10 per cent. commission.

The trees were six years old ; they were planted 23 feet apart. This land was cleared 10 years ago and cost him $50 per acre to clear. He planted the trees without taking the stumps off and let them grow for a year or two. Thus they were growing while the timber was being taken off. He next took off the stumps, that cost him $400 per acre. He thought that he could take an acre of stumps off at $400 per acre and get his money back in three or four years. He planted both large and small fruits. He would not do it on poor land. He would pick out his land. He, of course, meant three or four years from the time they began bearing.

He thought it better to leave the stumps in as when taken out of the hard-pan the holes filled up with water and soured the land. This was his neighbor's experience. His soil was sandy loam with some rocks in it but not gravelly. He did not think the hard-pan held the water on his place as he had natural drainage. The soil was 18 to 22 inches deep. Land of that kind if perfectly level would require drainage.

Mr. White said he did not think any one should complain about paying $150 per acre for land when cleared and improved. The English farmer would have to pay five, ten or twenty times that for a freehold place, and should not complain about $150. It was worth it and no one could clear land for less.

Mr. Hutcherson said that if one put a few hundred acres in strawberries, what could be done with them? There would not be a market for all the product. Could a man pay so high a price for land? The $150 per acre was only one part of the expense. A man has to buy trees, stock his dairy, etc.

Mr. Henry enquired the value of the growth of a tree per year.

Mr. Hutcherson considered a Bartlett pear orchard was worth three times as much as apples. If a tree is planted out and growing for a year, he would

value that tree at $1.00, and at $10.00 at ten years old. He considered it would pay good interest on that amount over and above all expenses. Last year he advocated not overdoing the planting of strawberries. They should make arrangements to have fruit shipped in car lots. If fruit culture were encouraged and no market provided there was going to be a loss. The time was in the East when all the apples that were wanted could be gathered for the taking of them away. This was changed now simply by making a market in England.

Mr. Okell had gone into this matter. $15,000 to $20,000 worth of jam alone comes into to Victoria every year and is distributed by the wholesale houses throughout the Province. The greater part of this came from Eastern Canada; the rest comes from London, England, and other places. His firm had submitted samples to the Hudson's Bay Co. and they were pronounced equal to Crosse & Blackwell's, and they had given them an order for $3,000 worth, and they intended putting out four times the amount they had done in the past. That meant a great deal of fruit. the markets of the world were opening up to B. C. fruit and there was a very bright prospect before the growers. The fruit in demand was Bartlett pears, peaches and apricots. They were making an apricot preserve for which there was great demand and if B. C. could not grow them they would have to go elsewhere, but he would like to get them in B. C.

Mr. Hutcherson said Mr. Okell had not answered what he was trying to get at. In the first place there was not a suitable location for peaches and apricots. There may be such places, and if so, if planted, could we handle the fruit grown? Take strawberries for example. If three or four or ten men were to combine they could make more money by loading a car and shipping to Winnipeg, but at the present time he had to depend on the canneries and local markets. If shipped to town the market would be glutted in a few days. It was merely a question of the combination of fruit growers.

Mr. Henry thought that at present we had not enough fruit to ship outside of B.C. Until we really have the fruit to offer we cannot get the market. There will be no difficulty about the market if we have the fruit.

Mr. Cunningham thought it would be well to be careful on this point. If he had erred in the past it was in taking a rash view of things. We must not forget that the trade relations with the neighboring republic and ourselves may be changed and we may look for the duty being lowered, and we would then have to meet competition from that quarter. Strawberries were grown in Washington and Oregon at four cents and could be shipped by direct rail for quarter or half cent. It would be well not to hold any unreal views.

The committee appointed to amend the Horticultural Board Act and to enquire into the World's Fair exhibit reported as follows:—

"Your Committee on the Horticultural Board Act, 1892, suggested that sub-section 4 of section 2 be amended by striking out the word "and" in the second line making the word "District," in the third line plural, and by adding the words "Westminster and Vancouver City Districts." Section 3 provides that members of the board shall reside in the district for which they act, yet two of the gentlemen appointed live outside of their districts. So far as this association knows and believes, the Horticultural Board has never been regularly organized, thus failing to comply with the Act. We would suggest that a committee consisting of Fruit Inspector Hutcherson and Secretary Macgowan of this association be appointed to interview the Government with a view to having the Act amended and a working board appointed, and the following names are suggested :—For the Province at large, J. R. Anderson, Victoria ; District No. 1, G. A. McTavish, Victoria ; District No. 2, ———— Nanaimo ; District No. 3, E. Hutcherson, Ladner's ; District No. 4, G. W. Henry, Hatzic ; District No. 5, A. Postill, Vernon.

We, your committee on World's Fair exhibit, would suggest that this association abandon the idea of holding a local show, and that the estimated cost of the same be appropriated towards World's Fair display. We would urge most strongly upon the membership of this association and all interested in the development of British Columbia, the great necessity for hearty co-operation with the Government in their efforts to secure an exhibit that will be representative of the capabilities of our favored Province.

Mr. Wintemute moved, and Mr. Butchart seconded, the adoption of the report, which was carried. Considerable discussion ensued regarding the help the Government would give towards the exhibit.

Mr. Browning proposed that Messrs. Harris, Henry and Hutcherson be appointed a working committee to look after the World's Fair exhibit. This was seconded by Mr. Butchart, and was carried; Mr. Sharpe's name being substituted for Mr. Hutcherson's.

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## MARKETING FRUITS.

BY WM. A. DASHWOOD JONES, NEW WESTMINSTER.

It is now quite time that Fruit Growers and other persons, who handle fruit for the market in this country, should realize that it is absolutely necessary to pay more attention to the packing, handling, and sorting, of their fruit, before putting it on the market.

At present a large percentage of our finest native fruits, are annually spoiled, before they even reach the market, simply for want of a little care.

Some just dump their crop in rough boxes anyhow, and then expect to get the highest price when it reaches the market ; and when remonstrated with

about their carelessness, say "It does not pay them to spend so much time over it."

But let them give it once a trial, and they will find by the prices they realize, that they are more than repaid for the extra time spent in careful packing, etc.

One of the great faults existing at present is trying to put too much into one box. For instance plums and cherries should not be packed in fifty or one hundred pound boxes, but in shallow boxes made especially for them; for plums say boxes holding about twenty pounds; for cherries about ten pounds The adoption of a standard size of box, for the different kinds of fruit would be a remedy in this case. Cherries and plums will open out nicely, if the fruit is carefully packed on the bottom of the box side by side, the box filled and then reversed, that is to say, make the former bottom the top to be opened, and vice versa.

Care must be taken to leave as much of the natural bloom on the fruit as possible.

Never pack fruit for market wet. Currants suffer badly even in twenty four hours if packed immediately after rain.

Soft fruits such as strawberries, raspberries, blackberries, etc., should be picked into the baskets they are shipped in, to avoid as much handling as possible.

Apples should not be shaken down off the trees, but carefully handpicked and then sorted, all inferior ones such as are blemished, cracked, bruised, or deformed, should be placed by themselves and fed to pigs, or sold as inferior fruit, but it is a very poor policy to mix them in with the good ones. The good apples should be again sorted before marketing, as to sizes, and as near as possible of one size packed together.

Never mix different kinds of apples or any other fruit in the same box. Apples should be packed on their ends and not on their sides.

Fruit should be packed in neat packages, with the variety and name of grower stamped or marked legibly on the outside of the box, this might be the means of inducing growers to take extra pains, as a good sample would be a travelling advertisement and would prevent mistakes.

For long distance shipments, fruit should be gathered a little on the green side especially pears, never shipping over-ripe fruit, as a few here and there are liable to destroy the whole shipment, this is especially noticeable in peaches, when one bruise has been known to permeate a whole box in twenty-four hours. In packing pears, especially the softer varieties, wrapping them in paper, tends to make them turn out in good shape and protects them from bruises on a journey.

# SMALL HOLDINGS AND IMMIGRATION.

BY R. E. GOSNELL.

I need not state what is apparent and admitted by all, that population is the great need of this Province. The consumer and producer are the complement of each other. We want more of both.

British Columbia is in a peculiar position at present. That it has great resources we all know; but how to utilize them is a problem easier to propound than to solve. In proportion to natural products, the imports, especially in the line of necessities, are, I was going to say, alarmingly great. The balance of trade is shockingly against us. On the other hand, nearly every line of home industry is overdone on account of a lack of a consuming population. These are unpleasant admissions to start out with. But we must face them.

In one sense, comparing this province with its contemporaries east, west and south, we might refer to it as the last place made. That is, from a business point of view. It is right on the edge of a great continent to which until three or four years ago the trade lines did not extend. It is a great country, but it lacks one or two things.

It is all very well to talk of encouraging industries, but we want somebody to buy our manufactures. Talk to the sugar refiner, lumberman, brickmaker, founder and machinist, fruit canner and so on, and everyone of them will complain of a limited market. To the east is an expensive and long haul with cheap labor to compete with. No chance there! To the south a tariff wall confronts us. No chance there! To the west an undeveloped trade exists, no doubt, but with countries about which one distinguished writer has said it was impossible to predict. Only a possible chance there!

Perhaps no other country on the face of the globe contains so many elements in contiguity, which enter into industrial enterprises, as does British Columbia--coal, iron, wood, sea coast, geographical situation, climate, fish, minerals, agricultural lands and what not. Everything, under certain conditions, favors it becoming the greatest manufacturing country in the world. Conditions may develop, and undoubtedly will, whereby B. C. will occupy some such position in the Empire as England does now in the world. I fully believe that the trade centre of gravity will some day be in Canada as it is now in Great Britain. With the continent of Europe on the east and the great continent of Asia on the west and great continents to the south, and Canada as the shortest natural trade route joining them all, there can be but one conclusion as to the future of a country which combines with its unique geographical situation the most wonderful combination of natural resources. I have been in all parts of Canada and I can truthfully say that no part of it, with the exception of Ontario, is so rich as B.C. Therefore, it is not out of any pessimistic view of this Province that I have spoken of the present conditions.

But in the meantime while this destiny is accruing, we must look to the development of our internal resources. We may look over the seas and in our day dreams see the ocean furrowed with ships, we can stand in imagination on the long line of docks piled up with the merchandise of many lands, we may fancy the din of industry on every hand and tread the streets and jostle with its million of inhabitants, but it does not add a soul to our population or put a dollar in our pockets. It will not alter the facts that we are at the present time buying far too much and producing far too little; that the markets for which we could cater are far too far away and that the home market is far too limited to make industry pay. Our home market is a good one but it is easily congested.

Before reaching out after those "illimitable possibilities" ahead of us we must people our waste places, and cause our valleys to blossom and our hillsides to bear fruit. We must dot the landscape with farm houses and snug villages, intersect it with roadways and draw dark lines of railway all over it. We must find a market near home before going abroad for it. To do all this *we must have the people.*

Let us look first at the kind of population we most need. Do we require bookkeepers, clerks and occupants of gentlemanly occupations? We have too many for the jobs on hand. Mechanics? There are as many as we can find employment for. Business men, traders and speculators? Business is already well supplied in every line. Manufacturers? Yes, if we can find a market for their goods. Shipbuilders? Yes, when we have produce for their ships to carry. Fishermen? Yes, when we have found a market for their fish. Capitalists? Yes, to buy real estate, to build mills, to develop our mines and to cultivate lands. All these will come as fast and even faster than the country develops. But after all these are not the people we want.

To find out the lacking element we must look at the products we most largely import to supply the real wants of the country. What are they? Butter, eggs, flour, fruit, grain, meats, condensed milk and a host of other articles, as the auctioneer says, "too numerous to mention." These indicate the great openings for industry which British Columbia affords. We want farmers, first, last, and above all others.

It is true, we import a great many articles of manufacture, machinery, clothing, household goods, etc., etc., which it might also be said indicate a demand which could be supplied at home, but these represent such a variety of lines in no one or few of which is the market sufficient to justify the establishment of an industry to supply them, even if the keen competition of cheap Eastern labor were out of the question.

The farmer is differently situated. There is a demand for all he can supply, and in freights, duties, etc., he has an all round margin of about 25 per cent. over outside competitors. Take for instance, fresh eggs selling at from 35 cents to 90 cents per dozen and poultry 18 cents to 25 cents per lb.

with a constant and irrepressible demand. It is incomprehensible that it should be the case but it is nevertheless. Mr. Macgowan and myself have figured it up and placed the value of the imported agricultural produce which might be raised in the Province at between $1,500,000 and $2,000,000. The margin there leaves room for 3,000 farmers to supply or a farming population of 15,000 in all over and above the present farming population.

Take the present population of B. C. at 100,000—and it is not more than that. Strike out 25,000 for Indians, 60,000 for the urban population, and count all the rest, miners, loggers, laborers, Chinamen, ranchmen and farmers as farming population and you have only 15,000 men, women and children left or 3,000 farmers, heads of families. Or in other words, taking the view most favorable to present conditions, we import as much as we raise altogether.

Taking it again statistically, I have estimated that there are 1,500,000 acres of farming lands from first-class to middling—not including grazing or tracts only available by irrigation—easily accessible and more or less settled upon in the Okanagan, Fraser Valley, and Coast. Giving one hundred acres to each man, which, in the majority of cases, is far too much in this country, and you have room for 15,000 farmers or a farming population of 75,000, equal to the present white population of B.C. That estimate does not include the immense areas of pastoral lands in the southern interior or the lands in the northern interior and therefore is easily possible, taking the Province as a whole.

If the present ratio between urban and rural population were maintained, when the farming population reached 75,000 the whole population would be 550,000. This does not take into account, either, the population that would be dependent upon the fishing and mining industries as yet practically undeveloped, so that we can easily see the possibilities of 1,000,000 people in this Province and what an essential factor of progress the farming element is.

Farmers have been well represented as the back-bone of a nation, the industrial vertebrae around and to which cling all the essential organisms, and apart from the question of population altogether, the history and experience of all countries go to show that no nation has prospered for any length of time where the agricultural element was absent or unduly suffered. We may talk as we like about our sea ports and a prospective great commerce, about our wealth of timber, fish and minerals, but what will do most for B.C. will be agricultural development. Our timber will some day be gone and our fisheries and minerals be exhausted, but nature has given us a token that as long as the world lasts there shall be a seed-time and harvest.

And here we have reached the hardest part of our problem, how to secure the population we desire and require?

To start with, the land question is the obstacle to be overcome. We all know what that is. We all know how few improved farms there are and how much land is held which is not improved. Practically all the land in the Province has been taken up, a great deal of it for speculative purposes in the expectation that some day it would be very valuable, and as a consequence unimproved lands all round have gone up beyond their commercial value and we have the very interesting situation of every person having lands to sell and nobody wanting to buy at the price. This state of things has beyond all question greatly retarded settlement, in fact, so far as any serious settlement of farmers is concerned it has put a stop to it.

Of course, this will work out its own remedy, inasmuch as land owners will sooner or later be quite as anxious to get rid of their land as they were to acquire it and realize their own money out of it. The trouble has been that they have been wanting for unimproved, non-producing lands (and therefore valueless), little less than improved lands are worth, and practical farmers from the East are not fools enough to pay the price of improved lands for their farms and improve them afterwards. They very properly want some of the "unearned increment" themselves. That fact must be faced by those who have land to sell. In my own experience I have talked to hundreds of practical men from the East and elsewhere and I have found the verdict unanimous against buying farm lands under present conditions. It is true that our lands are more productive and prices of produce are better than in the East, but when you find in the best part of the western peninsula of Ontario, than which there is no finer farming country under the sun, farms fully cultivated, fenced, drained, with good dwellings, barns, stables and outhouses, fine orchards, excellent roads within easy reach of town, churches, schoolhouses—everything that a farmer could desire—offered for from $50 to $75 an acre without purchasers, of which I know personally numbers of instances, can you expect settlers from the East, the very men who have left the opportunities I have referred to, to pay $15 all the way up to $50 and $75 and even as high as $100 per acre for land wholly unimproved, without houses or fences, drains or roads, or anything else as an inducement except hard work and prospects. You say land is limited and therefore bound to be high in price. But land after all is only a merchantable commodity, worth so much as an investment, returning a certain percentage on a certain outlay. If you can make 10 per cent dividend on a farm after paying $100 an acre for it then that farm is worth $100 an acre and more than that you can sell it for that. You could sell every inch of land in B.C. this year if it were all under cultivation and paying a certain dividend. It is dividends men are all after, but you must make your dividend first before you can finance on it. Where is the farm of 160 acres devoted to general farming in B.C. that is paying a dividend of 10 per cent on $16,000? The average farm in Ontario, it is computed, does not pay a dividend on over $50 an acre and when you add years of toil, the cost of building, fencing, draining, your annual taxes, the clearing of the land, stocking it, and so on, and so on, on top of $25 or $50 an acre, as the case may be, in the first instance, you have

represented a capital investment of between $100 and $250 an acre according to the nature of the land. Will it not bother the average farmer to get a dividend on that? That is the business way of looking at it, and business principles ultimately settle the price of farm lands as well as anything else. In the above I speak not of the very best lands or the very poorest, but the average.

