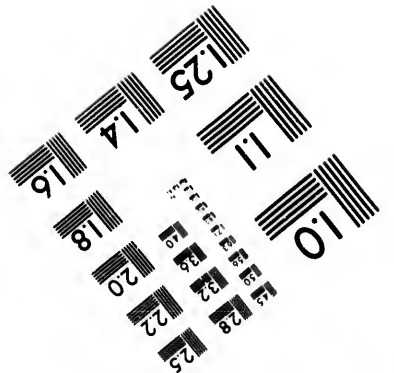
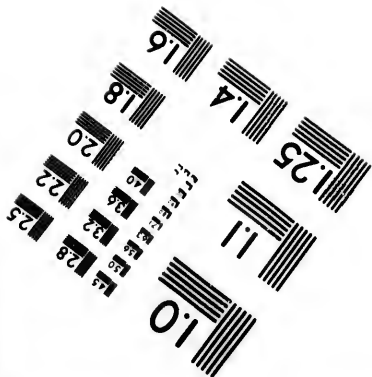
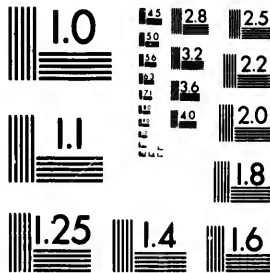


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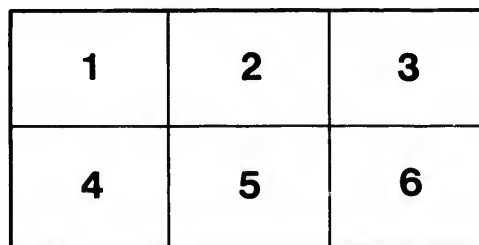
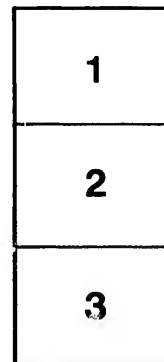
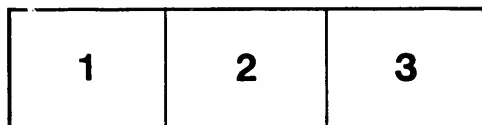
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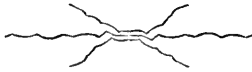
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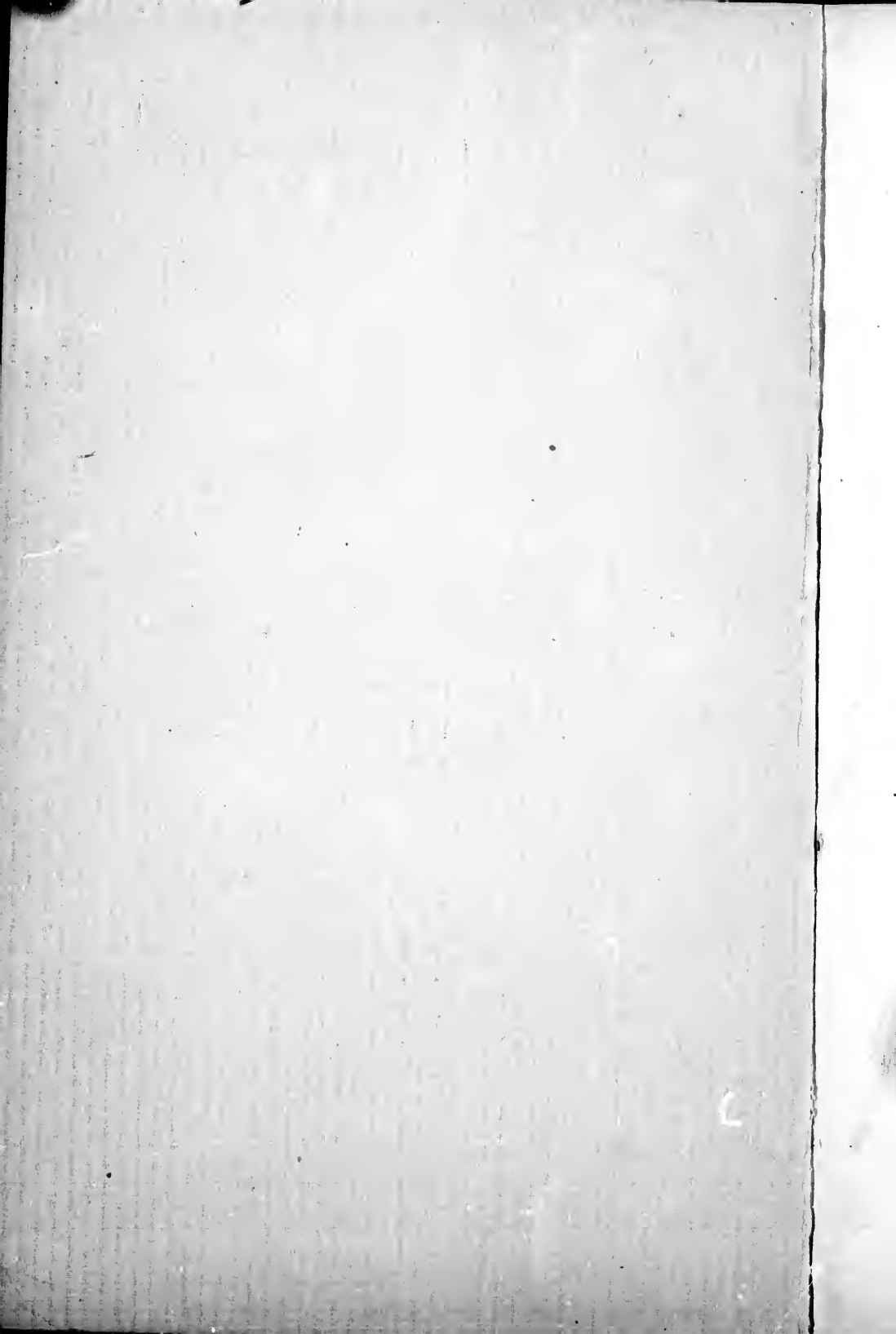
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PROFIT.



BY

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FRUIT GROWING

FOR

PROFIT.

COMPRISING A

COMPLETE HISTORY OF APPLE CULTURE,

From the time the Seeds are Planted until the Proceeds are pocketed.

WITH CHAPTERS ON

The Plum, Pear, Cherry, Strawberry, Raspberry, Blackberry,
Currant and Gooseberry.

BY

W. O. CREIGHTON,

Graduate of the Provincial Agricultural School.

HALIFAX, N. S. :

NOVA SCOTIA PRINTING COMPANY.

1891.

THE

Canadian Horticulturist.

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PREFACE.

T H O U S A N D S of dollars are annually paid out for fruit trees by farmers in the eastern counties of our Province, not one in every hundred of which is properly planted and cared for afterwards. This is mainly due to the want of information on the subject.

Believing that a great source of wealth, in the production of fruit orchards and gardens, lies within the reach of our farmers, and that ignorance of the culture of large and small fruits must be the great obstacle in the way of progress of this industry, I have been led to offer this little work to the farmers.

Many of the works in circulation on this subject have been written in the interests of some particular nursery, and contain information that is totally unreliable, or applicable only to certain districts. I have written in the interests of the fruit grower only, and mainly with the hope that the young men of our province, who have been led to look upon farming as a sort of unprofitable drudgery, may be led to engage in an industry, the intelligent pursuit of which cannot but prove profitable to themselves, and a source of wealth to the country at large. In many parts of the province advantage has already been taken of the unequalled facilities for fruit culture. Large orchards have been planted, and vast crops annually produced. Within a few years the foreign markets have taken from this country, in a single season, a quarter of a million dollars worth of fruit, and the amount is yearly increasing, without danger of over production. The lessons which these facts teach, is to plant without hesitation in all favorable localities, bearing in mind that the planting should not exceed the limit of the very best care and cultivation that can be given.

I shall always be glad to give any information in my power, or to mail scions to any one desiring them, for the mere cost of postage. Young men desiring to obtain a practical knowledge of fruit culture are invited to correspond.

A. R. FULTON.

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FRUIT GROWING FOR PROFIT.

INTRODUCTION.

NOVA SCOTIA is a land of great natural resources. It is not usually ranked among the great agricultural countries of the world; but a close study of its soil, climate, etc., proves beyond a doubt that its capabilities for raising nearly all the various grains, vegetables, and fruits grown in a temperate zone, are unsurpassed. Why is it then, that so many young men, brought up upon farms, leave the land of their birth, and seek their fortune in other countries?

One main reason, no doubt is, that they have not a true idea of the resources of their own country. They are accustomed to hear other lands spoken of in terms of the highest praise, and as "distance lends enchantment to the view," they are led to believe that they can only attain success in life by leaving their homes, and going abroad into the world.

A second reason that may be mentioned is, that the tendency of the education received in our public schools is not such as would inspire our boys with the dignity of the farming profession. We fear the tendency is in the opposite direction. They are drawn away from the farm into some of the over-crowded professions, or into the restless, over-taxing, perplexing pursuits of business life.

A third reason that may be mentioned, and one not generally taken into consideration, may be found in the tendency to migrate, of the race to which we Anglo-Saxons belong. From time immemorial it has been the disposition of the Aryans to rove. In the earliest dawn of history we ~~may~~ find them in the centre of Asia; in later years in central and northern Europe, and in modern times in America.