Roughly our lands may be classified as timbered, brush lands and prairie. Each has its disadvantages. The heavy timbered land costs a great deal to clear; the prairie land as a rule requires dyking and draining, which is expensive; the brush and alderbottom, which embraces a variety of soils, etc., is perhaps the easist reclaimed in the long run, but is expensive too, so that some way or other farming means plenty of money and work, and another thing we must not lose sight of is that a great deal of our land for average farming purposes requires manuring. It is especially in need of phosphates, and I look to see the day when the Dominion Government instead of forcing the canners to destroy the fish offal of the Fraser River or tow it to sea will manufacture a fertilizer out of it for the farmers of the Westminster District.

The compensating advantages which the farmer possesses are: big yields, a beneficent climate, protection in the home market and consequent good prices and the prospect that if he undertakes and carries out the cultivation of a piece of land he will have a certain investment with constant good dividends.

Now, the moral of all these conditions is that:

I. We require population.
II. We require a farming population.
III. Unimproved farming lands are too high.
IV. And held in too large tracts.
V. All conditions point to the desirability of small holdings.
VI. Special inducements must be held out to secure a farming population.
VII. We need an immigration policy
VIII. And one based on a knowledge of these facts.

An immigration policy such as is carried out in Manitoba and the Northwest is entirely unsuited to this country. We cannot absorb a large population as rapidly as they can there. Our policy must be a selective one. A great deal of effort in the past has been wasted by a too general invitation, based on pamphlets and maps which simply give meaningless generalities to the outsider, who is more apt to be deceived than instructed because the information is not definite enough and is all one-sided.

What we want is not a lot of people coming to the country on a general supposition that there is something good here, but to know beforehand what there is to offer and then seek your settlers on that basis. When people come to this country now they have to search it over for themselves or trust themselves to the mercy of some real estate men as to the best investments.

The Government should have a bureau of information where the prospective settler could be acquainted with the minutest details regarding the country—what lands are for sale, at what price, the nature of the soil and, in fact, everything possible to know.

I conceive it also possible to obtain the co-operation of a large number of land holders, who cannot but by this time see the inutility of holding on to lands at high prices, in sub-dividing their lands and placing them on the market at prices and terms that would be an inducement to settlers. If a man, say with 500 acres, of land, were to put half of it in the market in 5, 10, 20 or 50-acre blocks as circumstances might dictate at a low price per acre *without interest*, on conditions of cultivation, he would find that the increase of value of the remaining portion would more than pay him for the sacrifice he had incurred in the first instance. There are many ways of giving inducements to settlers, such as leasing for a term of years free, with the option of purchase at a certain price at the end of that time ; as selling at a certain price, payment to extend over 10 years without interest; as giving a man certain number of acres on condition of bringing a certain number of other acres into cultivation, and so on. All these terms and conditions would vary according to the character of the land. Valuations and terms in a great many instances might be determined by land commissioners appointed by the Government to be paid by the contracting parties in whose interests their services were called into requisition, much in the same way as fence viewers are utilized in Ontario. It is not all for the Government to do. The people themselves who have the land must help, and there is not the slightest doubt that by concerted action and proper representations a sufficient number of land holders could be got to invite and offer portions of their land for sale. For instance, if the Government knew of even 10,000 acres of fairly good land that could be obtained on unusually favorable conditions in a certain district, say Westminster, it would then have something definite to offer and recommend to settlers and could make special efforts to secure them. Other land holders seeing the success of these efforts would be induced to follow suit.

It is not asking these men to be philanthropic and give up their lands in the public interest, because we all know that would be a useless appeal, but it is asking them to act in their own interest as well. What good is 10,000 acres of wild land to a man as a speculation if he cannot get settlers on it. The longer he keeps it idle the more it depreciates in value A townsite company does not give away half of its real estate to a railway company out of love for the latter or indeed even to help it, but to make the balance of the property much more valuable. What a railway is to a townsite a settler is to a community. Settlers bring roads, public buildings, business and all the rest of it. Land owners must now see the folly of a policy of holding on to land to get the last dollar out of it. Land values are coming down and they should now see it in their own interests to come to the prices of those who want the lands.

This idea could be worked out at a very great length and incorporate numerous practical suggestions, but my space and your patience would be exhausted thereby. However, I am fully convinced that a practical scheme of immigration on the small holding principle can be carried out successfully and in the absence of any extensive tract of Government lands near the lines of communication it is the only practicable means of obtaining settlers. You must offer the settler some inducements, otherwise immigration efforts would be in vain; in the absence of free grant lands you must do the next best thing the cheapest private lands available, and the whole matter is one which might very well become the subject of a commission of enquiry. It is quite as important, I think, as to know the origin of the small-pox epidemic, or the framing of mining laws.

Fill this country up with small farmers, and with few exceptions they are the only class for which the conditions of B. C. are suited, and a whole train of industrial development will follow. This Province, has not, comparatively speaking, large areas of farming lands, but sufficient for all its requirements and all its possible population; and if there is one thing which should cause general regret is to see the extensive tracts which do exist lying idle from year to year, held on the foolish assumption that some day their owners will be made rich through the necessity of somebody or other buying at the owners' own price in order to get land. Unless we can induce the farmers to come in, settle and cultivate our lands, we will continue to import our farm produce by the car load and the present owners of soil will die land poor.

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## FLOWERS FOR THE HOME.

BY R. T. ROBINSON, VANCOUVER.

The flowering plants and shrubs that will succeed in this climate are so many that to mention all would take up too much valuable time and would be of no practical value. I will, however, mention a few that are well suited to this section, and ones which will give general satisfaction, with a reasonable amount of care. First I would place the rose. Roses require a good open situation and abundance of manure. One of the principal causes of failure in growing them is planting them in the shade, or near large growing shrubs, which, being stronger than they, will send their roots into the good soil prepared for the rose and thus deprive it of its proper share of nourishment, starving them, or at best dragging on a miserable existence, a source of annoyance to the owner and an eye-sore to all.

A few varieties which I have found to do well are General Jacqueminot, France, John Hopper, Hermosa, Malmaison, Marievan Hute, Magna Charta, Marechal Neil, Mrs. John Laing (this last I consider the best of all).

Nearly all the moss roses are quite at home here as well as the small flowered Polyanthus section. There are many beautiful roses that will not do well here in the open and should not be planted except by professional gardeners. As a pot plant for the window they often fail to do well. This is largely due to the use of varieties unsuited to the purpose. Carnations and pinks do remarkably well, and considering the beauty and fragrance of the flowers, their range of color, from pure white to deepest crimson and yellow, together with the length of time they are in blossom and their hardiness, should give them a place in every garden.

Wallflowers, stocks, balsams, asters, phlox, dwarf and perennial, and many others, will give a beautiful display all through the season. In planting, it should be the aim of everyone to put out as many perennials as possible, thus lessening the expense and trouble of planting every spring. Among such the pansy is a very general favorite, a plant always in bloom, a vigorous grower and one that could be used to fill spaces between largely growing plants. For a green to hide an unsightly building, if not too high, nothing will be so handsome as a row of sweet peas. Two plants that are but little known here are tuberous rooted begonias and cannas begonias, will thrive well in open border, in good rich soil, standing rain and sunshine better than almost any other of our popular summer bedding plants. A bed of them with a bank of cannas behind will give such a combination of beauty of foliage and blossom as cannot be equalled by any two plants of our gardens.

Plants suitable for window gardening are somewhat different in their requirements. For this purpose I would choose from among the following: Begonias Rex, tuberous rooted, all the shrubbery section, geraniums, fuchsias, heliotropes, calla lily, impatient sultani, pelargonium and primulas. For winter bloom, hyacinths, tulips, lily of the valley, and snowdrops should be given a place and will be out of the way by the time the space is required for the summer flowering plants. A very important point in pot growing plants is the drainage; see that it is perfect, and water only when the condition of the soil and plant require it.

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The *Daily World* said:—

All the members have felt greatly benefitted by the discussions which took place, but they felt rather disappointed to think that their efforts for the prosperity of the Province should have met with not the slightest sign of recognition from the business men of the city. Seldom is it that a more influential body of men assemble together as at the convention just closed; and when prominent gentlemen from all over the Province meet at a given place, they should be received in a proper manner.

One of the results of the convention will be the probable establishment of a Dairymen's Association in the Province, and an effort will be made to induce the Dominion Government to send out to British Columbia competent men to lecture on the subject this summer and organize the association.

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The following is from the *News-Advertiser* of January 26th, 1893 :—

## A USEFUL ASSOCIATION.

The Fruit Growers' Association, now sitting in conference in this City, is in our Province, specially adapted as it is for fruit growing and dairying (occupations that go well together), doing exceptionally valuable work in a quiet and unpretentious way. This the addresses given at and papers read to the present assembly, summaries of some of which will be found in this issue, amply prove. They are in general practical reports from practical men, and as such eminently suggestive of useful hints to a largely increasing number of British Columbians, who, for pleasure and profit enter into, or propose to enter into fruit growing.

The work of such an association is more necessary, as despite many grand climatic advantages, our fruit growing and horticulture in general, are yet quite in their infancies, and as one expert stated yesterday too often practised so inefficiently and unprofitably, that, to quote his words, probably not one tree in ten planted up to now has "come to profitable bearing," whilst not one planter in twenty "takes care of them as he should." All this may readily be remedied, and, indeed, a great advance in fruit growing skill is already beginning to show in many districts of the Province—largely as a result of following the timely advice of such capable experts, as are well to the fore at the meetings of the Association. What such organizations can do is well attested by the immense recent development, largely under their auspices, of such world famous fruit growing regions,—as to quote very different but equally cogent cases in point—the Province of Ontario, the States of California and Missouri. One thing which moreover specially commends itself in the meetings of the B. C. Fruit Growers' Association, is the apparently complete absence from its membership of the impracticable and mischief-making crank. It were well indeed, were this equally the case in many another important public organizations. For these things we heartily welcome the Association to our City, and emphatically urge its claim to all and more than all the present limited assistance it receives from the Provincial and other public authorities, whilst commending also its substantial case for a far larger support than it at present receives from the agricultural and horticultural classes, and the community at large. The *World* being equally strong in its commendation of the society.

The following were declared elected officers for 1893 :—

JOHN KIRKLAND, LADNER'S - - - - President
T. WILSON, HARRISON RIVER - - - - First Vice-President
W. KNIGHT, POPCUM - - - - - Second Vice-President
A. H. B. MACGOWAN, VANCOUVER - - Secretary-Treasurer

## DIRECTORS

Agassiz, T. A. SHARP
Ashcroft, EX-GOVERNOR CORNWALL
Burton Prairie, H. P. BALES
Cache Creek, C. A. SEMLIN, M.P.P.
Chilliwhack, I. KIPP
" A. C. WELLS
" J. H. BENT
Comox, J. A. HALIDAY
Cowichan, J. BRODWELL
Donald, G. E. MANUEL
Esquimalt, HON. C. E. POOLEY
Halls Prairie, R. M. PALMER
Hatzic, R. L. CODD
" G. W. HENRY
Hammond, W. J. HARRIS
" J. W. WHITE
Harrison River, T. WILSON
Haney, J. J. WILSON
Howe Sound, GEO. GIBSON
Kamloops, H. MCCUTCHEON
" J. A. MARA
Ladner's Landing, E. HUTCHERSON
" " J. KIRKLAND
" " W. H. LADNER
" " THOS. MCNEELY
Langley, JAS. MCADAM
" HY. DAVIS
" WM. JOHNSON
Lytton, THOS. EARLE
Lulu Island, O. D. SWEET
" S. BRIGHOUSE
" JAS. MELLIS
Lillooet, C. A. PHAIR
Matsqui, C. B. SWORD
" H. F. PAGE
Mission City, F. S. TIMBERLAKE
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Nanaimo, J. G. HALPENNY
" J. P. DAVIS, Box 112
Nicola, JOHN CLAPERTON
New Westminster,
" PETER LATHAM
" THOS. CUNNINGHAM
" A. C. WILSON
" T. R. PEARSON
" MARSHALL SINCLAIR
Okanagan, ALFRED POSTILL
" GEO. WHELAN
" LORD ABERDEEN
" HON. MAJORIBANKS
Pender Island, W. GRIMMER
Port Moody, NORVAL BUTCHART
Saanich, J. D. BRYANT
Salt Spring Island,
J. P. BOCTH, M.P.P.
Spallumcheen, DONALD GRAHAM
Spence's Bridge, JOHN MURRAY
Squamish, E. B. MADILL
Sumas, ALLEN EVANS
Surrey, J. PUNCH, M.P.P.
South Vancouver, W. J. BRANDRETH
" " J. HURRELL
Vancouver, J. M. BROWNING
" R. E. GOSNELL
" R. T. ROBINSON
" WALTER TAYLOR
" A. H. B. MACGOWAN
Victoria, G. A. MCTAVISH
" DR. J. W. POWELL
" D. W. HIGGINS
" MR. JAY
" D. R. KER
" C. E. RENOUF
" W. H. BAINBRIDGE

VANCOUVER, January 26th, 1893.

Meeting of Directors. Present:—W. J. Harris in the chair, T. Wilson, W. Knight, E. Hutcherson, G. W. Henry, Thos. Cunningham, W. J. Brandrith, T. A. Sharpe, N. Butchart and A. H. B. Macgowan.

Following Committees were appointed:—

ON ANNUAL REPORT—Thos. Cunningham, G. W. Henry, E. Hutcherson, W. J. Brandrith, North Arm, and A. H. B. Macgowan.

FOR ASSISTING EXHIBITION ASSOCIATIONS IN THEIR FRUIT DEPARTMENTS—G. W. Henry, Hatzic; E. Hutcherson, Ladner's; Thos. Cunningham, Westminster; and A. H. B Macgowan.

ON PACKAGES—Thos. Cunningham, W. Knight, Popcum; and F. R. Stewart, Vancouver.

ON TRANSPORTATION—J. M. Browning, G. W. Henry, W. J. Harris, D. Oppenheimer, Thos. Cunningham.

On motion it was decided to hold May quarterly meeting at New Westminster.

# In Memoriam.

HONORABLE JOHN ROBSON,

WHO DIED IN LONDON, ENGLAND, ON JUNE 29TH, 1892,

AGED 68.

BORN IN PERTH, ONTARIO, IN 1824.

A resident of B.C. since 1859. One eminently fitted to fill the honorable position he occupied at the time of his death, viz., Premier of British Columbia.

From the time of its inception until his death this Association, in the deceased, had a warm and active friend, and much of its success has been attributable to his recognition of its claims.

# In Memoriam.

G. G. MACKAY,

WHO DIED IN VANCOUVER, , 1892,

AGED .

One of the first Directors of the Association, and from its start one who exhibited an interest in all its workings.

## WAXES FOR GRAFTING AND FOR WOUNDS.

### Common Resin and Beeswax Waxes.

1. Reliable Wax—Resin, 4 parts by weight; beeswax, 2 parts; tallow, 1 part. Melt together and pour into a pail of cold water. Then grease the hands and pull the wax until it is nearly white. One of the best waxes.

2. Resin, 4 lbs.; beeswax, 1 lb.; tallow, 1 lb.

3. Resin, 6 lbs.; beeswax, 2 lbs.; linseed oil, 1 pint.

4. Six lbs. resin; 1 lb. beeswax; and 1 pt. linseed oil. Apply hot with a brush one-eighth of an inch thick over all the joints.

5. For warm weather—4 lbs. of resin, 1 lb. of beeswax, and from half to a pint of raw linseed oil; melt all together gradually, and turn into water and pull. The linseed oil should be entirely free from cotton-seed oil.

6. Resin, 6 parts; beeswax, 1 part; tallow, 1 part. To be used warm in the house.

7. Resin, 4 or 5 parts; beeswax, 1½ to 2 parts; linseed oil, 1 to 1½ parts. For outdoor work.

### Waxed String and Bandage.

8. Waxed String for Rood Grafting—Into a kettle of melted wax place balls of No. 18 knitting cotton. Turn the balls frequently, and in five minutes they will be thoroughly saturated, when they are dried and put away for future use. This material is strong enough, and at the same time breaks so easily as not to injure the hands. Any of the resin and beeswaxes may be used. When the string is used it should be warm enough to stick without tying.

9. Waxed Cloth—Old calico or thin muslin is rolled on a stick and placed in melted wax. When saturated it is allowed to cool by being unrolled on a bench. It is then cut in strips to suit.

### Waxes for Wounds.

10. Any of the more adhesive grafting waxes are excellent for dressing wounds although most of them cleave off after the first year. Stiff and ochreous paints are also good.

## GRAFTING.

There are very many apple and pear orchards throughout British Columbia are unprofitable on account of the varieties planted. Many kinds also, once which profitable, are so no longer on account of the apple scab, as, for instance, the Fameuse, the Early Harvest, and the Fall Pippin.

Now any man, who has a little skill in the use of tools, can easily transform such trees to kinds that are valuable, by grafting; an art by many looked upon as difficult, and invested with many secrets.

The first thing to do is to secure scions of the kinds wanted, for these must be cut while the buds are yet dormant, and be laid away packed in earth, or in fresh saw-dust until needed. If near a good city market it will pay to grow a few such fancy apples as Red Astracan, Duchess and Wealthy, and scions may be secured at a very small cost, from almost any nurseryman.

Apples and pears may be grafted much later in the season than stone fruits, for while the latter may be done as early as possible in the spring, the former need not be done until the last of May, or even the early part of June.

Cleft Grafting is the usual method, and for the small limbs it is the best. For this, the tools required are a sharp saw for cutting off the limbs where the graft is to be inserted, a sharp knife to sharpen the scion, a grafting chisel, such as is shown in Fig. A *c*, to open the cleft where it is to be inserted, a mallet to drive the chisel, and a small kettle, with a lamp so fixed in it as to warm the water in which the wax is placed till needed.

Our illustrations will represent the process. The scion, Fig A *b*, is bevelled equally on both sides, with the outer edge if anything a trifle thicker than the other to ensure firm contact between the cambium layer of the scion, and the stock. It is an advantage to have a bud on this edge as shown if the stock is small, one scion may do, as in the engraving; but if large, it is better to have one on each side, and thus if one fails, the other may succeed.

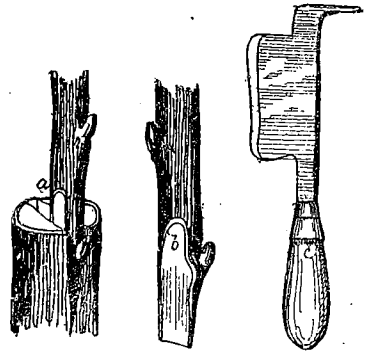


Fig. A.

The stock should be smoothly cut across with the saw, and then split with the grafting chisel, the narrow projection on the back of which is used to open the cleft for the insertion of the graft. All the cuts are then covered with grafting wax and the work is complete.

Grafting wax may be made in a variety of ways, but in all the ingredients are resin, tallow or linseed oil or beeswax, and it is more or less expensive according to the proportion of beeswax used. A very good recipe is one pint of linseed oil, one pound of beeswax and four pounds of resin. The resin and the beeswax should first be melted together, and the tallow or oil be added, when the whole should be well stirred up together. The mixture is then poured into cold water, and when cooled, worked by hand until ready for use.

A very simple method of grafting has been most successfully practised by the writer, at Maplehurst, during the past few years, which requires very little skill, few tools and no wax. An illustration showing it appeared in the *Rural New Yorker*, under the name of Crown Grafting, which engraving we have copied, because it shows the process so well that very little is needed in the way of description. One advantage of this method is that it may be used on limbs as large as six inches in diameter, and on trees of considerable age, for as the wood is not split the wound is the easier healed.

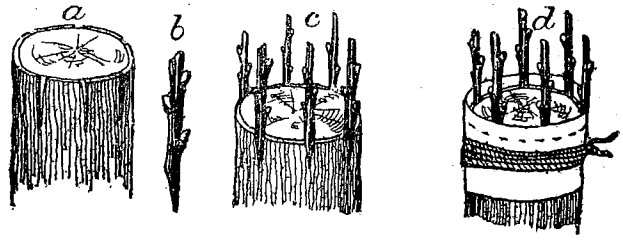


Fig. B.

In Fig. B *a*, is shown the stock cut, and prepared for the insertion of the scion, the cut down the bark simply reaching through the wood. At *b*, is a scion, beveled on one side only, which is the side to go next the wood. At *c*, the scions are set, but only a very large limb would need as many as are here represented; the writer has found two or three, in most instances quite enough, since nearly every one lives. At *d*, is shown the same, wound with stiff manilla paper, and tied firmly with a string. The paper is made to project upwards about half an inch above the cut, and the basin thus formed is filled with mud, which will dry and remain until the wound has begun to heal over.

The grape vine, too, may be easily grafted, and a knowledge of this may transform a profitless vineyard into one of great value. This work must be done early in the season before the buds begin to swell. The scion should be

about six inches long, and is inserted very much in the same way as described for cleft-grafting the apple, except that the old vine is cut some three or four inches below the surface of the ground, and that no grafting wax is used. Instead, the cleft stock is tied with a string (Fig. D), and the earth is carefully heaped about the scion so as to leave but one bud above the surface.

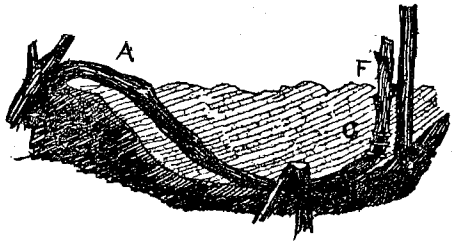


Fig. C.

Fig. D.

In case the old vine is too knotty for cleft-grafting, the work may be accomplished by splice-grafting a smaller branch, as is shown in Fig. C. This is done at a distance of two or three feet from the stump, at *g*, and the grafted branch is then laid down and fastened in place with a peg. The earth is pressed about the scion, leaving a bud above the surface, which is the only one that should be allowed to grow.

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## WHAT TO PLANT.

At a meeting of the Fruit Growers' Association a special committee was appointed to gather what information they could and report upon what varieties of fruit they thought were best to grow for profit in Britiish Columbia. After considerable investigation by this committee it was decided to recommend the following varieties:

Apples — Early summer, Yellow Transparents, Red Astrachan; late summer, Oldenburg, Gravenstein; fall, Wealthy, King; winter, Northern Spy, Baldwin, Golden Russet Ben Davis, Canada Red. Sweet apples—Summer, Golden Sweet; fall, Bailey's Sweet; winter, Talman's Sweet.

Crabs—Transcendent, Hyslop, Montreal Beauty.

Pears—Summer, Clapp's Favorite, Bartlett; fall, Beurre, Clairgeau, Beurre d'Anjou; winter, Lawrence, Beurre Easter.

Plums—Peach plums, Bradshaw, Imperial Gage, Lombard, Red Egg, Yellow Egg, Reine Claude de Bavay.

Prunes—Italian, Pond's Seedling, Coe's Golden Drop.

Cherries—Sweet, Early Purple Guigne, Governor Wood, Black Tartarian, Napoleon Bigarreau (Royal Ann), Yellow Spanish, Windsor. Cherries—sour, May Duke, Large Montmorenci, English Morello.

Peaches — Alexander, Waterloo, Early Rivers, Hale's Early, Early Crawford and Wager.

Apricots and Nectarines—Not sufficiently tested to be recommended.

Quince—Orange.

Grapes—Moore's Early, black; Worden, black; Delaware, red; Brighton, red; Niagara, white; Concord, black.

Strawberries—Crescent, Wilson, Sharpless, Bubach No. 5, Improved Jocunda.

Raspberries—Marlborough, Cuthbert, Golden Queen.

Black Caps— Souhegan, Tyler, Gregg.

Blackberries—Snider, Kittatiny, Erie, Taylor.

English Gooseberries—Industry, liable to mildew in some localities.

American—Champion, Downing.

Red Currants—Fay's Prolific, Moore's Ruby, Cherry Currant.

White—White Grape.

Black—Lee's Prolific, Black Champion, Black Naples.

List of varieties not thoroughly tested but worthy af trial—Apples, summer, Keswick, Codlin, Alexander; fall, Haas, Colvert, Princess Louise, Maiden's Blush, Red Betigheimer; winter, Pewaukee, McIntosh's Red, Hubbardson's Nonesuch, Seek-no-further, Rhode Island Greening, Grimes' Golden, Stark, Newtown Pippin, Yellow Bellflower.

Pears—Summer, Madeline, Marguerite, Brockworth Park; fall, Beurre Bossock, Duchess d'Angouleine, Howell, Sheldon; winter, Josephine de Malines.

Plums—Genii, McLaughlan, Moore's Arctic, Jefferson, Shipper's Pride, Smith's Orleans.

Cherries—Rockport Bigarreau, Olivet, Mezel, Black Republican.

Peaches—Foster, Shumaker, Wheatland and Coolidge's Favorite.

Grapes—Moore's Diamond, Meyer.

Strawberries—Haverland, Warfield No. 2, Triomphe de Gand.

Apricots—Moorpark, Early Golden, St. Catherine, St. Ambrose, Early Montgamet.

Nectarine—Boston, Early Violet.

Quince—Rhea's Mammoth, Champion.

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## ADVICE TO GROWERS AND SHIPPERS OF FRUIT.

The fruit industry of British Columbia is a growing one; in fact, it is practically in its infancy yet, and all growers ought to increase their acreage and encourage new horticulturists to set out orchards, with the firm belief that the fruit business is *not* overdone nor likely to be overdone in the near (or even remote) future.

Our markets for all varieties of fruit are increasing in number, and the territory into which fruit has been shipped during the season of 1892 extends eastward to the Atlantic.

The demand is continually increasing for all the better varieties of apples, pears, plums, prunes, peaches, and cherries, and we would suggest to those contemplating the setting out of new orchards or the increasing of their former acreage, to consult the commercial demands as well as the suitability of location. The serious mistake in the past has been the number of varieties of trees planted as compared with the total number of trees. Avoid this error. If you have ground cleared for five hundred trees, it is better, for your own interest, to plant the entire amount in one class of fruit, even though you select two or three varieties from that class. In many instances it would even be best to have the entire lot of one variety. Orchardists should understand that they are not raising their fruit for home consumption; their largest profits will be in the shipping trade. And if they have a sufficient quantity of any one variety of fruit to load a car, they are in a position to dictate prices to the shipper, whereas if they have but a small portion of a car, and the shipper is compelled to look into a dozen orchards in order to buy a sufficient quantity of one given variety to make up a car load, the shipper can dictate. Another view is this: wherever large orchards exist, there the larger buyers congregate first, and the owner of the orchard realizes all the benefits of active competition among the buyers. California horticulturists know this, and making money by having large orchards and plenty of each variety of fruit.

Those owning old orchards should take every means to clean them and keep them so. Cut out all the old branches and trim up the tree generally. *Burn your rubbish.* Don't let it remain piled up in a corner near a fence, for such piles are the breeding grounds of all kinds of pests. Burn it at once. Don't let the weeds grow in your orchard, but keep the ground thoroughly cultivated all the time. It will pay you well in the long run.

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## MARKETING FRUIT.

It is hard to explain just how ripe fruit should be when picked for market. In all instances, it is best to consult the wishes of the shipper or dealer. If fruit is intended for the local market, it should be ripe enough for immediate use, and yet firm enough to "stand up" for two or three days before showing signs of decay. For shipping purposes, much depends on the distance the fruit is to go and the length of time it is expected to "stand up" before reaching the consumer. Take the suggestion of the shipper in every instance, for, as a rule, he knows what he wants and how he wants it. The writer, during the past season, has had much success with shipping peach plums, simply because they were picked before they had their full growth and just after they had turned from green to their peculiar white cast—before getting even a blush of color. During previous seasons he had lost money on them because he has invariably waited for them to get a "blush" before picking them for distant shipping purposes.

### PEACHES.

Peaches, for distant shipment, should be firm and fairly well colored, and wrapped and packed in boxes containing about 20 pounds net of fruit. Grade the fruit so as to make two tier boxes of the larger and three tier boxes of the smaller peaches. Do not ship anything under a three tier peach to market; it is not saleable, and being offered hurts the sale of the better stock. For local use, riper peaches should be packed in common splint baskets containing about 18 pounds.

### PEARS

All varieties of pears should be picked as soon as they will leave the trees without pulling or breaking the stem. A gentle twist of the wrist should bring the fruit off the tree. Don't bruise the fruit in transferring it from your baskets to the orchard boxes, and under no circumstances gather fallen fruit for shipment. For distant shipment, pears should be wrapped and packed in standard pear boxes containing 45 pounds of fruit.

### APPLES.

All varieties should be carefully gathered in their season and allowed to remain in orchard boxes or small heaps for a week or more be ore packing for

shipment. Cull out all small or wormy fruit and be sure you pack only selected apples. It does not pay to send unmerchantable apples or any unsaleable fruit to market. Always use new standard boxes and face the first layer. Then fill in the box tightly and full, so that when the bottom is nailed down not an apple in the box will move in its place. Make your name, branded on the box, a guarantee of the quality of the fruit contained therein, and you will soon see how shippers will seek your brand and pay top prices to secure your pack. It pays big to build up such a reputation.

DRIED FRUIT.

Every large orchardist should have an evaporator of some kind on his place. All over-ripe fruit and fruit that is too inferior for the market, can be easily taken care of in a small evaporator. If you have a large prune orchard a good sized evaporator will be necessary. Of the different systems of drying it will be impossible to say anything in this article. Each system has its pecularities, its advantages and disadvantages. Use only new boxes (either 25 or 50 pound standard spruce boxes) or new cotton sacks for marketing your dried fruits. When packing in boxes line them first with clean white paper and next to that lay a sheet of waxed paper. Always face your fruit on this sheet of waxed paper, then fill in to the required weight and press into the box. The neater the package and the style of packing, the more readily your dried fruit will sell, and the higher the price realized therefor.

Attractiveness has much to do with the selling qualities of everything offered. Your fruit may be equal, and perhaps superior, to that of your neighbor's, but if your neighbor has packed his fruit more carefully or more attractively, he has undoubtedly been able to sell his output for a higher price than you.

# PEST AND REMEDY

# SUPPLEMENT

AS ADOPTED BY A COMMITTEE

APPOINTED AT THE

ANNUAL MEETING

OF THE

HORTICULTURAL SOCIETY

AND

FRUIT GROWERS' ASSOCIATION

OF

BRITISH COLUMBIA.

# Insecticides and Fungicides.

## USEFUL INFORMATION FOR FRUIT GROWERS GATHERED FROM RELIABLE SOURCES.

That Spraying *is* necessary there is no doubt or question, as a science each succeeding year brings its valuable experience to aid us in a successful effort to rid our orchards, nurseries and vineyards of destructive insects and injurious diseases.

### SPRAYING MIXTURES.

The substances used in spraying may be divided into two classes: insecticides and fungicides; the former being used against insects and the latter against fungi.

### INSECTICIDES,

or the mixtures used for the extermination of insects, may also be divided and classed according to their mode of action: 1. Those which take effect by being eaten along with the ordinary food of the insect; and 2. Those which act from the outside, closing the breathing pores, or causing death by irritation. The first are for insects that destroy by eating, and the second for those that suck the juice. The most popular insecticides of the first class are the various combinations of arsenic known as Paris green, London purple, slug shot, etc., while those of the second class are kerosene and soap emulsions, lime spray, tobacco decoction, helebore, pyrethrum, etc.

### FUNGICIDES.

The fungi are an entirely different class of enemies to contend with. A fungus is a plant that feeds upon organic matter adapted to its wants. At certain stages of their existence most parasitic fungi may be checked quite easily, and at such times they should be attacked. When a fungus has become established in a plant, it cannot be reached without destroying the host in the affected places. The parasite must be destroyed before it reaches the host,—this is the principle underlying the application of most fungicides. The application should be preventive, not curative, for the the latter is practically impossible when the fungus is once established. The principal fungicides used in spraying are certain salts of copper in the following various combinations: Bordeaux mixture, eau celeste, carbonate of copper, Galloway's mixture, potassium sulphate, etc.

Fungous diseases will in all probability increase in proportion as the food plants upon which they prey are multiplied, and as climatic and other con-

ditions are favorable to their development. Spraying, therefore, must be resorted to, and in order to derive the greatest benefit, it should be generally practised. The value of the efforts of one man who faithfully sprays his orchard is greatly lessened if his neighbor neglects preventive measures and so allows his orchard to serve the purpose of a breeding ground for the spores of fungous diseases such as pear and apple "scab."

## HOW TO SPRAY.

As the treatment is entirely preventive, in order to make spraying effective it must be commenced early. All parts of trees or plants must be reached with the preventive agent. Drenching is not necessary and is expensive. A thin film or coating of the fungicide deposited upon the foliage will prevent the development of the spores as well as a complete soaking ; but it is important that all the leafy surface should be wetted at least on the upper side. For orchard work a good force pump, which may be fitted into a barrel—side or end—will give satisfaction. It must be of sufficient strength, and fitted with a nozzle which will project the spray in a fine state of division, yet with sufficient force to enter the deeper recesses of the foliage. More expensive pumps drawn and operated by horse power may be purchased, but are seldom necessary except for large orchards.

## CO-OPERATIVE SPRAYING.

Some factors which are deterrents to the progress of spraying may be enumerated as follows. This work, like the introduction of spraying for the prevention of insect enemies, on account of involving new lines of thought and action, is sometimes regarded by the farmer as impracticable on a large scale. It *must* be done at certain periods of the year—otherwise it is ineffectual. It involves the purchase of implements and materials which are sometimes difficult to obtain just when required. The success of the work depends also on intelligent adaptation of the treatment to the climatic conditions existing during the spraying period.

To obviate some of these difficulties I would suggest the adoption of a co-operative plan of spraying.