So the young men of Nova Scotia, in taking the advice of Horace Greeley to "Go West," are only following the instincts deeply implanted in the race, and in endeavouring to persuade them to remain at home we have to contend against their nature as well as their education. Still we

believe it is possible to convince them that success in life can be as surely and safely attained by remaining upon the farm, and helping to develop the great natural resources of their native land.

Now, while we do not claim that a man can become speedily wealthy by farming, still we believe there is a prospect of comfort and plenty in every branch of agriculture, if undertaken in an intelligent, reasonable, and energetic manner.

FRUIT GROWING FOR PROFIT.

In no branch of farming is success more certain than in fruit raising. Farmers in Eastern Nova Scotia are accustomed to hear what has been accomplished in the production of fruit in the valleys of the Annapolis and Cornwallis rivers; but never seem to think that fruit can be successfully grown in other parts of the province. Comparatively few years ago Nova Scotia was supposed to have a climate wholly unsuited to the production of fruit, and in other countries similar views were entertained regarding sections now noted for the abundance and quality of their fruit. Some of these erroneous ideas had their origin in the fact that varieties then introduced were wholly unsuited to the climate, etc.; but great success was attained when the best English and American varieties were grafted on to native seedling stock. Previously, trees accustomed to entirely different degrees of moisture, temperature, etc., were tried and failed. Hence it was concluded that fruit could not be successfully grown. This is now known to be a great mistake.

The most important question we have to consider is: Can fruit be profitably grown on a large scale outside of the favored fruit belt, extending from Windsor to Digby? I begin by asking this question, and shall endeavour as I proceed, to give a few reasons, and to offer a few suggestions as to how this question may be answered in the affirmative.

Prof. William Saunders, Director of the Dominion Government experimental farm at Ottawa, says:—"Apple production might be increased to any reasonable extent with profit. I see no reason why the production of this valuable fruit might not be indefinitely increased in your province. Plums do well in many parts of the province, including Cape Breton. With increased push and enterprise there is a great future for Nova Scotia in this respect;

and the success you have attained is only a foretaste of that which awaits you."

R. W. Starr of Cornwallis, a practical orchardist of wide experience, a keen observer, and probably one of the best authorities on pomology in the province, speaking before the Fruit Growers' Association in 1886, said:—"I remember having seen Ribston Pippins, Greenings, and Bishop Pippins, grown by the late Mr. Hockin of Pictou, that would compare favourably with the same sorts grown in Kings; and Baldwins grown in other parts of the county equally as good as the best I can grow at home. Farmers in other parts of the province should go into the business more extensively. I have seen fine trees all along between Upper Newport and Shubenacadie, and there are some noble trees in the valley of the Stewiacke." Again he says:—"I saw larger fruit in some of the small orchards in Upper La Have than I have seen in the Annapolis Valley. I might say the same of New Germany. In Bridgewater, the various kinds of fruit looked as well as those we have here under ordinary cultivation, and there is no reason why the whole of that country might not be equally successful with the Annapolis Valley in this industry."

Prof. H. N. Smith of the Provincial School of Agriculture, speaking at the same time, says:—"I was surprised to find grapes and apples growing nicely on the north shore of Tatamagouche Bay, on an arm projecting out into the Bay. When these fruits grow and ripen in the cold and icy winds of Tatamagouche Bay, I see no reason why they should not do well anywhere."

Many others whom I could quote have expressed similar views, and my own experience and observation incline me strongly to the same opinion. There is no reason why the different sections of our country should not become famed for certain varieties suitable to their soil, as Annapolis is for the Nonpareil, Cornwallis for the Gravenstein, and West Hants for the Ribston Pippin.

As regards the keeping quality of the fruit, there is no doubt but that in Eastern Nova Scotia we have a great advantage. In the Annapolis Valley they claim that they can beat the world in the keeping quality of their apples; but in Pictou we can raise Gravensteins and Bishop Pippins that are in full flavour long after theirs are worthless. This is a matter of small importance when we remember that we have to compete with them in the same market. ✓

But in view of the number of orchards being planted, it may be asked: Is there not danger of overstocking the market with our fruit? I think not. Should we succeed in raising too many apples to supply our local markets, we have only to look across the Atlantic to find an unlimited market for good fruit. London alone has a population of five millions, or equal to that of the whole of the Dominion of Canada. Liverpool and Glasgow have each half a million more; and there are other large cities within easy reach of us where a profitable market can be opened up.

Nova Scotia has many natural advantages for shipping fruit, not to be found in any other fruit growing district on the continent.

I. Its numerous good harbors along its extensive line of sea coast.

II. Unrivalled opportunities for shipping during the winter.

III. Nearness to the great markets of Europe.

IV. Cheapness of transportation, which will no doubt increase when the supply is great enough to cause the steamship lines to compete for the carrying.

These points, coupled with the fact that we produce varieties that will stand shipping after all danger of competition is past, places us in a position that cannot be attained by any other country.

The whole question is one of dollars and cents. Let us make a calculation of profits from an orchard of fruit trees. The farmer who raises grain is well satisfied if he has a profit of \$20 per acre, after paying all expenses. Let 50 trees be planted on each acre of ground. Ten years will pass before much can be got from the trees; but the ground is not lost, for hoed crops and small fruits can be raised every year among the trees. After the tenth year you may count upon an average yield of one barrel per tree, with a prospect of an increase each succeeding year. Thus, in ten years you get fifty barrels, worth, after paying cost, \$2 per barrel, or \$100 per acre. In ten years more we might expect to see this return doubled. This is not mere theory, but what has been accomplished over and over again, not only in the older fruit growing districts of the province, but on a small scale outside of it. I would like to know what other crop can be raised with as little labor that is going to produce such a result. Here are a

few figures by Mr. J. Bigelow, President of Nova Scotia F. G. A., on apple culture in Kings County :

Cost of an Orchard of 1000 Apple Trees, and Revenue therefrom, in Kings County, N. S.

25 acres of Land, at \$30 per acre	\$ 750 00
1000 apple trees at 20 cents	200 00
Setting out 1000 trees at 10 cents each	100 00
Fertilizing 1000 trees	100 00
Fencing and sundries	100 00
8 years interest on \$1,250 at 5%	500 00
Cultivation 8 years, \$100 per year	800 00
Manuring, mulching, replacing dead trees, and all other expenses	450 00
Total cost till 8 years old	\$3000 00

INCOME.

Yield the ninth year and previous, say 500 bbls., at \$1 per bbl., clear of all expenses	\$ 500 00
Yield the 10th to 15th year, average, 1000 bbls. at \$1 per bbl. clear	5000 00
Yield the 15th to 45th year, 2000 bbls. at \$1 clear	60,000 00
Total income in 45 years	\$65,500 00

An orchard of 1000 trees gives from the tenth to the fifteenth year an income of \$1000 a year, and for thirty years thereafter gives \$2000 a year income, being the yearly income of an investment of \$40,000 at 5 per cent. This is based on the low average yield of two barrels a tree, and \$1 per barrel net value. At half this yield the orchard is worth after 15 years \$20,000 as a permanent investment, and is produced at a cost of \$3,000, as shown above. To further show the enormous profits of the business we will double the cost of the orchard, say \$6000, and decrease the yield one-half, say 1000 bbls. a year, giving \$1000 per year income for thirty years, and then you have an investment worth \$20,000, at a cost of \$6000. This statement is made from the actual experience of many farmers in this county for the thirty years past, and my own experience for 15 years past. I arrived in this country 15 years ago, and all I knew about an apple was to eat it, but I was induced to purchase a few hundred trees, and my experience has far over-reached the figures contained in the statement just read to you."

Those who are willing to embark in this enterprise, giving it the same share of study and attention necessary to produce a large crop of anything else, will reap a certain reward in hard cash, as well as leave a heritage for future generations.

APPLE CULTURE.

As the apple is unquestionably the most important fruit raised in Nova Scotia, the best methods of its culture is a question of the utmost importance. The object to be aimed at is to obtain the greatest quantity of large, sound, handsomely formed, well flavored, and highly colored fruit. To attain this most desirable object requires constant care and attention from the time the seed is planted until the crop is harvested and marketed. We will therefore consider apple culture under the following heads:—

- I. Selection and Preparation of Ground (Drainage).
- II. Buying or Raising Trees.
- III. Selection of Varieties.
- IV. Transplanting.
- V. Cultivation.
- VI. Manuring, Mulching.
- VII. Grafting, Budding.
- VIII. Pruning.
- IX. Thinning Fruit.
- X. Destruction of Insect Enemies.
- XI. Prevention of Diseases.
- XII. Picking, packing, marketing.

SELECTION AND PREPARATION OF GROUND.

A great deal depends upon the site selected for an orchard. Many people plant their trees on land that is little good for anything else; others again plant them around the fences out of the way of cultivation, or along the banks of brooks. It is needless to say that such seldom attain success. As you may expect your orchard to produce the most profitable crop grown on the farm, it should be given the best ground. Whatever will produce a vigorous growth of corn or potatoes, will in general be best for trees. Sterile soil is unfavorable for both, but doubly so for the latter, for while it only lessens in quantity the growth of farm crops, it lessens the quantity and greatly injures the quality of fruit.

Trees will grow well on sandy loam, or clayey soils. The soil should be dry, firm, mellow, and fertile. It should be deep, or made so by ploughing, to allow extension of the rootlets; dry, or made so, by draining to prevent injury by stagnant water below the surface. Peaty or spongy soils are not suitable for the growth of fruit trees.

EXPOSURE

is an important consideration in growing fruit trees for profit. Orchards are frequently planted in the low sheltered nooks, or in rich meadow lands. Few things have been more detrimental to the fruit interests. The hillside and exposed plateau are less subject to frosts than the sheltered bottom and lower lands. By all means let the orchard be planted on the hillside. Some claim that a southern exposure is best; but a week of warm weather early in the season will cause the buds to start, only to be killed by the succeeding frosts. My own experience goes to show that a north-west exposure is better than a southern. On a north-west exposure the flowering does not develop so early, and is more likely to take place in genial weather. Should a frost occur at time of flowering, those having a slope towards the west will not receive the sun's rays for some time after sunrise, thus giving them time to thaw out gradually and escape the injurious effects of the frost. Next in importance to exposure comes

SHELTER.

All orchards should be sheltered. If naturally sheltered so much the better; if not, windbreaks should be planted as early as possible. They save the fruit from being shaken, and frequently prevent immense loss in the shape of bruised and fallen fruit. No better tree can be found for the purpose than our common spruce. Deciduous trees, such as beach, maple, etc., outside the spruce, make the shelter more complete and effectual, as well as more ornamental. ✓

Having selected the situation, the next thing to be considered is the preparation of the soil. In a climate moist like that of Nova Scotia,

DRAINAGE

is of course all important, for manure is nearly all lost in land soaked with water. In portions of our province the rainfall is very great; in such circumstances the greater the need of drainage. Whenever the top roots reach the cold sub-soil, the size and quality of the fruit begin to deteriorate, and the tree itself loses its vigor. Grumblers, in reference to their poor crops of fruits, are little aware that they have themselves to blame for these results.

A judicious course of draining always improves the character of the fruit. Even old trees have been benefited by laying tiles two and a half or three feet below the

surface, midway between the rows. Some of the beneficial effects of drainage may be mentioned:

1. Soil is made warmer.
2. Solution of plant food is less diluted, more concentrated.
3. Free access of air, increased oxidation, fermentation and absorption of ammonia.
4. Roots can penetrate deeper.
5. Removal of injurious matters, as iron oxide, etc.
6. Plant food more evenly distributed.
7. Sub-soil is improved in texture.
8. Increases the number of capillary spaces.
9. Gives an opportunity for earlier cultivation.
10. Guards against the evils of excessive drought, and also against the evils of excessive rains.
11. Prevents loss by surface washing.

No province needs draining more than our own. Many means are available to prevent the bad effects of drought; draining alone can save us from the evils of an over-abundant rainfall.

PLOUGHING.

The ground should be well-ploughed the fall before, and as deeply as possible; and the manure well harrowed in until the soil is made fine and thoroughly mixed with the manure. If then it is ploughed again in the spring, and again thoroughly harrowed, the whole will be in a fine condition for the reception of trees. This is the best and cheapest way of preparing the land; for the saplings, long, and healthy shoots that will grow up even the next year, and the size, beauty and richness of the fruit soon afforded by such an orchard kept well cultivated during its early years, will astonish those who have never seen anything but slipshod culture.

If the whole field cannot be deepened, a strip of land ten feet wide may be treated in this way, in the centre of which the trees may be planted, and the remainder of the field may be deepened in the same way by the time the roots have passed the boundaries of the first.

LAYING OUT THE ORCHARD.

Everyone will admit that an orchard regularly laid out is better in every respect than where the trees are in crooked lines. An owner can feel no pride in giving proper cultivation to an irregularly planted orchard, and trees

standing out of line will be a constant annoyance to every ploughman who is in the habit of laying perfectly even furrows.

After having the ground thoroughly prepared, measure off the distance with a pole, and set stakes where the tree is to be planted. After two rows are accurately measured off on one side and one end, the measuring may be dispensed with and labor saved by sighting in different directions while setting each successive stake. When properly done they should be in line looking from any direction. Drive these stakes down so they will not be disturbed when digging the holes.

The distance between trees is a question that has caused a great deal of discussion among fruit growers. No rule has been laid down for the guidance of beginners, and persons are often at a loss to know the most suitable distance to place the trees. They generally make the mistake of planting too closely. They look far apart when young; but before many years their branches are running into one another, causing them to grow tall and spindling. The guiding rule should be to allow space enough that when they reach full size, the sun's rays may enter freely on each side. The roots, as well as the tops, should have free space. For apple trees, forty feet each way will be the greatest distance required. The usual distance is two rods or thirty-three feet, giving forty trees to the acre. This is a very convenient distance, and gives ample room for cultivation. In no case should they be planted nearer than thirty feet, except in the case of dwarfs.

The holes should be dug large enough to receive the roots in their natural position, and deep enough to set the tree the same depth that it stood in the nursery. It is well to dig the hole a little deeper than is required for this purpose, filling in the bottom with a few shovelfulls of fine dry loam from the surface. The ground is now ready for the work of transplanting.

BUYING OR RAISING TREES.

In selecting trees for a young orchard, too much care cannot be exercised. Purchase only the very best from nurseries near at home, and grown on soil as nearly like that on which they are to be planted as possible. Trees grown on a rich soil are always furnished with more fibres, and stand the shock of transplanting much better than those grown on a poor soil. Most farmers are in the habit

of purchasing their trees in lots of half a dozen or more, from glib tongued tree agents, whose only object is to sell, and who often furnish only the refuse stock of nurseries, untrue to name, with badly mutilated roots, at double or triple the rate for which any reliable nurseryman will furnish good stock. Order your trees direct from some reliable nurseryman as near home as possible, or better still, go and select your trees yourself, or get some reliable, capable person to do it for you. In selecting trees, the largest are not always the best. Medium sized trees are lifted with better roots than larger ones. It is always better to have a small tree with plenty of good roots, than a large one deficient in root. The former is more sure to grow, while the latter will never make a satisfactory tree. In a few years the difference will be apparent.

But there is no reason why every farmer who proposes to raise fruit should not have his little nursery, and raise his own trees. In this way he would be sure of having good stock of the varieties required, and would run no risk of being swindled by the tree agents. The cost, too, in time and money would be less than half that charged by an agent. What is to hinder boys and young men living on the farm with their parents from engaging in this work on a small scale, and widening out as their experience grows?

In early spring, as soon as the land is fit to work, prepare a strip of ground as you would for a crop of vegetables. Scatter seed or refuse apples along the drills, and cover about three inches. In a few weeks the young plants will appear. Cultivate the young twigs the remainder of the season as you would a crop of potatoes. The more thorough the cultivation the better root you may expect the young tree to possess. If the work has been well done and the land in good condition you may expect the trees to be from six inches to one foot high by the fall. They should be lifted before the ground freezes and only the best selected (the rest thrown away) and carefully packed in sand or moss and put in the cellar until the time comes for grafting, which is generally during the winter or early in spring.

The process of grafting is extremely simple. Cut the stock off the root just at the neck, or where it came above the surface of the ground before it was lifted. Fit the scion on the root as you would splice two rods together, having first cut a little tongue in each of them, then wrap a strip of cotton rag saturated with grafting wax around each of them and the thing is done.

The operation can be performed so rapidly that a thousand a day is only considered fair work for a person with a little experience. They may then be put back into the cellar until they are to be planted out in the nursery.

Nursery rows are about three feet apart, and the roots, grafts, or pips, as they are sometimes called, are planted about one foot apart in the row. They should be planted so that only one bud of the scion is above the surface of the ground, and kept in cultivation for two or three seasons when they are ready to be transplanted into the orchard. During the whole time the trees are in the nursery they require to be carefully watched, superfluous sprouts removed, crooked trees straightened, etc.

SELECTION OF VARIETIES.

There is perhaps no part of the subject of fruit growing that requires more care and study than the selection of varieties. There are so many excellent varieties, and so many things to be taken into consideration, that it is extremely difficult to make a selection.

The soil must be carefully studied, and only varieties suited to it should be planted. A Bishop Pippin, for example, will not thrive on a wet soil, neither will a Blenheim succeed if the soil is too dry. Some again, as King of Tompkins, do best on a light soil, while Ribston Pippins do best if planted on heavy clay loam.

It should be borne in mind that varieties that succeed in one place will not prove profitable in another. Some of the best varieties grown in New England are failures in Ontario, while those varieties most popular in Ontario are not the best for Annapolis, and some of the most profitable varieties in Annapolis, as the Nonpareil, do not succeed in other parts of the province. It is only by experience and observation that we can arrive at anything like a correct conclusion.

Consideration must also be given to the requirements of the market where the fruit is to be sold. In our local markets such varieties as Red Astrachan, Emperor Alexander, and Bishop Pippins are popular sorts, while they are altogether unfitted for foreign markets. It will be found best in the long run to plant largely only those varieties that are well fitted for shipping, as they always bring good prices at home; and in case of a surplus, there is always a ready market for good keeping apples in London and other large cities of Europe.

Avoid too many varieties. Few and not many should be the motto of the fruit grower. Too many varieties are found in our orchards, and a very large proportion of them is unfit for foreign or any other market. I cannot too strongly emphasize this point, which has largely been the cause of failure in many places. It is not an uncommon thing to see twenty or thirty varieties growing in one orchard of perhaps not more than one hundred trees. If an orchard contains, say twenty varieties, each of which has to be assorted two or three times, at the close of each time several barrels will be left unfilled, which will have to be filled with other sorts and sold at a disadvantage. If I were planting one hundred acres of orchard I would not plant more than six varieties at the outside. One of the most successful orchardists of Annapolis County in one year raised 500 barrels of Nonpareils, and only 200 barrels of other sorts. Instead of having a few trees of each sort he would plant more Nonpareils, or whatever variety stood highest in the London market. Such is the true policy.