First, where orchards are not large, a few farmers might combine and purchase a spraying outfit, which would serve the community, and if it were possible to have it continuously operated by the same individual, whom practice would lend superior facility in using it, an additional advantage would be gained. Another arrangement could be made as follows :—

A complete spraying outfit, including chemicals, might be purchased by a person who would be prepared to spray under contract, by the acre, or at a stated figure per tree. If this system of combating fungous and insect enemies was introduced, it would obviate much of the prejudice and inconvenience now connected with the work, and spraying would probably in a few years, to the great benefit of orchardists, become the general practice.

Most seasons, from November to April, is the time for thorough work in destroying fruit pests in orchards, on various trees and plants of this Province.

It is the only season when successful work is done with a view to exterminate the pests, entirely without injury to plant life.

Summer spraying is beneficial, but results only in holding the damaging insects in check, while the washes given in thfs supplement for winter spraying are of such strength as will destroy the egg germs if properly applied. The soap and lye, also the sulphur and lime washes are excellent fertilizers, and will benefit trees wherever applied. These washes should be used in every orchard.

Every person purchasing young trees should see that the same have been disinfected, as advised in this supplement.

The San Jose Scale or Greedy Scale and Woolly Aphis are the insects to be guarded against more than any other, and for protection it will pay to wash every tree being planted, or that is now in the orchard.

Merchants should be forbidden to dispose of fruit boxes, etc., for the use of fruit again, unless fumigated. All growers should avoid the practice of picking up boxes promiscuously from fruit stands, unless they have been thoroughly disinfected, because from this course many orchards have been infested

There are many beneficial insects, which destroy the injurious insects; the practice of growers should be to learn and distinguish these and their habits, in order to best protect them. Most birds are of great benefit to horticulturists, destroying the injurous insects, and should be protected.

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## CAUTION.

*The special attention of all using any of the washes recommended is called to note carefully the difference between those for use in the winter season, when the trees are in a dormant condition, and those to be used during the spring and summer months, when the trees are in foliage. The winter washes cannot be used without injury to the fruit buds, after they have commenced to swell, and the summer washes are not of sufficient strength to be of any value for use in the winter months, when insects are in the pupal state, and therefore require much stronger solutions to destroy them than they do after they are hatched.*

### LONDON PURPLE.

*In the use of London purple for the destruction of Codlin Moth, owing to the fact that there is no uniformity in the strength of it, the*

*safe plan is, to make a test of it by spraying a few trees and letting them stand for twenty-four hours; and if the foliage is found to be affected, reduce the strength by adding more water.*

AGAIN.

*Do not use the lye washes to destroy the Codlin Moth, or the London purple or Paris green to destroy the Aphis. In other words, note carefully, and use the washes for the specific purposes as recommended.*

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Professor Maynard, of Massachusetts Agricultural College, sums up the following facts now pretty well settled, viz.:

(1) That of the arsenites, Paris green gives the best results as an insecticide.

(2) That the longer the mixture containing the arsenites stands, the greater the injury from soluble arsenic.

(3) That the foliage of the peach, plum and cherry is more susceptible to injury than that of the apple and pear.

(4) That the injury varies with the varieties, some being more susceptible than others.

(5) That young leaves are less injured than those fully developed, and are more injured on weak trees than on those that are vigorous and healthy.

(6) That Paris green cannot be used alone with safety, stronger than one pound to three hundred gallons of water, but with the lime mixtures it may be safely used at one pound to from fifty to one hundred gallons.

(7) That the foliage is most injured when kept constantly wet by light rains or foggy weather, but that heavy rains lessen the injury.

(8) That the least injury is done when the liquid dries off most rapidly.

(9) That the time of day when the application is made is unimportant.

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BLACK KNOT.

SIR,—I notice that Prof. Farlow, of Harvard University, has successfully used red oxide of iron with linseed oil as a paint to destroy black knot on plum trees. Would not a liberal dressing of copperas around our plum and cherry trees fortify them to some extent against the attack of fungus by absorbing ome of the iron, or would plum or cherry trees not absorb it

Again, would not iron sprayed on the trees in the early spring, before the foliage appears, be destructive to the fungus spores which might be blown upon them?

SUBSCRIBER.

The plum and cherry trees would not be likely to absorb a sufficient quantity of iron to prevent the spores of the black knot from growing upon them, for trees will not take up more than a certain percentage of this element from the soil, even though it be very abundant there; but spraying the trees with sulphate of iron in early spring has not only been highly recommended, but has proved itself to be a valuable remedy for black knot. This substance is used in the proportion of one pound to twenty-five gallons of water, and, although too strong to be applied when the foliage has developed, it can safely be applied while the trees are yet in bud, and will serve to destroy, not only a large number of spores of the black knot, but also of the scab, mildew, rust and other fungi,

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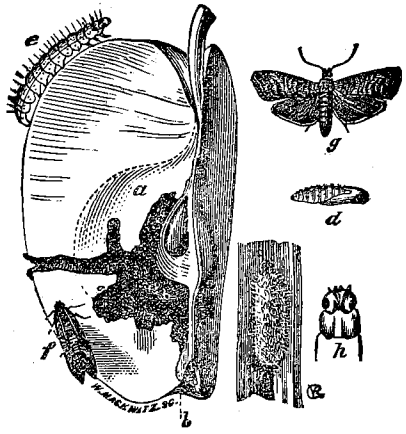
## KEROSENE FOR BLACK KNOT.

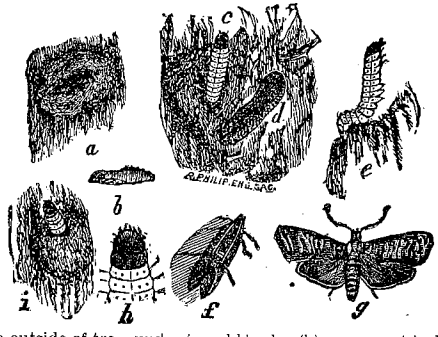
My next door neighbor had several plum trees bearing fine fruit, and all died covered with knots; but before dying I had secured a few sprouts and had some fine young trees, on which, when they were about six feet high, knots began to break out on the trunks, some six inches long. Having filled a small sewing machine oil can with coal oil, I gave the knots a dose; they stopped growing, but in about a month a few more made their appearance and some old ones began to swell again, then another dose finished them. The next year (last summer) a few spots appeared, they were treated before they broke out, and all the trees are now very thrifty, only scarred where the large knots were, all the knots died and fell off like loose bark, leaving dead spots over which the new bark is growing. If the trees are very badly affected, it is better to cut them down, they are so unsightly. The oil does not seem to have any bad effect on the sound part of the tree; but, like all other medicine, too much might be injurous, but I'd rather kill trying to save than let the disease have its way.—R. N. Y.

## THE CODLIN MOTH.




The puncture made by the moth is represented at (b), the borings of the larva at (a), the mature worm at (e), the moth with wings closed at (f), the moth with wings expanded at (g), and the cocoon at (i); (d), the chrysalis, and (h), the anterior part of the body, magnified.

This insect, which appears in the early worm-eaten apples and pears, in the form of a reddish white grub, was introduced into this country with the apple tree from Europe. It causes the fruit to fall prematurely from the trees. "The perfect insect," says Charles Downing, in his work on *Fruit and Fruit Trees of America*, "is a small moth; the fore wings grey with large round brown spots on the hinder margin. These moths appear in the greatest numbers in the warm evenings of June, and lay their egg in the eye or blossom end of the young fruit, especially of the early kinds of apples and pears. In a short time, these eggs hatch and the grub burrows it way till it reaches the core. The fruit then ripens immediately and drops to the ground, here the worm leaves the fruit and creeps into the crevices of the bark and hollow of the tree and spins its cocoon; which usually remains there till ensuing spring when the young moth again emerges from it.




(a), Nest of larva on outside of tree, under the old bark; (b), pupa; (c), larva exposed from nest; (d), old nest; (e), larva about to build nest; (f), the moth at rest; (g), moth with wings spread; (h), head of larva.

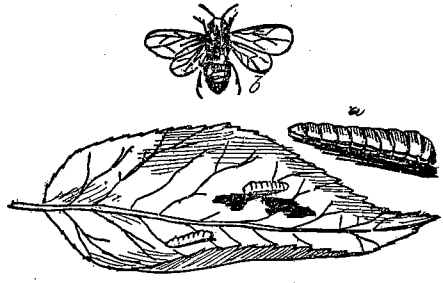
## REMEDIES AGAINST THE CODLIN MOTH.

There are two modes of fighting them generally made use of—one is to prevent the hatching of the egg, or the killing of the young worm while working into the fruit; the other is the catching of the worm in traps as it is escaping from the fruit, or having the fruit eaten by hogs as soon as it drops from the tree and before the worm escapes. The first mode is without doubt the most successful, and is also the least expensive. This is accomplished by spraying the trees with London purple or Paris green, using one pound of either to one hundred and fifty gallons of water. Paris green is a compound of arsenic and copper. It is a far more powerful poison than arsenic alone, and is not soluble in water, hence it will remain much longer on the trees. London purple is another arsenical compound. It is the residue from the manufacture of aniline dye, and contains lime, arsenuous acid and carbonaceous matter. It is soluble, more adhesive and less poisonous than Paris green. It is better to wet the powder thoroughly and make a paste before putting it into the vessel of water, that it may not form lumps. The liquid should then be strained, thereby removing the sediment that is in the London purple. Some have reported to this Board that the London purple burned the foliage, This, doubtless, arises from difference in the strength of the London purple, and we recommend that care be exercised and tests be made before using, so that it shall not be too strong. The spray is caused by forcing the liquid, by means of a force pump, through a fine perforated nozzle, made specially for the purpose. The finer it is the less liquid will be required. The important thing is to scatter the spray on all the fruit.

## WHEN TO SPRAY.

The Codlin Moth, soon after the fruit sets, lays her eggs upon the calyx or blossom end of the young fruit. The grub, as soon as hatched, eats its way into the centre of the sound fruit, and there, growing with its growth, works its mischief. In its early state the young fruit is erect, its calyx or blossom end upwards, and the least particle of poisoned water falling upon it is sufficient to destroy the young worm when it attempts to eat its way into the fruit. Therefore, the best and most opportune time for spraying the tree is soon after the fruit is set, and when it is about the size of a small pea. Experience teaches, however, that it is not safe to depend upon the one early spraying to accomplish the results sought for, whether coming from a second, and perhaps a third, crop, which many affirm and others deny, or from those that from some cause have not matured as rapidly as others; still the facts remain that in many places the Codlin Moth does not sting the fruit and lay the eggs until later in the season. Therefore, to obtain the best results, the spraying should be continued with an interval of two weeks until the first of August, and even later than this on some varieties. Care should be observed that vegetables are not sprayed with these mixtures, and no animals be allowed to eat the grass that has been saturated with the spray, and that the spraying is not done when the trees are in bloom, for then it is that bees are present.

PEAR AND CHERRY TREE SLUG.



Growers should be on the look-out for this destructive pest about middle of June and again in early August, and if the young slugs are then abundant, they should be then promptly attended to, since if neglected, they soon play sad havoc with the foliage, feeding upon the upper side of the leaves and consuming the tissues, leaving only the veins and under skin. The foliage deprived of its substance, withers and becomes dark colored, as if scorched by fire, and soon afterwards it drops from the tree. Trees badly infested often become as bare of foliage in July as they are in January. In such cases the tree is obliged to throw out new leaves, and this extra effort so exhausts its vigor as to interefere seriously with its fruit producing powers the following year. Although very abundant one season, they may be very scarce the next, as they are liable to be destroyed in the interval by enemies and by unfavorable climatic influences.

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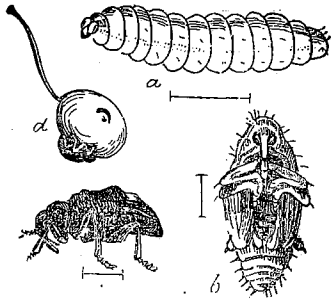
REMEDIES.

Paris green mixed with water in the proportion of one ounce to six gallons and applied to the foliage with a syringe or a spray pump, promptly destroys this slug.

Fresh air slacked lime, sand, ashes or road dust on the foliage is said to be an efficient remedy. But these latter are unsatisfactory measures and usually of little value, especially if applied late in the season.

## PLUM CURCULIO.

*(Conotrachelus nenuphar.*—Herbst*).*




The different stages are shown in the accompanying wood-cut: (a) represents the grub much magnified; (b), the chrysalis, and (c), the beetle, both magnified; (d), the young fruit, showing the crescent-shaped mark made by the insect, and the curculio, life size, at its work.

There is perhaps no insect so well known by name as the Plum Curculio. The perfect insect belongs to the family known as the snout-beetles, from the shape of the head, which is elongated into a beak. It is a small, rough, grayish beetle, about one-fifth of an inch long. The females lay their eggs in the young fruit of plums and cherries, frequently destroying the whole crop.

### REMEDIES.

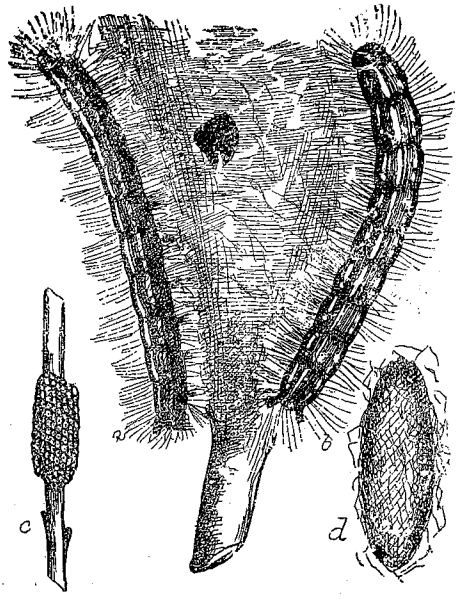
The beetles are sluggish in the early morning, and drop from the trees if a sudden jar be given to the trunk. For this purpose a metal spike is driven into the trunk, which is struck sharply with an iron hammer. This gives the sharp jar necessary to dislodge the beetles which fall on sheets or into receptacles placed beneath the trees. They are then collected and destroyed.

Of late years abundant evidence has proved the efficacy of spraying the trees, as soon as the fruit has formed, with Paris green, 1 pound to 200 gallons of water, and ten days afterwards a second time with a weaker mixture, one pound, to 300 gallons. Should heavy rains occur immediately after these sprayings, they must be repeated.

### POISONING.

Poisoning by using arsenical poison, Paris green or London purple, the last seems preferable, as it is cheaper, more readily mixed and more effective. One pound to 200 gallons of water is strong enough, spraying trees, Weir, says: "First, just before the blossom buds open: second, two weeks after the petals fall. If a weak, soapy kerosene emulsion is used at this spraying to mix the poisons in, it will also destroy the leaf lice, aphides, bugs and all other insects injurious to the fruit and foliage: and then a third spraying about June 10th, and your fruit is safe."

## THE APPLE-TREE TENT CATERPILLAR.




(a), Side view; (b) back view, full grown at about six weeks old; (c), cluster of eggs; (d), cocoon, oval of pale yellow color.

The moth is of a pale, dull reddish or reddish-brown color, crossed by two oblique parallel whiteish lines, being usually paler than the general color, although sometimes quite as dark, or darker. It lives but a few days in the winged state, merely long enough to provide for a future generation, by the deposition of eggs. The moths are usually most abundant during the first two weeks in July. The eggs, conical, and about one-twentieth of an inch long, and deposited in July upon the smaller twigs in ring-like cluster.

The young caterpillars are fully matured in the egg before winter and thus remain until favorable spring weather, when they begin to move about and soon construct for themselves a shelter by extending shoots of web across the nearest fork of the twig upon which they were hatched, for retreat at night and stormy weather. In five or six weeks they become from one inch to one and three quarter inches in length.

### REMEDY.

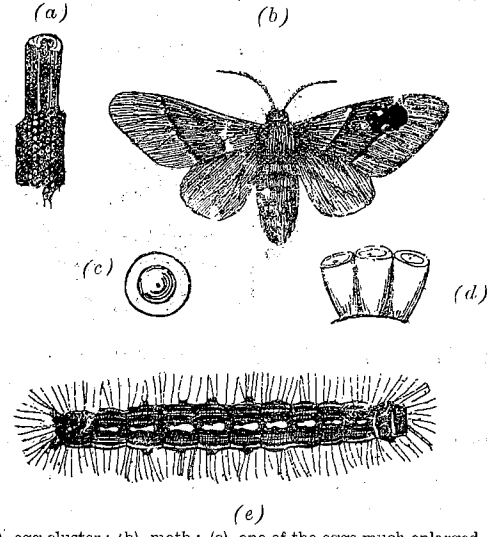
The egg clusters must be sought for during winter months, when the trees being leafless, the eye will readily detect them, after being hatched out, their nests are so conspicuous that there can be no excuse for neglecting to destroy them, and where any of these pests appeared last season thorough

search must be made for these rings of eggs (which are generally found on the small branches), collecting and destroying by pouring boiling water on them or by burning them.

Paris geen mixed with water in the proportion of one ounce to six gallons, and applied to the foliage with a syringe or a spray pump, will promptly destroy this insect.

## THE FOREST TENT CATERPILLAR.

This insect closely resembles the common tent caterpillar described on another page. The eggs are of almost uniform diameter, and from three to four hundred in each cluster, squarely cut off, as shown in (a). After the




(a), egg cluster; (b), moth; (c), one of the eggs much enlarged, as seen from the top; (d), a side view from the same; (e), the caterpillar.

insects are hatched in spring they are often seen marching about in single or double column. In about six weeks these insects are full grown, ts shown in (e).

They are from one to one and one-half inches long, pale, bluish color, with black points and dots. On the back is a row of ten or eleven oval or diamond-shaped white spots, by which it may be at once distinguished from the common tent caterpillar, while on the sides there are pale yellowish stripes somewhat broken and mixed with grey. These insects were numerous in several sections last season. In some of the old orchards the foliage of the apple trees was entirely devoured.

While particularly injurious to the apple, the insect also attacks various species of forest trees, such as oak, thorn, ash, basswood, plum, cherry, walnut, etc.

When full grown the larva spins its cocoon in some suitable place, when after two or three days there is a change to a chrysalis of a reddish-brown color, densely clothed with short hair and after two or three weeks the moth appears, when, having deposited its egg, it perishes.

REMEDIES.

These egg clusters must be sought for and destroyed during the winter months. They can be readily detected, and are easily dislodged and destroyed. If left unmolested they will hatch out in spring and be the cause of much damage. See also, remedy recommended for Apple-Tree Tent Caterpillar.

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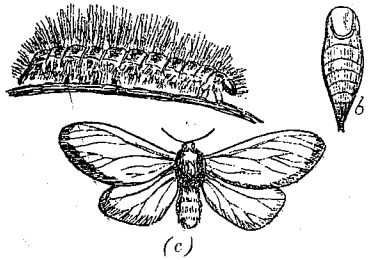
THE FALL WEB-WORM

*(Hyphantria Textor.)*

*(a)*



*(c)*

This insect appears towards the end of the summer and is totally different in all its stages from the common tent caterpillar. The moth of this species deposits her eggs in broad patches on the under side of the leaves near the end of a branch in the month of June, hatching out in July and August.

As soon as the young larvæ appear they begin to eat and to spin a web over themselves for protection. They devour only the pulpy portion of the leaves, leaving the veins and skin of the under surface untouched. From their birth the web-spinning habits of these larvæ promptly leads to their detection as soon as seen they should be removed, by cutting off the twig or branch and destroying it. As they remain constantly under the web for so long a period the removal of the branch insures in most instances the destruction of the whole colony. See also remedy recommended for apple-tree-tent caterpillar. This insect was destructive around Chilliwack last season.

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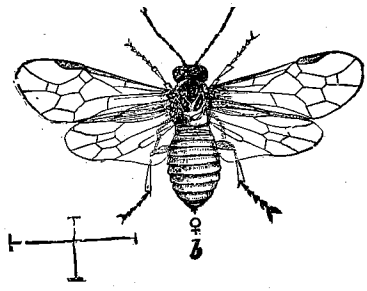
CURRANT FLY.

This insect has not yet, as known by this Board, visited the gardens of this Province, but has been found in the neighboring state. Hence we deem it important to be on the watch for it, with the proper remedies for its extermination.



The perfect female is shown in the above figure, the lines showing the actual size.

This insect will ruin the currant and gooseberry crop, if once it has gained entrance and is allowed to go unmolested. In its perfect state it is a small two-winged fly which lays its eggs on the fruit while it is small. The larvæ enter the fruit yet green and feed on its contents, leaving a small black scar at point of entering. The affected fruit ripens prematurely and shortly decays and drops to the ground, when on opening them a small white grub will be found, about one-third of an inch long.

REMEDIES.

The following remedies have proved effectual where tried in other places: Use one large tablespoonful of powdered white hellebore dissolved in a pailful of water, spraying the bushes just before they bloom and again after the fruit has set.

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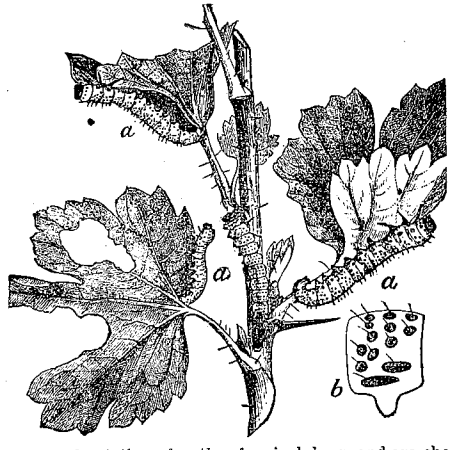
## CURRANT AND GOOSEBERRY SLUG OR WORM.

*(Nematus ventricosus).*




The full-grown worms are about three-fourths of an inch long, and are shewn at (a); (b) gives the position of the black spots upon a magnified joint of the body.

This voracious insect differs from the Cherry Slug. The flies are yellow, not black. The slugs are green, or green dotted with black, and not brown. They feed on the gooseberry or currant, and eat the leaf entire, instead of merely removing the cuticle; It is so readily dealt with by the timely application of remedies, that there can be no possible excuse for for the shocking damage often seen done to these useful fruits about town and country homes.

### POWDERED HELLEBORE.

Hellebore is the best of known remedies, and a perfectly effectual one. Properly applied, no harm can possibly result from it. It should, according to Prof. Lintner, be used in the following manner: Early in the spring, as soon as the leaves of the currant have fully put forth, watch for the first indications of the hatching and commencement of the young larvæ. You have only to look for these on the *lowest leaves on the bushes near the ground.* The indications will be numerous *small holes eaten into the leaves.* Sprinkle powdered hellebore over these leaves, renewing it if washed away by rain, and the desired end is accomplished. If the hellebore remains upon the leaves during the time that larvæ are hatching, all will be killed, and none will remain for subsequent spreading over the leaves and for the need of future attention. If the first brood of worms is thus destroyed, there will be few, if any, to form a second brood in June.

### HAND PINCHING.

Some find it convenient to watch for the first eaten leaves, and to pinch them off by hand and destroy them. The eggs are always to be found conspicuously arranged in rows upon the veins of the under side of the leaves.

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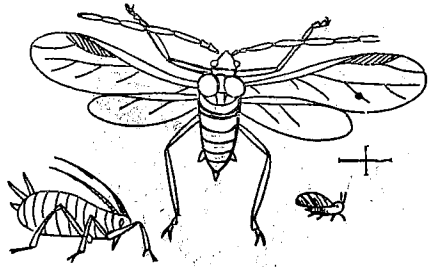
## THE APPLE TREE APHIS.



(Greatly magnified.)

During the winter there may be found in the crevices and crooks of the bark of the twigs of the apple tree, and also about the base of the buds, a number of very minute oval, shining black eggs; these are the eggs of the

Apple Tree Aphis. also called the Green Aphis, and Apple Tree Louse. These eggs are deposited in the autumn, and when first laid are of a light yellow or green color, but gradually become darker and finally black. As soon as the buds begin to expand in the spring, these eggs hatch very tiny lice, which locate themselves upon the swelling buds and the small tender leaves, and inserting their beaks feed upon the juices. All of the lice then hatched are females, and reach maturity in ten or twelve days, when they commence to give birth to living young, producing about two daily for two or three weeks, after which the older ones die. The young locate about the parents as closely as they can stow themselves, and they also mature and become mothers in ten or twelve days, and are as prolific as their predecessors; they thus increase so rapidly, that as fast as new leaves expand, colonies are ready to occupy them. As the season advances, some of the lice acquire wings, and dispersing found new colonies on other trees. When cold weather approaches, males as well as females are produced, and the season closes with the deposit of a stock of eggs for the continuance of the species another year. The leaves of trees infested by these insects become distorted and twisted backwards, often with their tips pressing against the twig from which they grow, and they thus form a covering for the Aphis, protecting them from rain. An infested tree may be distinguished at some distance by this bending back of the leaves and young twigs. It is stated that the scab on the apple often owes it origin to the punctures of these plant lice.

## REMEDIES.

Very much can be accomplished in the destruction of the eggs that have been deposited upon the bark and in the crevices of the trees during the winter months while the trees are in a dormant condition, by scraping the dead bark off the trees, and washing or spraying them with a solution of lye water, made by dissolving one pound of Gillet's concentrated lye in five gallons of water, care being observed not to use this strength of wash after the buds have commenced to swell; this strength of wash will also remove the moss from the limbs and bark of the tree, as well as destroying the larvæ of the Codlin moth which may be reached by it. A frost occurring after a few days of warm weather will kill millions of them. In the egg state, the insect can endure any amount of frost, but the young Aphis quickly perishes when the temperature falls below the freezing point.

The Lady Bird or Lady Bug is one of the most beneficial of the insect tribes to the horticulturist, from the fact that they prey on other insects in all stages of their growth, from the larvæ to the perfect beetle. These should be propagated and protected so far as possible in orchards afflicted with the Aphis, for myriads of them are devoured by the Lady Bird and their larvæ.

## KEROSENE EMULSION.

In making the kerosene emulsion for spraying trees for lice, be sure and follow the correct method: Dissolve in 2 qts. of water 1 qt. of soft soap or

¾ lb. of hard soap by heating to the boiling point. Then add 1 pt. of kerosene oil and stir violently for from three to five minutes. This may be done by taking a common force pump and putting the end of the hose back into the mixture again. This mixes the oil permanently, so that it will never separate, and it may be diluted easily at pleasure. This mixture should be diluted to twice its bulk with water, or about 14 times as much water as kerosene. The kerosene emulsion is successful in destroying cattle lice and sheep ticks, as well as all varieties of plant lice.

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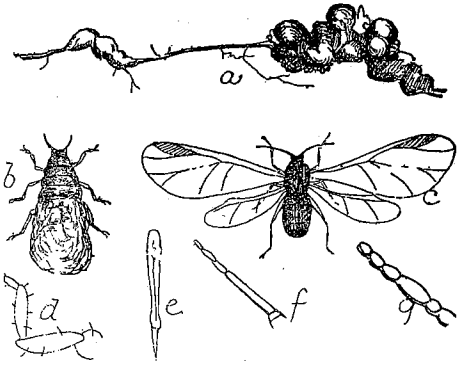
WOOLLY APHIS.




WOOLLY APHIS *(Schizoneura lanigera)*. (After *Riley*).

(a), an infested root; (b), the larvæ—color, brown; (c), winged adult—colors, black and yellow; (d), its leg; (e), its beak; (f), its antennæ; (g), antennæ of the larva; all highly magnified.

This insect is of a dark russet brown color, with the abdomen covered with a white down of cottony appearance. It attacks the roots, trunks and branches of apple, pear and cherry trees. It does not affect the leaves or fruit.—*Cooke.*

This is, without question, one of the most dangerous enemies to which the apple tree is subjected. That it has secured a strong hold in the larger portion of the orchards in and around Victoria, Nanaimo and New Westminster cities, also a greater part of Westminster district is affected. So far as we can learn little, if any, effort has been made to exterminate it from any of the orchards infested. This, we think, is due to the fact that but few know what it is, and the danger that its presence brings to the orchard.

The Woolly Aphis is a small insect covered with a white, woolly substance, hence its name. Its color is a reddish brown, and when crushed it yields a red juice. They infest the apple tree in particular both roots and

branches. They live upon the sap of the bark and produce small warts or granulations on it. They increase with astonishing rapidity, and the wind carries them from one tree to another by the light down in which they are enwrapped, and thus they spread quickly from one orchard to another. Not a moment should be lost in destroying the first one that puts in an appearance.

## REMEDY.

The following remedy is taken from the secretary's report, California State Board of Horticulture:

"Four pounds of rosin, three pounds of sal soda, water to make four and one-half gallons; dissolve the sal soda in a few pints of water; when thoroughly dissolved add the rosin; heat until dissolved and add water finally. Use one and one-half pints of this solution to the gallon of water. Use at a temperature of 100 degrees Fahrenheit."

The application of any of the rmedies used for the destruction of the Green Aphis are also recommended as being good. It is thought by this committee that owing to the dampness of our climate the Woolly Aphis will not infest the roots to any great extent, and that a shovelful or so of fresh ashes placed around the base of the tree will destroy those that may have commenced operations below the surface and prevent others from doing so. In the drier climates of the Interior and east of the mountains, it doubtless will be found that they will do their most destructive work out of sight at the roots. When this is known to be the case, the application of fresh gas lime has proved to be a lasting destroyer of the insect, and also a valuable fertilizer for the tree—a couple of shovelfuls for each tree, spreading it over the surface around the tree to cover about six feet in diameter. If the soil is deep and well drained, a much larger quantity map be safely used. Care should be taken not to put it around the body of the tree, as the solution of gas water formed by the rains might scald the bark. It will be well also to use in connection with the gas lime a shovelful of fresh ashes around the base of the tree. This will prevent possible migration of the Aphis from the roots to the upper branches.

This insect appears in two forms, one of which attacks the trunks of the apple tree, the other works under the ground and produces on the roots wart-like swellings and excrescences of all shapes and sizes. While it usually confines itself to the roots of trees, it is sometimes found on the suckers that spring up from the roots, and occasionally the mature lice crawl up the branches of the trees, where they also form colonies during summer, and then are known as the Woolly Aphis of the apple. The insect which attacks the trunk and limbs of the apple tree is of the same species as that which works on the root, having the same cotton-like covering. In October a considerable number of these appear with wings, having but little downy substance upon their bodies. Late in the autum, the females deposit eggs for another generation the following spring, and thus furnish the parents of countless hosts to infest the trees another season.

There are several friendly insects which prey upon this Woolly Aphis. A very minute four-winged fly, *Alphelinus Mali*, is parasitic on it, and the larvæ of a small beetle belonging to the Lady Bird family, *Scymnus Cervacalis*, feeds on it.

Use Kerosene Emulsion for spraying while the trees are in leaf also.

During the summer months those on the trees can easily be killed by touching them with a swab dipped in coal oil.

SOAP—FOR YOUNG TREES.

Two pounds of home-made soft soap to one and one-half gallons of water, poured around the roots of the nursery stock (young apple trees), destroy the Woolly Aphis, the earth being first cleared away from the trees. The roots of young apple trees should be dipped before planting.

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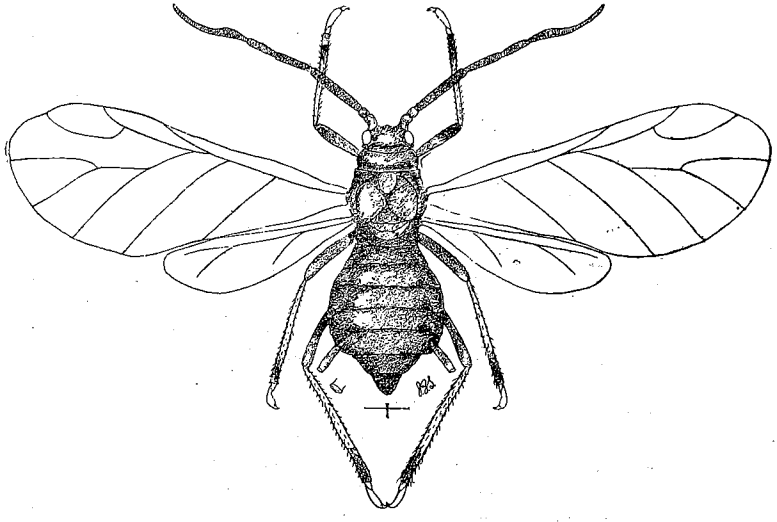
## PEACH TREE APHIS.

*(Myzus Persicae).*



This aphis begins to work upon the young leaves of the peach trees almost as soon as they burst from the bud, and continues throughout the greater part of the season unless swept off, as sometimes happens with surprising rapidity, by insect enemies. The perfect winged females are about one-eighth of an inch long, black, with the under side of the abdomen dull green; the wingless females rusty red, with the antennæ, legs and honey tubes greenish. The winged males are bright yellow, streaked with brown, with black honey tubes. Use the kerosene emulsion, spraying as in direction for the apple tree aphis.

## HOP PLANT LOUSE.

The hop louse invaded the hop fields of British Columbia last season to a large extent and if allowed to go unmolested would soon ruin that industry.

"Wherever it occurs, whether in England or on the continent of Europe, in New York, Wisconsin or on the Pacific coast, the Hop Plant Louse *(Phorodon humuli)* has substantially the same life round. The eggs are laid in the fall on different varieties and species of the plum, both wild and cultivated. They are small, glossy, black, ovoid, and are attached to the terminal twigs, especially in the more or less protected crevices arounds the buds. (Fig. A).

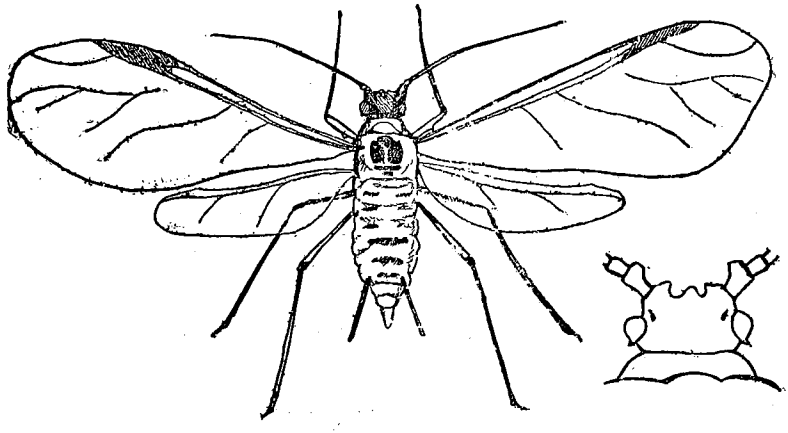
(FIG. A.)