Notwithstanding the fact that perhaps no two orchardists could be found to agree exactly upon the question of varieties, I take the liberty of naming a few which are among the best, if not the very best, and which I believe can be most profitably grown in many parts of eastern Nova Scotia. For early varieties, Red Astrachan is probably the most profitable, as the tree is extremely hardy, a rapid grower, and a heavy and annual bearer. It is also a very popular apple in our local markets on account of its color and strong acid flavor, often bringing from three to four dollars per barrel. If kept, however, it soon loses its flavor, and on this account may soon lose some of its popularity. Season, first of August.

The Dutchess of Oldenburg, another apple of Russian origin, and like the Astrachan, a hardy and rapid grower, and an early and heavy cropper, but of better quality. It comes in season in September, when the markets are apt to be glutted with all sorts of fall apples, and on this account does not sell so readily as the Astrachan, but it will often prove a valuable substitute for the Gravenstein in places where the latter cannot be grown, as its extreme hardiness will enable it to do well along the cold northern shores where other varieties utterly fail.

Next, I would name the Gravenstein, which I have mentioned before as having better keeping qualities when grown here than in the Annapolis valley. It has been called the king of Nova Scotia apples, and indeed it has no

superior at any season of the year. It was introduced into the province from Germany, by the Hon. Chas. R. Prescott of Cornwallis, about the year 1835, who after having fruited it, generously gave scions to all applicants. It is now estimated that one-fifth of the total apple production of Kings County is Gravensteins. With us the fruit ripens about the first of October, and will keep until the last days of January. The tree is thrifty, strong, robust grower of good habit, making a handsome head, comes early into bearing, and continues under favorable conditions to yield good returns every year. It is also a favourite in the English market.

For winter varieties, I would name only three, the first being the King of Tompkins, a large, red, showy market fruit, very popular on account of its fine appearance as well as its many valuable qualities. The tree is a very strong grower, succeeds best on light dry soils, generally an early, reliable bearer. It keeps well through the winter, sells well in the local market, and is very popular when shipped to the English market.

The Golden Russet of Western New York, has long been confounded with, or mistaken for Roxbury Russet, simply because it was first introduced by the agents under that name. There is no trouble, however, in distinguishing them, as the form and characteristics of the fruit, as well as the habit and growth of the trees, are distinct and totally different. The tree is a rapid, vigorous grower, when young rather straggling in its habits, forming long willowy branches. The fruit is medium sized, round, smooth, and firm. It keeps longer than any other apple raised in Pictou County, and is a valuable substitute for the Nonpareil of Annapolis. It is not a heavy cropper, but bears a moderate crop every year. This variety sold in New Glasgow in May of the present year for \$6.00 a barrel, and in London we have seen it quoted at \$8.50 per barrel. In favorable localities we cannot plant too many of this variety.

Last in this list I would place the Ribston Pippin, which though largely planted in Annapolis, Kings and Hants, has not been thoroughly tested in other parts; but from our little experience with it we believe it will be a profitable apple. The tree succeeds best in a clay soil, is a slow grower, and for this reason it is often best to top-graft it on some more vigorous growing stock. The fruit is first-class, and brings the highest price in the English market, if placed there in good condition.

These six are the varieties I would select, a few of the first two, and the remainder of the last four. That I believe these the most profitable is no reason that others should do so. Let every one study out the matter for themselves, and arrive at their own conclusions.

TRANSPLANTING.

The old saying that "whatever is worth doing is worth doing well," applies with peculiar force to the transplanting of trees. A great deal of loss and disappointment has resulted from hasty and careless transplanting. Necessarily some risk attends the removal and resetting of a tree. Some of the roots must be broken, and the tree may fail to thrive in its new location. The roots should not be exposed to the sun or wind, or allowed to become dry. They should be kept as moist as when removed from the earth. If the roots become dry they should be dipped into water, or better still, in a puddle of mud prepared for the purpose. If the buds are dried up, bury the whole tree for three or four days, keeping it constantly moist, when it will regain its vigor.

When everything is ready for planting, the stakes, which were left in the centre of each hole, should be removed, and the tree placed where the stakes stood. Each tree is placed firmly, and the roots spread out in all directions. A little fine surface soil and compost, if used, are then carefully shaken over the roots and small fibres, no vacant space being left. When the roots are well covered the soil is trodden firmly and evenly all around the tree. This is important, as it holds the tree steadily, and prevents it from being moved by the wind. The soil is then thrown in and trodden down, but left somewhat rounding. A tree can thus be planted in about two minutes by a man, with a boy to help, and 200 can easily be set out in a day. It is a mistake to buy large trees. They cost more, the freight is more, and the smaller trees are more easily transplanted, and need no staking, and in five years will be ahead of the larger ones.

The day after the planting the trees should be carefully pruned, cutting back the branches to about one-third of their length, and removing all but three or four of the best and most regularly placed of them. Staking is seldom necessary. In places where the snowfall is heavy it may be of advantage. If the stakes are driven before the tree is planted they may be driven straight down; if

after, they must be in a slanting position. In either case the tree must be fastened to the stake by means of a withe or soft cord, that will not injure the bark. A crooked tree should be held straight by means of a stake until it maintains that position of its own accord.

In nearly all soils the use of water in settling the earth around the roots will be found serviceable. Dashing in a few quarts before the hole is quite filled is the more common way, but an admirable mode is to settle the fine earth as it is sifted in, by a regular shower at the same time from the watering pot; one man holding the tree, a second tilling in the earth, and the third applying the water. By this process the roots are not disturbed in their positions, and every cavity about them is filled in the most perfect manner. The trees will be found to maintain their position better than when pulverized earth alone is used; for although they at first may be easily moved, while surrounded by the half liquid mass, in a few hours the earth will absorb the superabundant moisture, and they will become as firm as if they had stood for weeks in their new positions.

Before a tree is set in the earth all the bruised and wounded parts, when broken or cut with the spade, should be pared off smoothly to prevent decay, and to enable them to heal over during the growth of the tree.

Whole rows should be planted with the same variety. This will save much trouble in picking, and dispense with the use of labels.

CULTIVATION.

Many seem to think that when the tree is planted the work is done, and the trees are left to take care of themselves. During the whole growing period nothing is more important than good cultivation. This is a point upon which all orchardists agree. It is allowed by every scientific and practical fruit-grower that thorough cultivation of the soil is necessary for the healthy growth of trees, and for the production of the best quality of fruit.

Downing says:—"It is an indispensable requisite in all young orchards to keep the ground mellow and loose by cultivation, at least until the trees become established."

Beadle says:—"Doubtless the very best thing for the trees is to keep the ground thoroughly cultivated, the surface loose and pliable, free from weeds, and in good heart."

Patrick Barry once said :—" I will admit that fruit can be grown on good soil without either manure or cultivation, but not of the best quality. I should as much expect to see a good crop of corn without cultivation as to see a heavy crop of first class fruit in a sward-bound orchard."

These are only a few of the authorities in favor of high cultivation in order to produce good fruit, and such testimony might be increased many fold. Place the tree in grass land, or give it no cultivation, let the surface become baked hard, or allow weeds to cover the surface, the tree will have a feeble growth, and the fruit as a necessary consequence will partake of the condition of the tree. A feeble tree will of course bear small fruit. Cultivation alone has often changed both size and quality in a surprising degree. A few experiments only are needed to convince anyone of this.

" An orchardist in one of the Western States tried an experiment which strongly proved the benefit of cultivation in orchards. He set out an apple orchard, and gave it good care. The fifth year it bore eight barrels of fruit, twenty barrels the sixth year, and for eight years afterwards the annual yield was 85 barrels on an average. Cultivation was continued up to this time, and he thought it was now time to seed down to grass and clover. The next year the product fell to 15 barrels, or less than one quarter. Cultivation was again resumed, and the second year it bore 225 barrels. The owner concluded to keep up clean culture in future."

Some years ago a few trees were observed to bear very small fruit. They were then standing in grass ground. Subsequently the whole surface was subjected to good cultivation. The next crop had fruit at least double the size of the other.

A tree in another place bore, when standing in grass, very inferior fruit, when a herd of swine accidentally rooted up the grass and reduced the whole to a mellow surface. The fruit that year was greatly increased in size, and so much improved in flavor that it would not have been recognized as the same sort.

To purchase and set out fine fruit trees of rare sorts in a baked and hardened soil, whose entire moisture and fertility are consumed by a crop of weeds and grass, might very aptly and without exaggeration be compared to the purchase of a fine horse, and then perpetually to exclude from him food and drink.

The first work in the spring will probably be the removal of the earth placed as a protection around the trunks of young trees the preceding fall, and stirring the ground up loosely around the roots for some distance from the trunk as a centre. This should be done as soon as the ground is fit to work. This stirring should be repeated every week or two all summer.

In ploughing great care must be taken not to injure the bark of young trees. It is not necessary, however, to leave a strip along each row unploughed to grow grass and weeds. It is well to use only one horse for the first few rounds in backing up the ground against the trees. Use long leather traces with short whiffletrees securely wrapped up, so as to prevent any injury to the bark should they come in contact with it. The earth can then be backed up closely without injury to the trees, or loss of ground. In ploughing the earth away for the last few rounds, fasten the plough securely to one side of a bobsled, to which the horses are attached. You can then plough very close to the trees without any danger of injuring them. If the bark should happen to be injured, wrap up the wound with a cotton rag saturated with grafting wax, and the bark will soon be renewed. Leaving it exposed to the sun and the attacks of insects may cause a permanent canker.