Winter egg of the Hop Plant Louse and shrivelled skin of the sexual female which laid them—enlarged.

From an egg hatches in the spring, about the time when the plum buds begin to burst, a stout female plant louse, known as the stem-mother, which differs from the summer individuals, by having shorter legs and shorter honey tubes.

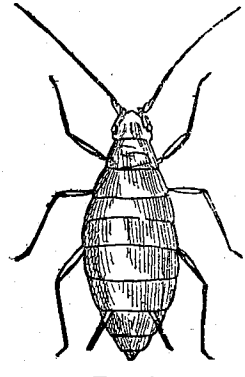
She gives birth, without the intervention of the male, to living young, and this method of propagation continues until the last generation of the season. The second generation grows to full size and gives birth to a third, which becomes winged (Fig. B), and develops after the hops have made considerable growth in the yards. The winged lice then fly from the plums to the hops deserting the plum tree entirely and settling upon the leaves of the hops, where they begin giving birth to another generation of wingless individuals. They multiply with astonishing rapidity. Each female is capable of producing on an average about one hundred young, at the rate of three per day, under favorable conditions. Each generation begins to breed about the eighth day after birth, so that the issue from a single individual runs up, in the course of a summer to trillions. The issue from a single stem-mother may thus, under favorable circumstances, blight hundreds of acres in the course of two or three months. From five to twelve generations are produced in the course of the summer, carrying us in point of time to the hop-picking season.

There then develops a generation of winged females *(sexuparæ)*, which fly back to the plum tree and give birth to the true sexual females (Fig. C), (FIG. B).



The Hop Plant Louse, third generation on plum—the generation which flies to the hop. Head below at right. Both enlarged.

which never acquire wings and never leave the plum tree. By the time this generation has matured, which requires but a few days, varying according to the temperature, belated winged individuals which are the true males (Fig. D) fly in from the hop fields. These fertilize the wingless true females upon



(FIG. C).

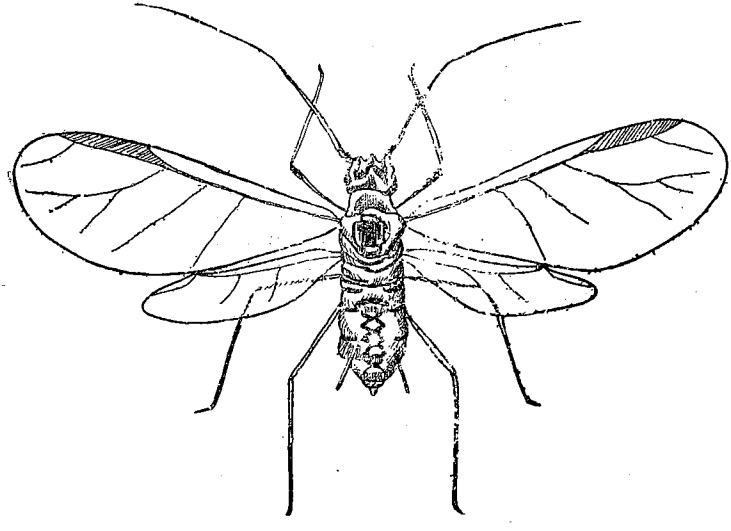
The Hop Plant Louse, true sexual female—enlarged.

the plum leaves, and these soon thereafter lay the winter eggs. Thus there is but one generation of sexed individuals produced, and this at the close of

the life round—the females wingless on plum trees; the males winged on hops. All intervening generations are composed of virgin females only *(parthenagenetic)*. This is the invariable round of the insect's life.

## REMEDIES.

From the life history just given, three important facts are obtained: (1). It will pay to make a preventive application of some of the mixtures mentioned further on, with apparatus before described, to all plum trees in the neighborhood of hop yards, either in the spring, before the appearance of the first winged generation and its consequent migration to hop, or in the fall after hop picking and after the lice have once more returned to the plum, and are making their preparations for the laying of winter eggs. The latter time will, perhaps, be preferable, for the reason that in the fall the plum trees will be less susceptible to the action of the washes, and a stronger solution can be applied without danger to the trees. (2). All wild plum trees in the woods through a hop-growing country should be destroyed. (3) The hop vines should be either burned or thoroughly drenched with kerosene emulsion as soon after the crop is harvested as possible, with a view of killing the males, and thus preventing the impregnation of the females. (4). If the above



(FIG. D).

The Hop Plant Louse, male—enlarged.

measures have been neglected and the lice have attacked the vines, the crop can still be protected by spraying with insecticide mixtures, which, if thoroughly applied will prove effective, and there will be no danger of reinfestation from neighboring untreated yards, since during the summer the lice cannot migrate except by crawling from one yard to another.

## SUBSTANCES TO BE USED.

Last season several solutions were used for spraying the vines, but from a majority of the reports received, the quassia chips and whale oil soap seems to have given the best satisfaction. A number of the growers failed to prepare the kerosene emulsion properly, the mixture not forming a perfect emulsion. The formulas in any of these washes should be closely observed and carried out.

### FORMULA FOR KEROSENE EMULSION.

| | | |
|---|---|---|
| Cheap kerosene | pints | 8 |
| Water | " | 4 |
| Soap | pound | ½ |

Dissolve the soap in the water and add, boiling hot, to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute one part of the emulsion with twenty-five parts of water. A common grade of kerosene, which is good enough for this work, can be bought in most localities at eight cents per gallon by the barrel, and the soap used can be made for one cent per pound. This would make the batch given above cost eight and one-half cents, and diluted with twenty-five gallons of water to one of the emulsion would make thirty-eight and one-half gallons of wash. At this rate one hundred gallons would cost twenty cents.

### FORMULA FOR TWENTY-FIVE POUNDS FISH-OIL SOAP.

| | | |
|---|---|---|
| Crystal potash lye | pounds | 1 |
| Fish-oil | pints | 2 |
| Soft water | gallons | 3 |

A strong suds made at the rate of one pound of this soap to eight gallons of water will also be found a uniformly safe and satisfactory wash to use, killing the lice and not harming the vines. After standing three days, however, the suds will lose its efficacy.

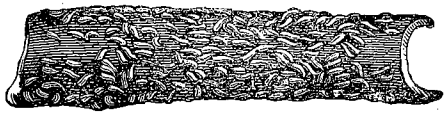
The Board also recommends the Quassia Chips solution which has been used with great efficiency in the hop yards of the Puyallup valley. Formula as follows:

### QUASSIA CHIPS SOLUTION.

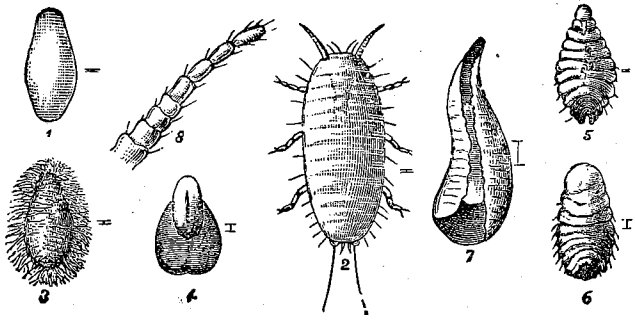
8 pounds of Quassia Chips.
7 " " Whale-oil Soap.

The quassia chips are boiled in about one gallon of water to each pound of chips, for one hour. The soap is added while hot, and allowed to dissolve. This solution is then diluted with 100 gallons of water. Use with sprayer.

## THE OYSTER SHELL BARK LOUSE.



The scale is of a brownish or grayish color, about one-sixth of an inch in length, nearly the color of the bark of the tree, and in shape resembles the shell of an oyster—hence its name.




In some instances the branches and trunks of the trees become literally covered with these scales. Under each scale, as shown in the figure above at 1, may be found a mass of from twenty to one hundred eggs. In May or early June and September they hatch, and appear as shown, highly magnified, at 2. In a few days a fringe of delicate, waxy threads issues from their bodies, as seen at 3. Gradually the insect assumes the form shown at 4; 5 and 6 present the larva as nearly full grown and when detached from the scale. Before the end of the season the louse has secreted for itself the scale covering shown at 7, in which it lives and matures.

### REMEDIES.

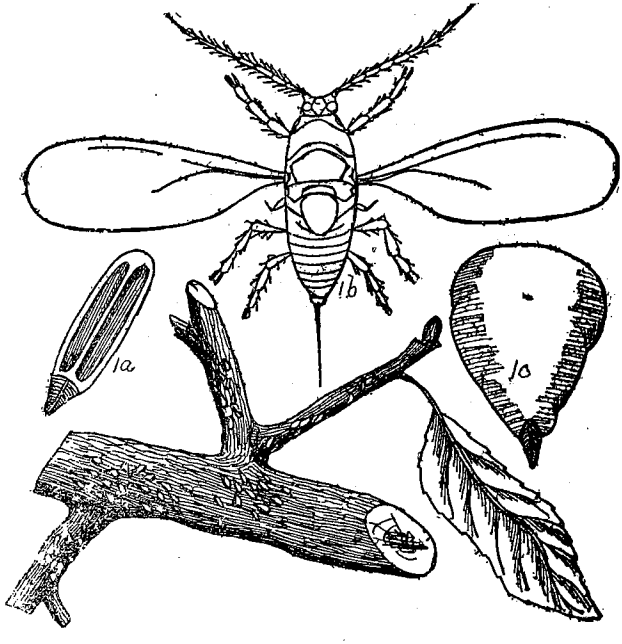
The following is recommended for winter wash; one pound of concentrated lye (American or Babbitt's); one-half pound of rosin; two and one-half gallons of water.

First dissolve the lye in water, and when thoroughly dissolved by heating, add the rosin; use at a temperature of 100 degrees Fahrenheit.

For use when the tree is in foliage, dilute by using ten times the quantity of water. The summer wash is attended with best results when applied when a majority of the insects are hatched out. The first brood generally appears when the cherries are turning color. Badly infested trees should be treated to several applications of the wash with an interval of ten days.

## THE SCURFY BARK LOUSE.

*(Chionaspis Purpurs).*




This insect was found this season in the Okanagan district where it was doing considerable damage. Is resembles in some respects the Oyster Shell bark louse, yet is sufficiently dissimilar to be readily distinguished from it. In this species the scale of the female is oblong in form, pointed below, very flat, of a greyish white color and about one-tenth of an inch long.

It is found chiefly on the apple but sometimes affects the pear and also the mountain ash. It is far less common than the Oyster Shell bark louse and is nowhere anything like as injurious as that insect.

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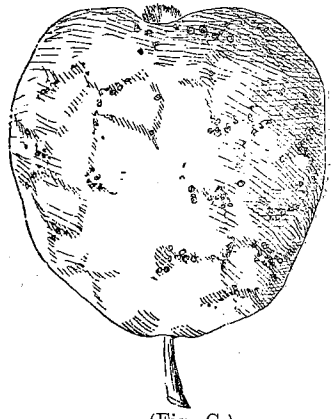
### REMEDY.

Same as for the Oyster Shell bark louse.

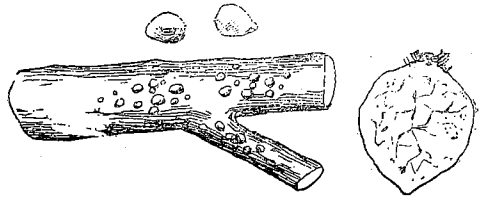
## SAN JOSE SCALE OR GREEDY SCALE.

*(Asptdiotus Perniciosus or Aspidiotus rapax).*

(Fig. A.)



(Fig. C.)



(Fig. B.) (Fig. D.)

A and B, portions of branches infested; C, a pear infested; D, larva of female enlarged.

This dreaded and most destructive enemy of not only the fruit, but the ornamental and forest trees as well, has secured a hold in some of the orchards in Oregon and Washington, and it is feared that it will be ultimately found in this Province. Careful enquiry from parties with whom the Scale is found, develops the fact that they have been brought into Oregon on trees shipped from California. As trees from California have been pretty generally distributed all over the coast by the industrious tree pedlar, so it may be expected that these destructive insects have doubtless gone with them.

The remedy to be applied to the Scale is much more simple than the one to be applied to the tree pedlar or the careless person who buys his trees without first knowing whether they are coming from infested nurseries or not.

This is, without exception, the most pernicious Scale insect known in this country. It affects all the deciduous trees. They have also been found on some of the evergreen varieties. They infest the bark of the trunk and limbs of the tree, also the leaves and fruit. Their presence upon the bark will soon turn the sap part of the wood beneath the bark to a reddish color. Their presence upon the fruit causes it to be covered with bright red spots, and, when badly affected the fruit shrivels up and cracks open.

The scale of the female is circular and flat, gray in color, except the centre, which is of a reddish yellow. The scale of the male is black, and is somewhat elongated when fully grown. The full grown Scale is scarcely one-sixteenth of an inch in diameter. The eggs are yellow. The young larva are very active and of a pale yellow color, and barely to be seen by the naked eye. The young scales appear like fly-specs. They multiply with great rapidity, there being three broods in one season. The first hatching is usually the latter part of May, the second in July and the third in September.

The fact that they multiply thus rapidly and infest to the death nearly every variety of tree and shrub, makes their presence in our midst one of great danger to not only our fruit trees, but to the shade and ornamental trees as well.

The following remedy for the Scale is recommended :

This pest is so readily detected during the month of May, that wherever trees are infested they will be noticed at once, and where they were not destroyed last season, the trees or bushes should be sprayed or thoroughly washed during winter with solution as follows ; notice what is stated as to the strength of the solutions, as to summer and winter spraying.

For summer spraying : Take two gallons of water ; put into this one pound sulphur, one pound concentrated lye ; boil for two hours, then add one half gallon fish oil ; boil until it makes a hard soap ; add one half gallon kerosene oil, stir well and boil a few minutes. Add to this twenty-five gallons cold water. For winter spraying double all the ingredients for the amount of water used.

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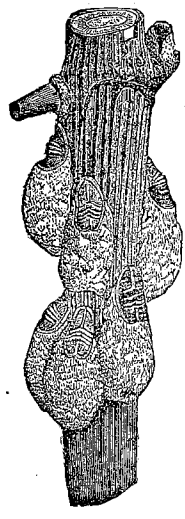
## THE WOOLLY MAPLE BARK LOUSE.

*(Pulvinaria innumerabilis.)*

The presence of the Woolly Maple Bark Louse is manifested in the spring and early summer by the occurrence upon the twigs of maple trees, especially on the under side, of a brown, circular, leathery scale, about one-quarter of an inch in diameter beneath which is a peculiar fluffy cotton mass, presenting the appearance of Fig. A. In the spring there may be found in each of these masses great numbers (700 to 1,000) of small white, spherical eggs.

Early in summer these eggs hatch into young lice, which scatter over the trees wandering about on the twigs and leaves for a few days and finally fixing themselves upon the lower leaf surface insert their beaks and suck out the sap.

This scale infests the maple trees, currrant bushes, and fruit trees.



(FIG. A.)

They also attack the quince tree and currant bush.

In autumn the males issue as winged insects, but females remain on the tree, removing, however, from the leaves to the twigs or branches.

The cut shows eggs as hatched in the spring.

There is a species of black ant that destroys the egg sac, and on that account it does not increase as do some of the other insect pests.

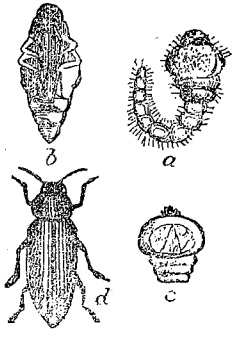
## REMEDY—USE WITH SPRAY PUMP.

For summer spraying : Take two gallons of water; put into this one pound sulphur, one pound concentrated lye ; boil for two hours, then add one half gallon fish oil ; boil until it makes a hard soap ; add one half gallon kerosene oil, stir well and boil a few minutes. Add to this twenty-five gallons cold water. For winter spraying double all the ingredients for the amount of water used.

This solution, with a sprayer, will be effective in destroying the Aphis.

## APPLE TREE BORER.

*(Chrysobothris femorata).*




(a), Shows larva; (b), chrysalis; (c), primary stage; (d), the perfect insect.

Of these there are a number of species. The two striped or round-headed is extremely destructive to apple orchards, from the boring of the grub into the wood of the tree. The mature beetle appears during May and June, and being strictly nocturnal, is seldom seen except by those who hunt for it. The female deposits her eggs mostly in June, in the bark near the foot of the tree, and also in the forks of the main branches. The eggs hatched, the minute grub commences boring into the wood, generally downward the first year, and upward and near the bark the second year. The Borer lives in the wood of the tree until the third year when it emerges a perfect beetle. It infests healthy as well as unhealthy trees, and is very destructive.