Hoed crops, as potatoes, corn, or small fruits, should be raised in an orchard. Every time the crop is hoed the trees should get their share. If hoeing will benefit a potato plant, it is equally beneficial to an apple tree. Green crops, as buckwheat and clover, may be grown to good advantage in an orchard, if ploughed under for a manure; but in no case seed down to grass until the trees are well grown. After this it may be sufficient to seed down and pasture calves, sheep or swine, giving a liberal top dressing of manure every second year.

MANURING.

Analysis of apple wood ash shows in 100 parts, 16 parts potash, 18 parts lime, and 17 parts phosphate of lime; the ash of the bark shows 4 parts potash, and 51 parts lime, indicating that potash and phosphate of lime are essential fertilizers of orchards.

Horace Greeley once said, "a tree was like a cow tied to a stake. It could not rove in fresh pastures, but must continue to grow, feed, and produce fruit in a limited circle." He stated the case concisely. Those who grow farm crops

in orchards, and do not apply manure, are like him who would not only refuse to supply food to the cow tied to the stake, but would remove the grass beneath her feet, and rob her of the dew and refreshing showers

Nothing for general use is equal to stable manure, as it contains in it all the essential elements of plant food, both organic and inorganic; and it must continue to be, in the future as in the past, the main dependence of the fruit grower. But as orchards are increasing rapidly, and farm-yard manure is required for other crops, we must supplement it by commercial manures or compost. Potash can be supplied in the form of hard wood ashes, and should be used whenever attainable. Phosphoric acid is supplied in the form of bone dust and superphosphate, and nitrogen is often attainable in the form of peat or muck. Every summer a compost might be formed of muck or black mud, ashes, bone dust, with any waste material about the farm. Build these into a heap, using plenty of fresh slacked lime for each alternate layer; cover the whole over with ground plaster to arrest the ammonia set free by the lime. In a few months the whole may be turned over, when it will be in a condition to apply to the land. This will form an almost perfect fertilizer for orchards.

The amount of manure to be given to an orchard must be determined by the annual growth of the shoots. If less than a foot, more vigor must be imparted to them by cultivation and fertilizing; if more than a foot and a half, they are quite thrifty enough.

Whenever an old orchard loses its vigor it should be ploughed up, and receive a liberal top-dressing of lime or bleached ashes. The change that may be thus wrought can hardly be understood by one who has not witnessed the result.

MULCHING,

or covering the ground about a tree with straw, coarse hay, litter, or better still, with leaves from the forest, will often prove beneficial with trees that do not receive thorough cultivation. It is an excellent protection against mid-summer droughts, which often prove destructive to newly transplanted trees, and is a good substitute for mellow cultivation where the latter cannot be given.

Old orchards, after they are seeded down to grass, should be kept well mulched, especially if the grass is mowed every year for hay. It should, however, be removed every fall, as it affords a convenient breeding and hiding place for mice and injurious insects.

GRAFTING.

The common way of propagating the apple is by grafting. The seeds are sown in drills; and in due time the young seedlings are taken up and grafted in the manner I have already described under the head of raising trees. This method is known as root, tongue, or chip grafting.

Larger limbs of older trees are commonly grafted by what is known as cleft grafting and crown grafting. The scions, which must be of last year's growth, are usually cut in the fall, and stored in moist sand in the cellar; but hardy varieties may be cut at any time before the limbs begin to grow. Grafting out of doors begins in the spring with the first warm days, and continues until the leaves expand early in June. The scions having been kept dormant, the best time is when the leaves in the stock are just pushing out.

In cleft grafting the branch is first sawn off carefully, so that the bark is not loosened on the stock, the stock split, and a wedge inserted to hold it open, while at each side is placed a scion, which should contain about three buds, and be nicely whittled off with a sharp knife, a little thinner on the inside than outside. Pains should be taken to have the inside bark of scion and stock to meet. As the bark of stock is generally thicker than that of the scion, the latter will have to be placed a little deeper than the surface bark of the stock. Some give the scion a little slant out, thus making sure that the barks come in contact at one point at least. The wedge is now taken out, and the air thoroughly excluded by covering over with grafting wax.

Crown grafting may be performed on still larger limbs, which are not easily split. The scion is cut with a slope as if for splicing, and the bark around the edge carefully lifted and the scion slipped in. As many as a dozen scions may in this way be placed on one large limb. After they begin to grow the most vigorous may be retained, the rest removed.

It is not always best to plant the variety you wish to grow at first in the orchard. Some varieties are very slow growers, and time is gained by planting some fast growing variety for a stock, and afterwards top-grafting with the variety required. It is folly to attempt to graft old trees, unless they are in a vigorous, thrifty condition. Limbs one and two inches in diameter are the best for grafting. It should take three years to completely top-graft a tree.

Each year great care should be taken not to mix the varieties; whole trees, and indeed whole rows, should be grafted with the same variety.

While it is found that the stock has an influence upon the scion, the influence of the scion upon the stock is much greater. In starting apple trees in the nursery we graft on roots of seedlings. After such roots have been affected by the graft for three or four years, we find that those grafted with Red Astrachan are very fibrous, branching out near the surface with few top roots; while the row adjoining, or parts of the same row grafted with Duchess of Oldenburg or the Fameuse are destitute of fibres, and possess only three coarse prongs as a rule, one of which is liable to the toproot seeking an abode far down in the sub-soil. The whole relation between the stock and scion is very imperfectly understood, and presents an interesting field for study.

I have found the following mixture very satisfactory for grafting wax:—4 parts rosin, 2 parts beeswax, and one part tallow; melt together over a slow fire, but in no case allow to boil. It is very important that the beeswax be pure.

BUDDING

is not widely practised as a means of propagating varieties, but it seems to be growing in favor with nurserymen. It is usually done in the month of August, or any time when the bark will lift readily from the stock. The bud is cut from the present year's growth. The leaves are first removed, leaving a short stub for a handle only. The bud is removed with an inch of the wood directly under the bud. This wood used to be peeled away; but now it is left attached to the bud, with better success.

An opening is made in the stock by cutting a perpendicular and a horizontal line in the shape of a T, about an inch to an inch and a half long; carefully lift the bark, and gently press the bud into place by part of the leaf stem remaining. Wrap up in cotton rag or woollen yarn. There is seldom any failure in budding when done by experienced hands. Failure is often caused by not cutting off enough bark with the bud, or by some injury done to the bark when removing it from the stock.

Ring grafting is done by having a ring of bark taken off, and putting into its place another ring of the same width having a bud of the desired variety. Both grafting and budding, although they may look difficult, can be easily learned by any person of average intelligence in a few hours, but of course it requires considerable practice to become expert.

PRUNING.

There is no point in fruit growing upon which farmers in general need education more than on the question of pruning. We have seen fine trees all over the country almost ruined by injudicious pruning. The time to begin to prune young trees is the day after they have been transplanted. All superfluous branches should then be removed, and the top kept constantly trained to suit the fancy of the owner. A little time spent when the trees are young will save days of labor afterwards, and save cutting off large limbs when the trees get older. When this is properly attended to, all the pruning can be done with the thumb and finger. Do not be afraid of over-doing it; there is more danger of not thinning out enough. The limbs look far apart, but they will be closer when they grow larger.

In pruning larger and older trees, large limbs should never be cut off if it can be avoided, unless they are dead, but if they have to be removed, cover the wound with a coating of paint or grafting wax to preserve the wood until it grows over. About August look over all pruned trees, and remove all the young suckers starting up where the limbs were cut off. They are now easily removed with the hand; but if left, they rob the tree of the sap that should go to help regain what was lost by cutting off the branches.

It is impossible to tell what season of the year is the best for pruning. The best authorities differ on this point. I prefer early spring, just after the severity of the winter is past. Plenty of leisure time is at least one argument in favor of pruning at this season. At whatever season of the year the work is done, it should not be done hurriedly. We have known farmers to neglect to prune until ploughing the orchard, and then to remove all branches interfering with the team by chopping off with the axe; others again saw the limb off two or three or even six inches from the joint, thus slowly but surely killing their trees.

As a general rule the production of fruit and leaves is adverse to fruitfulness. Cutting back the tops of overgrown trees checks growth, and favors the production of fruit buds; but such treatment, out of the ordinary course of nature, should be cautiously applied, as the first crop gives another check, and often materially injures the tree and the character of subsequent crops. In the production of fruit of the best quality, pruning is next in importance to good cultivation.

THINNING FRUIT.

Next to good cultivation another important point is thinning out the young fruit on the tree. This contributes to bring out the excellent qualities of the fruit, and to give it size and a handsome appearance. Over-bearing always injures the growth of the tree, yet thinning is scarcely ever practised.

A successful orchardist tells us that he has found great profit in thinning the fruit; that while he had fewer specimens, he had as many bushels, the fruit could be picked in far less time, and the crop sold more readily, and at a much better price. Some have doubted whether this practice can be made remunerative except in the production of finer fruits; but another cultivator, who raises an annual crop of the best apples, assures us that the secret of his success is the thinning of the fruit, and he has no doubt of the economy of the practice.

When the trees are in bloom whipping the trees should be practised; then again, after the fruit is formed, thin out until you think there are few enough; again, after the fruit is half grown, all injured and inferior specimens should be removed. Like pruning young trees, there is not much danger of thinning too much. The error will probably be in the opposite direction. This treatment will accomplish two things—it prevents over-bearing, and has the effect of securing an annual yield, no unimportant item in the growing of fruit for profit. As many bushels can be got from the trees in the fall as if good and bad mixed together had all been allowed to grow. The labor of assorting will be less, and they will bring a better price in the market.

DESTRUCTION OF INSECT ENEMIES.

The insects most injurious to apple orchards in Nova Scotia are the borer, bark louse, codling moth, tent caterpillar, the canker worm, and the apple tree plant louse. I have found all of these more or less injurious during the past year. Before taking up each of these in particular, it may be well to say a few words on insects in general.

The life of an insect is divided into four well marked periods, during each of which their habits are entirely different. These are—

(1) The egg; (2) the caterpillar or larva state, during which as a rule they are most injurious; (3) the pupa or

quiescent state, in which the insect, except in a few orders, lies quiet and has no power of motion ; (4) the perfect insect.

Some are injurious in all their stages, but the larger number in only one, so that unless we know them in all their stages, we lose opportunities for destroying them by not recognizing them as enemies.

Injurious insects may be divided into two classes: (1) those which possess jaws, by means of which they consume their food ; (2) those which have instead a hollow tube by which they suck up their food in the shape of liquid juice. Now it is apparent that for insects of the first class, as the potato bug, all that is necessary to do is to apply to the foliage some poisonous material that will not injure the plant, but which will destroy the insects while devouring the leaves. For the second class, however, these remedies are useless, for they are able to pierce through the poisonous material, and extract the juices upon which they live from the interior of the leaf. With these insects it is necessary to make use of such poisons as act by mere contact with their bodies and do not require to be eaten.

Then again, there is another class that may be termed insect friends, as they prevent other species from doing harm. In these man finds his greatest protection from the countless hordes that rob him of so much of his produce. They are known as Ichneumon flies and Tachina flies. The former belong to the same order as the wasp and the bee, and may be recognized by being very active, and having two pairs of wings. The female lays its eggs beneath the skin of a caterpillar or soft-bodied insect. These hatch inside the victim and live upon the juices of its body. When full grown it eats its way out through the skin.

The Tachina flies have only one pair of wings. They belong to the same order as the house fly, which they much resemble. These lay their eggs on the outside of the skin of the victim, and the young maggot eats its way into its host.

It is well that the farmer should know the appearance of these insects, so that he may not destroy his friends as well as his enemies. This is sometimes a difficult matter ; but as a general rule, if an insect is active and has well-developed running powers, it is harmless ; if slow and heavy in its movements, it is probably injurious.

THE ROUND HEADED BORER

is one of the most destructive insects with which we have to contend. It is always worse in orchards that have not

received proper cultivation. Few persons are aware to what an alarming extent this insect is infesting the orchards in various localities. A tree becomes unhealthy, and eventually dwindles and dies, often without the owner having the least suspicion of the true cause—the gnawing worm within.

The female deposits her eggs during the month of June, mostly at the foot of the tree; and the young hatch and commence boring into the bark a fortnight afterwards. They differ in no respect from the full-grown specimen, except in their minute size; and they invariably live for the first year on the sapwood and inner bark, leaving shallow flat cavities, which they fill with their sawdust-like castings. Although the holes are very small, and are frequently filled up, yet the presence of these worms can be generally detected, especially in young trees, from the bark under which they live being darkened and sufficiently dry and dead to contract and form cracks. During the winter it remains inactive, but begins its work again in the spring. On the approach of the second winter it is about half-grown, and still living on the sapwood, and it is at this time that they do most harm, for if there are five or six in a single tree they almost girdle it. During the next summer it cuts into the solid wood, and before it has finished its larval state it invariably extends its passage to the bark, sometimes cutting entirely through a tree to the opposite side from which it commenced. It then stuffs the upper end of its passage with sawdust-like powder, and the lower part with curly fibres of wood, after which it rests from its labors. It remains inactive in the larval state until the following spring, when it casts off its skin and becomes a pupa. In three weeks it appears as a beetle; and in a fortnight more it cuts its way through the sawdust-like castings, and issues from the tree through a perfectly round hole, having been in the tree a few days less than three years.

From this it is apparent that plugging the hole to keep it in is on a par with locking the stable door after the steed is stolen. The round holes are infallible proof that the intruder has left, while the plugging of any other hole where the castings were seen will not affect him in the least.

Prof. Saunders, in his "Insects Injurious to Fruits," strongly recommends alkaline washes as a preventative. Keep the base of every tree free from weeds and trash, and apply a strong solution of soft soap, in which is mixed a

little washing soda, to the trunk of every tree during the month of May, and you will probably not be troubled with borers.

There is another species known as the flat headed apple tree borer, totally different from the round headed borer; but, as the beetle makes its appearance during the months of May and June, and lays its eggs on the trunk as with the preceding species, the same methods of cutting them out or scalding them can be applied in one case as well as the other, while the soap preventative will prove equally efficient with both. It must, however, be applied higher up, as they attack all parts of the trunk, even the larger branches.

THE TWIG BORER

is occasionally injurious, but we have never known it to be numerous enough to do much damage. When found, the limb should be cut off and burned.

APPLE TREE BARK LOUSE.

This is one of the most troublesome and destructive insects with which we have to contend. It has become so common that there is scarcely an orchard that is entirely free from its ravages, and many a tree has been slowly and surely bled to death by this tiny sucker.

They are generally, when permitted to multiply, crowded upon the trunk, branches, and twigs as thickly as they can be placed, forcing one another out of place, and frequently overlying. Individually they are about $\frac{1}{16}$ of an inch long, and of the shape of an oyster shell. The insect is not one fitted for rapid spreading. Its introduction into an orchard is generally through planting infested trees. The female is wingless and only capable of motion for two or three days at the most, after which time she becomes permanently fixed for the rest of her life. The time of all others when they may be most easily destroyed is when they are just hatched from the eggs, and are exposed on the bark as soft, delicate, naked little creatures. This is generally from the first to the middle of June, and will often be found at the opening of the blossoms.

If an orchard is attacked before the owner is aware, much may be done by scraping off the scales in winter and burning them; but on large trees this is impossible, as most of the scales are to be found on the branches and small twigs. The only way is to treat with a kerosene emulsion, or some other liquid that will penetrate the scales and

destroy the egg. The old remedy, soft soap, or a strong solution of the same, is sure to prove very effectual if applied at the proper time. It may be applied with a brush, but the better way is to use a cloth and scrub by hand. They should be gone over again in three weeks, and those destroyed that have escaped the first treatment.

In Saunders' "Insects Injurious to Fruits," the recommendations made against this insect is brushing with a strong solution of soft soap and washing soda, or a solution made by dissolving half a pound or more of washing soda in a pailful of water. Painting the twigs and branches with linseed oil is also recommended, and claimed to be harmless to the tree and effectual for the destruction of the eggs sheltered beneath the scales."

In the report of the Horticulturist of the Central Experimental Farm for 1890, we find the following:—As a preventative to scale and other bark insects, the stems and main branches were washed early in June with soft soap, to which was added a sufficient quantity of a strong solution of washing soda which had first been dissolved, to reduce it to the consistency of a thick paint. This wash has the effect of keeping the bark green and healthy. It is a practice that should be followed generally by fruit growers.

THE TENT CATERPILLAR

occasionally appears in our orchards in the fall in such numbers as to almost completely defoliate the tree. Every one is familiar with the white web nests of this caterpillar when they appear on the trees early in summer.

The eggs from which these caterpillars are hatched are deposited during the month of June in oval rings. Each cluster consists of from two to three hundred eggs, and is covered and protected from the weather by a coating of glutinous matter. They are easily seen upon the twigs in winter, when they may readily be destroyed. The same temperature that causes the apple buds to swell and burst quickens the vital energies of these larvæ, and causes them to eat their way out of their eggs. They commence to spin a web the moment they are hatched, and indeed they never move without extending their thread wherever they go. All the individuals from one batch of eggs work together in harmony, and each does its share in building the common tent under which they shelter when not feeding and in inclement weather. They usually feed twice a day, once in the forenoon and once in the afternoon. In about six weeks they attain full size, when they desert their tent,

seek some little crevice where they spin a cocoon, within which they assume the pupa state; and from it, at the end of about three weeks, emerges the perfect insect, a reddish-brown moth; and as soon as they have paired the female lays her eggs on some twig and dies. In due time the eggs hatch, and the same cycle of changes takes place each year.

This insect is easily kept under control. The egg clusters may be destroyed during winter. The nests should never be allowed to get large, but should be cut off and burned. As they feed but twice a day, and are always in their nests night and morning, the early and late hours are the best to perform the operation. They are easily destroyed by spraying with arsenites, (a remedy that will be described further on).

THE CODLING MOTH.

This is one of the most important insects with which the orchardist has to deal, in view of the great loss which it annually occasions in its larvæ state. The moth makes its appearance from the last of May to the early part of June, about the time the trees are in bloom. The female deposits her eggs in the bloom end of the fruit, flying from one to another until her store of eggs is exhausted. In a short time the egg hatches, and the young larva proceeds to eat its way into the fruit, feeding as it goes, but making its headquarters in the core. In three or four weeks it is full grown; and about this time the infested fruit generally falls to the ground. The larva then crawls out, and seeking some convenient spot, soon becomes a pupa. Then about the month of August it bursts forth into the moth state, and the fruit is re-stocked with larva. The second brood do not issue as moths until the next spring.

Several methods, more or less effective, have been adopted to check the ravages of this insect. Some tie strips of woollen cloth around the trunk of the tree, into which the worms will crawl when about to assume the pupa state. By examining these cloths once a fortnight and destroying the worms, this troublesome pest can nearly be got rid of in one season.