The flat-headed Borers, while working in the same class of trees, is totally unlike the others. Boring an oval hole twice as wide as high, the beetle flies by day instead of at night, and besides the apple tree, attacks the oak, peach, soft maple, ash, willow, tulip, and even the elm and cotton wood; it also attains its full size in one year from the egg. This Borer attacks limbs and trunk indiscriminately.

### REMEDY.

The natural enemies of these insects are the birds of the woodpecker tribe.

Artificial remedies are to find the cast of the larvæ, and kill them by piercing with a flexible wire. Prevention is, however, the only sure remedy. keep the base of every tree clear of weeds and trash, and apply a solution of soft soap reduced to the consistence of a thick paint by the addition of a strong solution of washing soda in water. This, if applied to the bark of the tree, especially about the base or collar, and thence up the trunk and over the larger branches, will dry in a few hours, and form a tenacious coating not

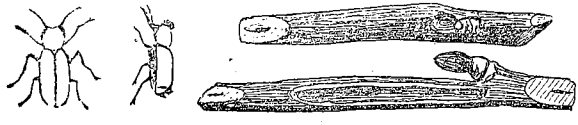
easily dissolved by rain. This soap solution should be applied in May, and a second time the latter part of June.

All trees liable to be troubled with borers of any kind should be examined at least twice each year and the earth removed from about the base of the tree, and wherever the castings of the larvæ are found protruding through the bark an application of unadulterated coal oil should be made by means of a small can. The saw-dust castings absorb the coal oil and it permeates the burrow and soon comes in contact with the larvæ which ends his destructive work. The amount of oil used will in no way endanger the health of the tree and does away with the old process of digging them out with a knife which usually badly mutilates the tree and it is also a great saving of time and labor as a person can inspect and treat many trees in an hour.

The following wash, applied hot to the trunk and large limbs of the tree, in May and again in the latter part of June, will not only keep the trees free from borers but also from any other insects that infest these parts of the tree, viz. : One pound of potash and one pound of lard dissolved in five gallons of boiling water, stirring in one pint of crude carbolic acid, slack four pounds of lime in one gallon of water and while hot mix all together adding four gallons of water.

## THE APPLE-TWIG BORER.

*(Omphcircus bicaudatus.)*



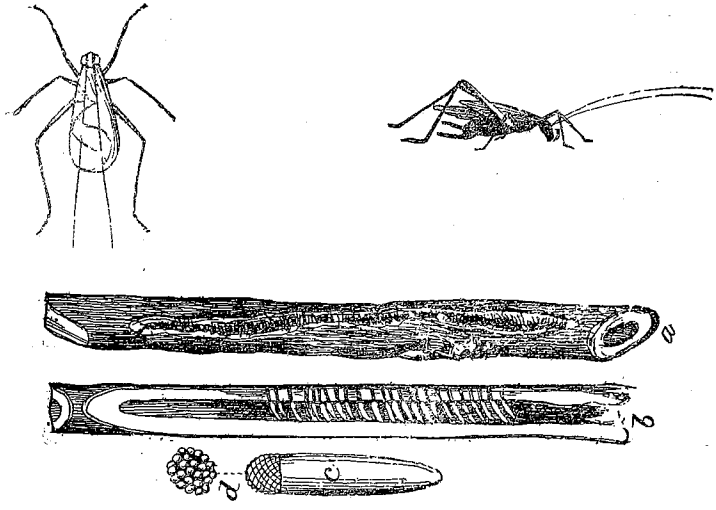
This Borer was found in some numbers in the Chilliwack district. It is a small cylindrical beetle, from one forth to one third of an inch in length of a dark chestnut brown colour above, black beneath.

Unlike most other borers which do their mischief in the larvæ state, this insect works in the beetle state, boring into the branches of apple pear and cherry trees just above a bud, and working downwards through the pith in a cylindrical burrow one or two inches long. The holes appear to be made partly for the purpose of obtaining food and partly to serve places of concealment for the beetle. They are made by both sexes alike. They work throughout the summer months, causing the twigs operated on to wither and their leaves to turn brown.

This insect does not often occur in such numbers as to inflict any material damage. Should it at any time inflict serious injury, the only remedy as yet suggested is to search for the bored twigs in June and July and cut them off and burn them.

## THE TREE CRICKET.

*(Œcanthus Niveus)*



In the Okanagan district I found this insect working on the young branche of the apple and plum trees, and I venture to say will be found troublesome on the raspberry canes. The insects are about seven-tenths of an inch long, of pale whitish green colour. They are exceedingly lively, and the males quite musical, chirping merrily with a loud, shrill note, among the bushes all the day. In the autumn they attain full growth, and it is then the female, in carrying out her instinctive desire to protect her progeny, becomes an enemy to the grower. She is furnished with a long ovipositor, which she thrusts obliquely more than half way through the limb or cane, and down the opening thus made she places one of her eggs. A second one is then placed in the same manner along side of the first, and so on until from five to fifteen eggs have been placed in a row.

Owing to the presence of these eggs the limb is much weakened and is liable to break on slight provocation. Sometimes the part beyond the punctures dies, but if it survives and escapes being broken in winter it is very apt to break from the action of the wind on the weight of foliage as soon as it has expanded in spring and the crop which would otherwise be realized is lost. About midsummer, or sometimes earlier, the insects hatch. They at once leave the limb or canes and do no further injury to them. At first they feed more or less on plant lice and later in the season on ripe fruit and other succulent food.

REMEDIES.

Cut out late in the fall or early in the spring all those portions containing eggs and burn them. Wherever the eggs are deposited the regular rows of punctures are easily seen. The mature insects may also be destroyed in the autumn by suddenly jarring the bushes or canes on which they collect, when they drop to the ground and may be trodden under foot before they have time to hop or fly away.

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## THE IMPORTED CURRANT BORER.

*(Æyeria Tipuliuformis.)*

This insect has made its appearance in Vancouver and New Westminster cities and is a serious impediment in the way of successful currant culture.

The parent of this destructive larvæ is a pretty wasp like moth and appears about the middle of June, when it may be found in the hot sunshine darting around with rapid flight. The female is said to lay her eggs near the buds when in a few days they hatch into small larvæ which eat their way to the centre of the stem where they burrrow up and down feeding on the pith all through the summer, enlarging the channel as they grow older, until at last they have formed a hollow several inches in length.

While this insect chiefly infests the red and white currants it attacks the black currant also and occasionally the gooseberry. Where the hollow stems do not break off indications of the presence of the borers may be found in the sickly look of the leaves and the inferior size of the fruit.

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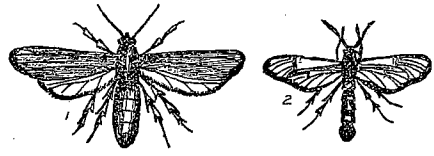
REMEDIES.

In the autumn or spring all stems found hollow should be cut out and burnt. During the period when the moths are on the wing they may often be captured and destroyed in the cool of the morning at which time they are comparatively slug ish.

## THE PEACH TREE BORER.

*(Ægeria exitiosa.).*



This pest, so destructive to peach orchards, is very widely disseminated. The moth appears from about the first of June to the middle of September. The female deposits her eggs in the bark of ths tree at the surface of the ground. They are very small, oval in form, slightly flattened and of a dull yellowish color. They are deposited singly and are fastened to the bark by a gummy secretion. As soon as the worm is hatched, it works downward in the bark of the root, forming a small winding channel, which soon becomes filled with gum. As it increases in size it devours the bark and sap wood, and causes a copious exudation of gum, which eventually forms a thick mass around the base of the tree, intermingled with the castings of the worm. When full grown the worm measures over half an inch in length and about a quarter of an inch in diameter. It is a naked, soft, round grub, of a pale whitish color, with a reddish horny looking head, and black jaws. In badly infested trees the whole of the bark at the base of the tree is sometimes consumed for an inch or two below the surface. Nor does the insect always confine itself to the base of the tree. It occasionally attacks the trunk further up, and sometimes the forks of the limbs. But exuding gum invariably points out the spot where the enemy is at work. Its operations are not always confined to the peach; it also works on the plum.

### REMEDIES.

Several remedies have been proposed to meet this evil. Where the borers are present they are easily detected in consequence of the exudation of gum. Hence, early in the spring the trees should be examined, a little of the earth removed from about the base of the tree, and if masses of gum are found, the grub should be searched for and destroyed. Hot water has been found very effectual in killing them. It should be used boiling hot, and after the earth has been removed from about the base of the tree.

Among the preventive measures much has been written in favor of mounding the trees, banking the earth up around the trunk to the heigth of a foot or more, and pressing it firmly about the tree Some allow the mounds to remain permanently, but the better way is to mound up late in the spring, and level off the ground again in September, after egg laying has ceased and the moth has disappeared. Another preventive, which we regard as much better

than mounding trees, is the use of stiff paper one foot high about the base, extending some two inches below the surface, and fastened at the top with string or wire. The washes recommended for the apple tree borer are also good to be used on the peach.

## BLACK SPOT OR FUNGUS.

*(Fueicladum drudriticum.)*

This disease that the apple and pear are subject to is doing a good deal of damage to those fruits in some portions of British Columbia. It is more apparent and destructive on some varieties than upon others. The causes which produce this disease are somewhat uncertain. Suffice it that those longest in cultivation, most productive, and in confined situations, appear to be most liable to it. It is a fungus growth, presenting, when examined by the microscope, a mossy, spongy character, occupying the skin so as to prevent the development of its tissues, and result in checking the growth at that point, thus creating a black spot and a deformity. When the malady spreads, as it sometimes does, over half or more of the apple or pear, it tends to a deeper nature and causes the fruit to crack open and become corky and worthless.

## FORMULAS FOR FUNGICIDES.

### BORDEAUX MIXTURE.

This fungicide originated in France and has become one of the leading combinations of copper salts. Since its introduction into America there has been a constant tendency to dilute the mixture more and more. The results from the diluted mixtures have been apparently as good as from those of full strength, and of course the cost has been proportionately lessened. The different formulas are indicated below:

### ORIGINAL FORMULA.

Dissolve six pounds copper sulphate in one gallon hot water in an earthern or wooden vessel. In another vessel slack three pounds fresh lime in one gallon water. Strain the latter and add to twenty gallons water. Now pour in the dissolved copper sulphate and mix thoroughly; keep the mixture stirred while using.

### GREEN FORMULA.

In 1891 Mr. W. J. Green, of the Ohio Experiment Station, used on apples, plums, pears, cherries, raspberries, etc., a still more dilute mixture, viz., four pounds copper sulphate and four pounds lime to fifty gallons of water, and obtained very good results.

The cost of the copper sulphate in a barrel of this mixture is less than one-third the cost of that in a barrel prepared according to the original formula.

A special formula of the Bordeaux mixture is, that London purple or Paris green can be added to it, making a combined insecticide and fungicide.

Care should be taken not to use the Bordeaux mixture on fruit crops too late in the season. Traces of it remain for some time, notwithstanding numerous rains, and are liable to cause unnecessary suspicions when on marketed fruit.

### TREATMENT OF APPLE AND PEAR SPOT.

Just before the blossoms open spray with diluted Bordeaux mixture. Repeat this after the blossoms have fallen, and make a third application two or three weeks afterwards. If the season is wet and rainy a later application may be adviseable.

### CAUTION.

Most of the copper compounds corrode tin and iron. Consequently, in preparing them for use, earthen, wooden, or brass vessels should be employed; and in applying them, the parts of pump which come in contact with the liquid should be made of brass.

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## GOOSEBERRY MILDEW.

This disease can be effectually treated by using either ammoniacal copper carbonate or Bordeaux mixture, but as potassium sulphide (liver of sulphur) serves the same purpose, is somewhat cheaper and more easily prepared, it is therefore recommended here.

Treatment should commence with the first signs of growth and continue at intervals of ten or twelve days till five or six applications are made.

### POTASSIUM SULPHIDE.

Dissolve one-half ounce of potassium sulphide (lime of sulphur) in one gallon of hot water. When cold apply in a spray. Used to prevent gooseberry mildew and similar diseases. Commercial lime of sulphur costs fifteen to twenty cents per pound.

### SODA HYPOSULPHITE.

Dissolve one-half ounce or one ounce soda hyposulphite in ten gallons of water. This is recommended by some for gooseberry dew and apple scab, but it is not in general use.

We copy the following from the first Report of the Department of Agriculture of the Province of British Columbia in regards to this destructive disease:

## APPLE TREE BARK DISEASE.

A peculiar disease, the nature of which, as will be seen from the copy of Mr. Fletcher's letter below, is not at present understood. Complaints come from Messrs. W. H. DeWolf and J. Howe Bent, who are planting out a large orchard at Chilliwack (see copy of their letter). From Mr. H. D. Green-Armytage, of Nicola, who says:—"The apple trees seem invariably to be injured in such a manner that part of the wood in the stem dies, and in time kills the whole tree." From Mr. Henry Woodward, of Alberni, who says: "Apple trees are liable to a bad disease which affects the bark." These complaints probably all refer to the same disease.

"WOLFDALE FARM, CHILLIWACK,
"26th December, 1891.

"*To the Department of Agriculture, Victoria, B.C.:*

"GENTLEMEN,—We send by to-day's mail a small box containing a few pieces of limbs cut from our apple trees, showing how some kind of an insect is doing harm to our trees, and in some instances have killed the branch, or small tree, where they have stopped the circulation of the sap.

"From the appearance of the tree it looks as if an insect of some kind stung the bark and sucked out the sap.

"You will also find enclosed in the box a small bottle containing a few insects we found in the holes, but we cannot say whether these are the insects that do the work, or if they are some other kind that have crawled into the holes for protection from the weather, but we presume these are the insects as we found them on several trees.

"They do not attack the old trees, except in the branches, where the bark is smooth; but in the young trees they go for the trunk and branches also, and in some instances have almost girdled the young trees.

"We would be glad if you will look into the matter and let us know if there is any remedy to prevent them from destroying the trees.

"Yours respectfully,

"W. H. DEWOLF,
"J. HOWE BENT."

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"CENTRAL EXPERIMENTAL FARM,
"OTTAWA, 9th January, 1892

"*James R. Anderson, Esq.*,
"*Victoria, B.C.*

"MY DEAR SIR,—I am in receipt of yours of 26th ult., enclosing letter from Messrs. W. H. DeWolf and J. Howe Bent, of Wolfdale Farm, Chilliwack B.C. The specimens of injured apple stems are also to hand. This injury has been submitted to me three or four times before from different parts of your

Province—Harrison Hot Springs, Cowichan, Departure Bay, &c. I regret to say that I cannot give you much information about it. I have submitted specimens to specialists in the United States, but so far they have given me no light on the subject which is of practical use. Prof. Burrill, of the University of Illinois, finds an undescribed species of microscopic fungus on the wounds, but it belongs to a family not previously known to be injurious. One thing, however, is certain, that the caterpillers enclosed with the specimens are in no way connected with the injury; these are caterpillars of tussock moths, which feed on the leaves, and they had only crawled to the holes in the bark to pass the winter. It is a habit with many insects to pass the winter when half grown in the larval condition, and several kinds do this on the trunks of trees and beneath mosses and lichens growing thereon. These caterpillars are dead, but I am able to recognize them by the beautiful barbed hairs and a gland on the back. In sending insects by mail alive it is best to send them in a tin box Moisture gathers inside a tightly corked glass bottle and drowns the enclosed insects. If your correspondents would send me a few more of these caterpillars I should be much obliged for them; they might be packed in a tin box without any holes, and a piece of moss put in with them would prevent their being injured in transit. I will endeavor to find out more about the fungus disease, and will write to you again on the subject.

"I am, &c.,

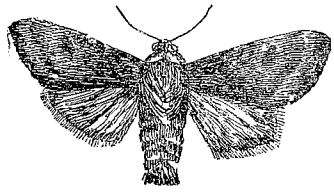
"JAMES FLETCHER,
"*Dominion Entomologist.*"

Mr. N. Butchart, Port Moody, gives the Fruit Growers' Association the following as preventative and cure, having been tested for three years by a neighbor Mr. Coltie.

Cut out all dead spots as they appear, using grafting wax to cover the wounds. While the trees are dormant wash the trunks and large limbs with this solution: 1 pound of Gillett's concentrated lye to five gallons of water; also spray the smaller limbs with solution, 1 can of lye to ten gallons of water.

## CUT WORMS.

*(Agrotis, Noctuidæ, etc.)*



(FIG. A).

(Fig. B.)

Of these destructive worms, which have the habit of leaving their places of concealment in the soil at night, coming to the surface and cutting off almost every kind of newly set vegetable and flowering plants, there are now known to be many species. Those of the genus *Agrotis*, being mostly thick, greasy-looking caterpillars of some shade of gray, brown or green, variously marked, are the best known and well to be looked upon with dread.