The moths are attracted by light, and many will be destroyed by lighting fires in the orchards in various places during the time the trees are in bloom. The utility of pasturing swine in the orchard, is admitted by all, and did all the infested fruit fall to the ground, would be a complete remedy. They can, however, be kept completely in check by the use of arsenites.

THE APPLE MAGGOT,

which I noticed last season for the first time, differs from the codling moth in many respects. The parent is not a moth, but one of the two-winged flies. The larvæ enter the fruit at any part, eating in every direction, but do not seek the core.

The destruction of the infested fruit by picking and feeding to swine, if they cannot be pastured, is a means of prevention.

CANKER WORM.

This pest, although numerous in the Annapolis Valley for a number of years, has as yet scarcely made its appearance in the eastern counties. Last year I found a few specimens in an orchard in Pictou County for the first time; but there is no doubt but with the increase in fruit trees its general introduction into the eastern counties is only a question of time. It is very important then that every fruit grower should become acquainted with its habits, and the methods of destruction, in order to cope with it successfully whenever it makes its appearance.

The female is a wingless moth, which can only reach the branches where she lays her eggs by crawling up the tree, which she does very early in spring. The eggs are deposited in clusters of a hundred or more on the bark of the branches and twigs. About the time the leaves are bursting forth the eggs hatch into tiny worms about one-eighth of an inch in length, and scarcely visible unless you look very closely, but they eat and grow rapidly. They completely devour the foliage, giving the tree the appearance of having been swept with fire. In three or four weeks they attain their full size, which is about an inch in length, when they let themselves down to the ground by a silken thread. A few inches below the surface they become chrysalides, in which state they remain until the next spring, when they emerge as moths.

Dr. William L. Baron of Illinois, gives the following remedies, which are substantially the same as those generally employed by fruit growers:

1st. Prevent the passage of the moth up the trees. This is done by putting round the tree a cloth about six inches in width, and besmearing it with tar, molasses, or a mixture of both, applied every other day. (Printer's ink is more commonly used in Nova Scotia.)

2nd. If the moths are prevented from ascending the tree, they will deposit their eggs below the obstruction, and for the most part near to it. These eggs can be destroyed by a single application of kerosene oil.

3rd. If the moths are not prevented from ascending the tree, they will deposit their eggs mostly upon the under-side of the scales of bark on the upper part of the trunk and larger branches. Many of these can be destroyed by scraping off and burning the scales.

4th. If all these precautions have been neglected, and the eggs allowed to hatch as soon as the worms are large enough to be easily seen, jar them from the trees, and sweep them away with a pole as they hang by their threads, and burn or otherwise destroy them.

5th. If the worms have matured and gone into the ground for winter quarters, plough the ground late in the fall so as to expose the pupæ to frost and to the action of their natural enemies.

APPLE TREE PLANT LOUSE (APLUS.)

Aplirides or plant lice frequently infest the leaves of the apple, pear, cherry. When they appear in vast numbers they retard growth, and injure the trees by sucking the juices. They may be destroyed by the use of whale oil soap, or an emulsion of kerosene.

Prof. Fletcher, Ottawa, gives the following formula for soap emulsion :

Kerosene	2 gallons.
Rain water	1 gallon.
Common, or whale oil soap	½ lb.

Heat the solution of soap, and add it boiling hot to the kerosene. Churn the mixture until it forms a cream which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute, before using, one-part of the emulsion with nine parts of cold water. The above formula gives about three gallons of emulsion, and makes, when diluted, thirty gallons of wash.

SPRAYING WITH ARSENITES.

One of the most important discoveries in the use of insecticides within the last few years is the use of arsenical poisons as a remedy for the canker worm, codling moth, caterpillar, and other insects that destroy the foliage. For this purpose Paris green has been much more extensively used than any other compound. It is a compound of arsenic

and copper, and when pure contains about sixty per cent. of arsenious acid. It is sometimes used dry, with various substances as flour or plaster of Paris as diluent, in the proportion of one pound of the poison to fifty of the diluent. It is more commonly used in water, one pound to about 200 gallons, and applied with a force pump with a spray attached to the nozzle. It has been found that if this mixture be sprayed over the trees just after the petals have fallen, sufficient of the poison will lodge inside to destroy the young caterpillars when they hatch, and before they eat their way into the apple. Great care must be taken not to apply the poison until after the flowers have passed their prime. No time is saved, as the eggs do not hatch until several days after they are laid, and the poison is apt to be washed off by heavy rains before it has done its work; and bees and other useful insects are apt to be destroyed.

Paris green is also an effectual remedy for the canker worm and the plum curculio, and is used by the more intelligent orchardists of our country. Many object to it on account of the danger in handling it. Care must be taken not to inhale any of the powder, or to let animals eat the grass under the trees until the poison has been washed off by rains.

London purple is used in the same way as Paris green, and for insects is equally effective, if pure, and has the advantage of being much cheaper; but as it is apt to be adulterated, its strength cannot be relied on.

DISEASES.

There are many diseases to which the apple is subject, all of which are, as yet, more or less imperfectly understood, but of the most common, as collar rot, leaf blight, black heart, black spot, the last mentioned is the only one that has really become a matter for serious consideration. It is a fungus disease known to scientific men as *Fusicladium Dentriticum*, and attacks not only the fruit, but the leaves and stems. It has become so prevalent of late years, that such varieties as the Fameuse and Bishop Pippin have become worthless as market varieties. I have found it the present season on fruit of the latter variety not larger than a pea. The scab was also growing on the stem. The known remedies for the disease are only partial; but as experiments are being continually made, it is to be hoped that before long an effectual remedy will be discovered.

The Fruit Grower's Association issued the following circular to each of its members in April, 1891, in regard to the disease.

CIRCULAR.

The following, from the report of Committee on Fungicides, is published by order of the Fruit Grower's Association for the information of its members:

After having carefully examined the results of numerous experiments, we find that the best authorities are of the opinion that the drainage from the apple scab (*Fusicladium Dentriticium*) may be almost entirely prevented at a slight cost, by spraying the trees, beginning in May before the trees come into leaf, again after the blossoms have fallen and the apples are forming, and continuing at intervals of two or three weeks until the end of July, with a solution of ammoniacal copper carbonate, at strength not to exceed 1½ oz. of the carbonate and one quart of ammonia to one hundred gallons of water. These materials may be had prepared (at Geo. V. Rand's, Wolfville,) at a cost of about 50 cents for enough to make one hundred gallons. From actual experiments with this solution upon Northern Spy trees at the Agricultural College, Wisconsin, the following results were obtained from the trees sprayed:

Fruit sprayed:

First quality (free from scab).....	75'02	per cent.
Second quality.....	23'35	"
Third quality.....	1'63	"

With trees of the same variety unsprayed, had of,

First quality.....	23'14	per cent.
Second quality.....	54'14	"
Third quality.....	22'71	"

We would call the attention of fruit growers to the importance of using proper pumps and nozzles, particularly the latter. It seems evident that much of the disappointment and damage done in some instances by the use of arsenites may be directly traced to the use of nozzles that allowed the so. to fall in large drops instead of a fine spray or mist, thereby seriously injuring the foliage, besides using a much larger quantity of the solution than is necessary.

If the nozzle is elevated to a level with the upper branches, either by a tube or length of hose attached to a light pole, the spraying is done more effectually.

In using the solution recommended for the apple scab, it may be well to remind those not familiar with the ingredients that owing to its corrosive nature it will be necessary to wash the pumps with clear water immediately after using.

A series of experiments were also conducted at the Central Experimental Farm, Ottawa, and the results given in the report for 1890. Below are a few of the results:

The trees were of the Fameuse variety, planted fourteen years ago on loose, gravelly soil. During the past four years these trees had not yielded more than 25 per cent. of first-class apples.

Treated with:

Copper Carbonate.....	1 ½ oz.
Ammonia.....	1 qt.
Water.....	22 gal.

Result:—

No. 1 apples.....	33 per cent.
No. 2.....	25 “
No. 3.....	42 “

Row 2. Treated with:

Copper Carbonate.....	3 oz.
Water.....	22 gal.

Result:—

No. 1.....	50 per cent.
No. 2.....	25 “
No. 3.....	25 “

As the cost of the application is much increased by the addition of ammonia, while the results cited above do not seem to warrant its use, it would appear that the copper carbonate and water mixture in the strength as applied above could be used to advantage, and at a cost of about one cent per tree each application, or five cents for the season. This is an outside estimate even for large trees. It may be mentioned that the older leaves appear to be more sensitive to injury from most fungicides and insecticides than the young and growing leaves.

A COMBINED FUNGICIDE AND INSECTICIDE.

At the Central Farm, Ottawa, a series of experiments were conducted, after which the following were recommended for trial:

(a) Carbonate of copper.....	1 ½ oz.
Ammonia.....	1 ½ pts.
Water.....	25 gals.
Paris green.....	1 ½ oz.

The carbonate of copper should be dissolved in the ammonia, then mixed with the water, and the Paris green

then added, care being taken to stir in well, and keep it from settling to the bottom.

- (b) Carbonate of copper.....1½ oz.
Paris green.....1¾ oz.
Water.....25 gals.

These mixtures are not warranted, but proved effective last year.

HOME MANUFACTURE OF COPPER CARBONATE.

As the precipitated form of carbonate of copper is not always obtainable from druggists, directions are given for the preparation of this material at a cost much less than the usual wholesale price.