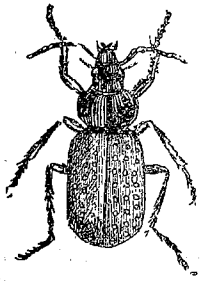
These troublesome pests, which are doubtless the cause of more loss to farmers in the spring months than any other insects, are the caterpillars of a number of different dull-colored moths (Fig. A.) which fly at night. The worms, one kind of which is shown in Fig. B., are smooth, greasy-looking dark caterpillars, ranging from about ½ an inch to two inches in length at the time they injure crops. They feed at night and hide during the day time. The eggs of most species are laid in autumn, and the young caterpillars make about a quarter of their growth before winter sets in. They pass the winter in a torpid condition, and are ready in spring to attack the young crops as soon as they come up. The full growth of most species is completed by the first week in July, when the caterpillar forms a cell in the earth and changes to a chrysalis, from which the moth appears about a month later.

## REMEDIES—CLEAN CULTURE.

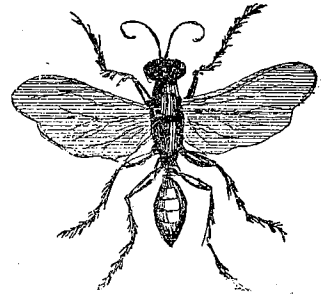
As the young caterpillars of many species hatch in autumn, the removal of all vegitation from the ground as soon as possible in autumn deprives them of their food supply and also prevents the late flying moths from laying their eggs in that locality. Fields or gardens which are allowed to become overgrown with weeds or other vegetation late in the autumn are almost sure to be troubled with cut worms the next spring.

## NATURAL REMEDIES.

There are two enemies which deserve especial notice, and, from the good service they do, should be known by sight to every cultivator. They are the Fiery Ground-beetle or Cut Worm Lion *(Calosoma calidum*, Fab.)—Fig. C.—and the Black Ground Wasp *(Ammopila luctuora)*—Fig. D. Both of these are desperate enemies of cut worms, the former feeding on them in all of its stages, the latter digging them out and storing its nest with them as food for its young grubs.



(Fig. C.)



(Fig. D.)

### BANDING AND WRAPPING.

It will be found to well repay the trouble and expense to place a band of tin around each cabbage or other plant at the same of setting out. These may very easily be made by taking pieces of tin 6 inches long and 2½ wide and bending them around a spade or broom handle so as to form short tubes. In placing them around a plant the two ends can be sprung apart to admit the plant, and then the tube should be pressed about half an inch into the ground. I have found this a useful means of disposing of empty tomato and other cans. To prepare these easily, they need only be thrown into a bonfire, when the tops and bottoms fall off and the sides become unsoldered. The central piece of tin can then be cut down the centre with a pair of shears, and forms two tubes.

Wrapping a piece of paper round the stems of plants when setting them out will also save a great many.

### POISONING.

Put a teaspoonful of Paris green or London purple in two gallons of water and sprinkle handfuls of grass, green sods or other vegetation, which can then be scattered throughout the patch, walking crossways of the harrow marks. By doing this towards evening after the last harrowing, during the night the cut worms that are deprived of their food will be out looking for fresh pastures, and will appropriate of the prepared bait, the smallest particle of the poison of which will kill. If the worms are very troublesome, the remedy can be repeated, it being easily applied.

### SHIELDING THE STEM.

By encircling each plant that is set with a bit of tar paper, or even other paper, the ravages of the worm may be prevented. The paper should extend upwards several inches from a point just beneath the surface of the soil.

### HUNTING AND KILLING.

By closely examining the surface of the soil in the morning, in the vicinity of their spoils, through dropping plants or otherwise their place of retreat may usually be discovered, and the worms killed.

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## THE STRAWBERRY WEEVIL.

*(Otiorhyncus.)*

This very destructive insect, shown me by Mr. Macgowan as creating great havoc amongst the strawberry plants of Mr. Nelson, I found to be one

of the snout bearing family known generally in England as the Strawberry Weevil. As far as I can learn from practical growers this pest has hitherto not been seen in British Columbia. I have met with it occasionally in England, but never saw it so thickly on the ground as in Mr. Nelson's plot; but always when I have met with it it has been under the same conditions of soil, that is a light, poor sandy soil containing a great proportion of semi-decayed stable-manure, leaves, and, worse than all, decaying wood and forest debris. This condition of soil is the happy home and nursery ground of wireworm, weevils, slugs, fungus and all the evils which vegetable life is heir to.

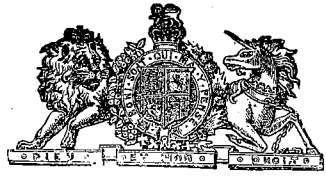
I found on looking over the plot of strawberries in question that at least one half were completely dead and many more were showing the flagging of leaf that denotes something wrong at the root. On taking hold of a plant it came up readily and a dozen or so white maggots were easily seen and closer inspection showed a perfected weevil whose powerful maudibles (easily seen with a lens of low power) found no difficulty in cutting through even the stouter roots of the plants. Although the ravages of this particular weevil are pretty well confined to the strawberry, it is often seen on the raspberry and other small bushes climbing among the branches, it seems to do little harm except to the strawberries, the harder nature of the roots preventing them from their deadly attacks.

Mr. Nelson was not sure where he got his plants from, and one row he had got of another variety was entirely untouched, which led me to believe that he had got the pest with the plants in an egg state, but let us hope that he has acted as his great namesake at Trafalgar acted and "done his duty" by rooting out and burning the infected plants. I strongly recommended him to do this at once, then to turn over the ground with a digging fork three or four inches, (the weevil never digs deeper than this), carefully picking out the larvæ, and to repeat this two or three times this summer, in the autumn to trench the ground at least a foot putting the top part at bottom, previous to which to put three or four bushels of gas lime on, (I may say his plot would be from 150 to 200 square yards); then put on at least ten or 12 cart loads of heavy clayey soil, roughly, and let the frost and winter rains act on this; in the early spring spread this top dressing and add well decomposed manure, dig, not too deep, and plant a crop of early potatoes which could be cleared off and strawberries planted again in early August. These latter should be got, not from a good natured neighbor who probably may have infected plants, but from a trustworthy nurseryman whose interest it is to keep nothing but clean stock and who could not possibly have been troubled with this pest without seeing and dealing with it.

A firm, solid soil (as all good fruit soil should be) will always hold its own against this pest, still it is well to remember that the rabbit plague in New Zealand, the sparrow in some other of the colonies, the Phyloxera that has devastated thousands of fair France's best vineyards, all had a beginning, and it behooves every one, and more especially in a new country, to grapple with

anything that may tend to mar the well doing of any industry that may be started. Thirty years practical experience in the Old Country has taught me how much scientific research combined with practical observation has done towards making it comparatively easy to ascertain the name, life history, and often the prevention and cure of the many forms of disease, fungoids, injurious insects, etc., which are inimical with plant life. But with the knowledge of these evils I cannot say that the cures for them have kept pace, and although ordinary ailment can be generally coped with if taken in time by the recognised treatment, yet the fact remains that Phyloxera, the hollyhock disease, the Bulbmite, and a few other evils I could mention, remain virtually masters of the field, even the modern and generally effective petroleum mixtures, Paris green, etc., being practically useless. This, of course, is a divergence from our original subject and is a wide field for observation, experiment and interchange of ideas, interesting and profitable not only to the professional grower but to everyone who has and loves a garden.

T. S.



## CHAPTER 23.

# An Act to create a Provincial Board of Horticulture.

[*23rd April, 1892.*]

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows :—

**1.** This Act may be cited as the "Horticultural Board Act, 1892."

**2.** There is hereby created a Provincial Board of Horticulture, to consist of six members, who shall be appointed by the Lieutenant-Governor in Council, one from the Province at large, and one from each of the horticultural districts which are hereby created, to wit :

1. The First District shall comprise the Electoral Districts of Victoria, Victoria City, Esquimalt, Cowichan, and The Islands :

2. The Second District shall comprise the remaining Electoral Districts of Vancouver Island :

3. The Third District shall comprise all the New Westminster Electoral District south of the Fraser River :

4. The Fourth District shall comprise all of New Westminster Electoral District north of the Fraser River and the Electoral District of Cassiar.

5. The Fifth District shall comprise all the rest of the Mainland of British Columbia.

**3.** The members shall reside in the districts for which they are appointed ; they shall be selected with reference to their study of and practical experience in horticulture, and the industries dependant thereon ; they shall hold office for a term of four years, and until their successors are appointed and qualified : Provided, however, that three of the Board first appointed (to be determined by lot) shall retire at the expiration of two years. All vacancies in the Board shall be filled by apointment of the Lieutenant-Governor in Council, and shall be for the unexpired term.

**4.** The Lieutenant-Governor in Council may appoint a Secretary, prescribe his duties, and may also appoint a Treasurer, who shall give a bond to the Lieutenant-Governor in Council in the sum of one thousand dollars for the faithful performance of his duties. The Secretary and Treasurer shall hold their appointments at the pleasure of the Lieutenant-Governor in Council. Before entering upon the discharge of his duties, each member of the Board shall take and subscribe to an oath of allegiance, and to faithfully discharge the duties of his office, which said oath shall be filed with the Provincial Secretary.

**5.** The Board shall receive, manage, use and hold donations and bequests of money and property for promoting the subjects of its formation; it shall meet in the months of April and October of each year, and as much oftener as it may deem expedient, for the consultation on and for the adoption of those measures that will best promote the horticultural industry of the Province; it may, but without expense to the Province, select and appoint competent and qualified persons to lecture in each of the districts named in section 2 of this Act, for the purpose of encouraging and improving practical horticulture, and imparting instruction in the best methods of treating the diseases of fruits and fruit trees, cleaning orchards, and exterminating orchard pests.

**6.** The office of the Board shall be located in such a place as the majority may determine; it shall be kept open to the public, subject to the rules of the Board, every day excepting Sundays and public holidays, and shall be in charge of the Secretary during the absence of the Board.

**7.** For the purpose of preventing the spread of contagious diseases among fruits and fruit trees, and for the prevention, treatment, cure and extirpation of fruit pests and the diseases of fruits and fruit trees, and for the disinfection of grafts, scions, or orchard debris, empty fruit boxes or packages, and other suspected material or transportable articles dangerous to orchards, fruits and fruit trees, said Board may suggest regulations for the inspection and disinfection thereof, which regulations shall be circulated in printed form by the Board among the fruit growers and fruit dealers of the Province, and shall be published at least ten days in two daily papers of general circulation in the Province, and shall be posted in three conspicuous places in each district, one of which shall be at the County Court House thereof.

**8.** The Lieutenant-Governor in Council shall appoint, from the number of the Board or from without their number, to hold office at the pleasure of the Lieutenant-Governor in Council, a competent person especially qualified by practical experience in horticulture, who shall be known as "Inspector of fruit pests." It shall be the duty of the said Inspector to visit the horticultural districts of the Province to see that all the regulations of said Board to prevent the spread of fruit pests and the diseases of trees and plants injurious to the horticultural interests of the Province and for the disinfection of fruit, trees, plants, grafts, scions, nursery stock of all description, orchard debris,

empty fruit boxes and packages, and other material, be made known to the people of the Province; he shall, whenever required, and under the direction of the Lieutenant-Governor in Council and of the Board, and may also upon his own motion, and upon complaint of interested parties, inspect orchards, nurseries and other places suspected or believed to be infested with fruit pests, or infected with contagious diseases injurious to trees, plants, or fruits, and he shall report the facts to the Board. The inspector shall, from time to time and whenever required by said Board, report to it such information as he may secure from observation, experience, and otherwise, as to the best method of diminishing and eradicating fruit pests and diseases from orchards, and also suggestions as to practical horticulture, the adoption of produce suitable to soil, climate, and markets, and such other facts and information as shall be calculated to advance the horticultural interests of the Province.

**9.** Whenever a complaint is made by any member of the Board that any person has an orchard, trees or nursery of trees, or a fruit packing house, store-room, sales-room, or other place in the Province infected with any noxious insects, or the eggs or larvæ of any such insects, or that any packages of trees, plants, or fruit arriving in this Province, or in this Province about to be disseminated, which are known or suspected to be from localities that are infected with any disease or pest injurious, or that may become injurious, to the fruit interests of the Province, such member shall inspect, or cause to be inspected, the premises or property to which such complaint relates, and if the same be found to be infected as aforesaid, such member shall notify, in writing, the person having charge of such premises and property to appear before him at such time and place as specified in such notice, to be heard in reference to the infection of such premises or property aforesaid. If such member, after hearing the person in charge of such premises or property, shall be of opinion that such premises or property, or any of the same, are infected as aforesaid, he shall notify, in writing, the person in charge of the same, within a time to be prescribed in such notice, to treat and disinfect said premises or property in the manner presented in said notice, and if the person so notified shall neglect or refuse to treat and disinfect the said premises or property, in the manner and within the time prescribed in the said notice, such person shall be liable to a fine of not less than ten dollars, nor more than one hundred dollars, to be recoverable on summary conviction before a Justice of the Peace; and if it appears on the trial that any orchard, trees, nursery, building, or any other structures, premises, or property in charge of the defendant referred to in said notice, or any part of such structure, premises, or property is infested or affected as aforesaid, the Court shall declare whatsoever of the same is so infected a nuisance, and shall order it to be abated, or may make any other order necessary to prevent its continuance, and it shall be the duty of the Board, or some member thereof, to execute such order, and the costs and disbursements of the prosecution shall be adjudgsd against the party convicted as aforesaid.

**10.** It shall be the duty of the Secretary to attend all meetings of the Board, and to procure records of the proceedings and correspondence, to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this Province and elsewhere; to correspond with agricultural and horticultural societies, colleges and schools of agriculture and horticulture and other persons and bodies, as he may be directed by the Board; and prepare, as required by the Board, reports for publication; he shall also act as assistant to and obey the direction of the Inspector of fruit pests, under the direction of the Board, in the exercise of the duties of his office, and shall be paid for his services as said Secretary and Assistant Inspector a salary to be fixed by the Board, and his mileage actually paid out shall be allowed when acting as assistant to the Inspector of Fruit Pests.

**11.** The Board shall annually, in the month of January, report to the Minister of Agriculture a statement of its doings, with a copy of the Treasurer's account for the year preceding, and abstracts of the reports of the Inspector of Fruit Pests, and of the Secretary. The members of the Board shall receive as compensation for their services, their mileage actually paid out when attending the meetings of the Board, and shall be allowed a sum not exceeding five dollars a day for time actually employed, to be fixed by the Lieutenant-Governor in Council.

**12.** The Treasurer shall receive all monies belonging to the Board and pay out the same only for bills approved by it, and shall render annually a detailed account to the Board of all receipts and disbursements.

**13.** The said Board shall, when making its annual statement, report to the Minister of Agriculture what (if any) legislation is needed in aid of the horticultural and fruit growing interests of the Province.

**14.** For the purpose of preventing the spread of diseases among hops and hop plants, and for the treatment and extirpation of hop plant pests, the Provincial Board of Horticulture shall have the same power, perform like duties, and receive the same compensation as it does under similar circumstances in the Act creating the said Board in relation to fruit and fruit trees.

# BILL.

CHAPTER 17.] [*April 12th, 1893.*

## An Act to amend the "Horticultural Board Act, 1892."

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows :—

**1.** This Act may be cited as the "Horticultural Board Act (1892), Amendment Act, 1893."

**2.** Section 2 of the "Horticultural Board Act, 1892," is hereby amended by striking out of the second line of sub-section 1 thereof the words "and the Islands," and by adding the words "and the Islands," to sub-section 2 theorof; also by inserting after the word "comprise," in the first line of sub-section 4 thereof the words "the Electoral Districts of New Westminster City and Vancouver City and."

**3.** Section 8 of the said Act is hereby amended by adding thereto the following :—"The inspector shall from time to time, under the direction of the Board, hold meetings throughout the Province in the interests of horticulture, and impart such information and instruction to fruit growers and farmers as may tend to the improvement and expansion of the fruit industry of the Province."

**4.** Section 9 of the said Act is hereby amended by inserting after the word "aforesaid" in the fifteenth line thereof the words "and such property shall not be removed after the person in charge of the same shall have been notified in writing as aforesaid without the written permission of a member of the Board." And the said section is hereby further amended by striking out the words "after hearing the person in charge of such premises or property" in the fifteenth and sixteenth lines thereof, and inserting after the word "aforesaid" in sixteenth line the words "and whether the person notified to attend is present or not."

**5.** Section 14 of the said Act is hereby repealed and the following substituted therefor :—

"14. The powers and duties devolving by this Act upon the said Board and the Inspector of Fruit Pests in relation to fruit and fruit trees, are hereby extended to hops and hop plants, for the purpose of preventing the spread of disease among hops and hop plants, and of extirpating any pests affecting the same.

**6.** Notwithstanding anything in the said Act contained, it shall be lawful for the Lieutenant-Governor in Council, at discretion, from time to time, to assign the performance of the duties of the Secretary of the Board to the Inspector of Fruit Pests, and to remunerate the Inspector accordingly.

*In addition to the annual report of the Association paying members for 1893 receive "The Canadian Horticulturist" and "Baillie's Horticulturists' Rule Book," a most valuable issue treating upon an almost innumerable line of horticultural subjects.*