In a vessel capable of holding two or three gallons, dissolve 1½ pounds of copper sulphate (blue vitriol) in 2 quarts of hot water. This will be entirely dissolved in fifteen or twenty minutes, using the crystalline form. In another vessel dissolve 1¾ pounds of sal soda (washing soda) also in 2 quarts of hot water. When completely dissolved pour the second solution into the first, stirring briskly. When effervescence has ceased fill the vessel with water and stir thoroughly; then allow it to stand five or six hours, when the sediment will have settled to the bottom. Pour off the clear liquid without disturbing the precipitate, fill with water again, and stir as before; then allow it to stand until the sediment has settled again, which will take place in a few hours. Pour the clear liquid off carefully as before, and the residue is carbonate of copper. Using the above quantities of copper sulphate and sal soda, there will be formed 12 ounces of copper carbonate.

Instead of drying this, which is a tedious operation, add four quarts of strong ammonia, stirring in well, then add sufficient water to bring the whole quantity up to six quarts. This can be kept in an ordinary two gallon stone jar which should be closely corked.

It is very important that orchards should be kept in a thrifty condition. Good cultivation will go far to rid an orchard of diseases and insect pests. Neglected orchards are the nests and propagators of the vermin or pests that spread year after year over our land, and cause so much labor and expense to exterminate. A few starved, ill-cared for, and half-dead orchards in a neighbourhood will breed enough worms, moths, caterpillars, and borers to seed and half destroy all the rest. It becomes a very important matter, then, that only strong, vigorous, healthy orchards are cultivated.

PICKING.

There are three things essential to safe and rapid apple picking; an ordinary light step ladder, a couple of light handled baskets measuring half a bushel, with a hook attached, and a smart man or boy who is not afraid to climb. The ladder is the least essential article of the three. If trees are properly trimmed, they will allow a man with a basket to move freely about. An ordinary iron will serve to hang a basket on a tree while it is being filled. Apple limbs are strong, and they will hold a boy or man much better than is generally supposed. It is quickness and agility rather than lightness that makes a good picker. I know from experience that a young man may be of more service in an apple tree than any fruit-picking machine. When one basket is filled it is handed down and another returned. A bag strapped to one's back in the manner used for sowing grass seed is a nuisance on a tree.

A cheap and simple picker may be made by bending a wire into the form of a circle six inches in diameter, with one side prolonged three inches into a V shaped projection. On this wire sew a cloth bag a foot or so deep, and fasten it to a pole by the side opposite the V. This V shaped projection will serve as a corner in which to catch the apple and pull it off, allowing it to fall into the bag. A strong, light step ladder will usually be necessary in picking round the outside of the tree. A pole with a hook on the end is also convenient for pulling down limbs, or to hook off stray apples, if one does not use the picker.

Take a two horse waggon with box on. Place two cross pieces, one at each end; let them extend nearly to the wheels, put a plank on the board about a foot wide on each side length-wise of the box; fasten them together with spikes or nails, and chain to the box. Hitch on a steady team and drive under your tree. You have a good chance to pick, standing on the planks which lie flat. Then let one or more men ascend the tree, and hand down their baskets to the man standing on the planks. Begin to fill the back of the waggon first. You have thus a rig whereby you can pick a good share of the apples from a tree and have a good place to stand while doing it. When the box is filled start for the barn or fruit-house. Pick up the apples, leaving leaves and limbs. Put blankets in the bottom of the box. Then you have your apples under shelter, and can sort and pack any time you wish—rain or shine.

PACKING.

Handle apples as carefully as you would eggs. Do not shake them from the tree. In packing out of doors, as many do, when a basket is handed down, another is returned, while the apples in the first are sorted. The sorting is easily done by having an empty basket at hand, into which the choicest apples are placed, while the culls are placed in a pile on the ground. An experienced man can sort rapidly and accurately. The choice apples are commonly placed directly in the barrel. Two or three times during the filling the barrel should be shaken gently to settle the apples firmly. It is not desirable to head up the barrel at once. Cover with boards for four or five days. But the best results in packing are always secured under cover. A cheap shed, which will not leak, is sufficient.

Great pains must be taken in sorting. Few people are aware what constitutes a first class apple. Such an apple must not be immature, overripe, wormy, or otherwise injured in any part, scabby or bruised. The quality should be uniform from top to bottom. It is the poorest of poor policy to put the best apples on the top of the barrel, and poorer ones below. Only the reliable, honest packer can always be sure of a ready market and good prices for his fruit.

Varieties that will not keep long should be sold in the nearest market, as they cannot be shipped without great risk; but hard apples may be shipped long distances without injury. Apples can now be sent from almost any part of Nova Scotia to England at an average rate of one dollar per barrel. Only the very best should be sent; all small, imperfect, or bruised specimens should be rejected.

PLUM CULTURE.

Plums can be grown successfully in all parts of the province, except, perhaps, on the mountain tops, where they are subject to undue exposure, and their bloom destroyed by spring frosts. In no part, however, can they be grown more successfully than in the eastern counties of the province, including the Island of Cape Breton. Last season I saw fine crops of plums growing along the shores of Northumberland Strait. The trees were thrifty and perfectly free from Black Knot. One farmer alone raises about 50 bushels of this delicious fruit annually. There are great possibilities before us in the cultivation of the plum. It is gratifying to notice that the local press of

Pictou is booming fruit culture, and proving that the capabilities of the county only need skilful development to place it in the front rank. It cannot be too strongly put before farmers that the whole of the fruit growing part of Nova Scotia is not confined to the Annapolis Valley; and the sooner we believe that fruit growing is possible everywhere in the province, where soil can be found suitable for trees, the more rapid will be our advance in fruit culture.

The following figures of profit on plums is taken from paper on plum culture, read before the F. G. A. of Nova Scotia in 1885 :

"Sharp and Shea, of New Brunswick, a year ago, from their small orchard, sold 1,000 bushels of plums at their own door for \$4,000, and last year, 1,500 bushels for \$6,000. A Canadian farmer raised from ninety trees of the Lombard variety, the third year from transplanting, forty-five bushels; and the fifth year, ninety bushels. John A. Shaw and John Publicover, of Kentville, sold Marsters plums for six dollars a bushel. Fred. F. Mitchell, of Grand Pre, the fourth year from planting, raised from one Weaver plum tree two and a quarter bushels, and sold them for \$10.69. R. D. G. Harris, of Canning, raised the fourth year of the same variety, one and one quarter bushels, and sold them at five dollars a bushel. Robert Spurr, of Round Hill, from four trees of the same variety, and planted the same time, raised three bushels. John Daniels, of Windsor, J. P. Chipman and Geo. Vaughan, of Kentville, raised three quarters of a bushel from each tree the fourth year. The price of plums has been extraordinary when all other fruits have been so cheap. The best of apples thirty-five cents per bushel, cranberries three dollars per barrel, pears two to four dollars per barrel; while plums, in all the markets of America, have brought from \$10 to \$15 per barrel."

There is not one plum orchard in Nova Scotia.

We read in the *Western Chronicle*, of Jan. 13th, a letter from Wanderer, of Citra, Fla., where a company will make from 100 acres of orange grove a profit of \$30,000 from 16,000 boxes. I will show you that a plum orchard of 100 acres here will double discount that orange grove :

Cost of 100 acres.....	\$ 2,000
Cost of 20,000 plum trees.....	10,000
Interest, 4 years at 6%.....	2,880
Ashes, Salt and Mulch.....	5,000
Labor (10 men and teams).....	13,870
Gathering and selling (45,000 bushels).....	11,250
Total Cost.....	\$45,000

Take Fred. F. Mitchell's crop at the basis of \$10.69
from one four year tree:

20,000 trees.....	\$213,800
Take cost out.....	45,000
	<hr/>
Net profit, 4 years.....	\$168,800

At the same rate, Harris' plums would pay him \$80,000 in the fourth year, and Spurr's \$30,000. From the above estimate we have a net profit of from \$30,000 to \$225,000 on an investment of \$45,000, and still have the land and orchard left free of cost. Suppose you say I have figured too high. I will divide them by 10, and we have a profit of from \$3,000 to \$22,500. We have now at our doors an enterprise that will discount an orange grove, or any other enterprise, whereby a capitalist can double his money in so short a time, and help to make the country prosperous.

Plum trees are sometimes planted in apple orchards. Plum and apple trees are planted alternately, and, as plum trees require much less room, bear fruit much younger, and are much shorter lived than apple trees, by the time the latter reach full size the plums may be cut out, leaving all the ground to the apple trees. This plan has its advantages, but is not to be recommended when it is desirable to attain the greatest success. As a general rule plums require higher culture and more heavy manuring than apples. While inferior crops of apples may be grown on land seeded down to grass or grain, plums are generally a total failure under such treatment. With such usage they often shed their leaves in midsummer, when all growth of tree and fruit ceases. Thorough cultivation until the crop is nearly matured is the best known remedy for this evil.

In most respects the culture of the plum is similar to that of the apple. They may be planted much closer, a rod being a very convenient distance, giving 160 trees to the acre. Thinning the fruit in the manner spoken of under apple culture is very important, as the plum often have immense crops, to the serious injury of the tree. For the same reason annual manuring is absolutely necessary. A failure in this respect generally means a failure of crop.

There are three serious obstacles in the way of plum growing, viz., the disease known as Black Knot, Curculio, and Rot.

The Black Knot is the worst disease to which the plum is subject. Indeed it has become so great a scourge that many farmers have become discouraged and given up the culture of this fruit. This ought not to be when it can be

so easily overcome. It only requires time and patience to effectually banish it. It was formerly believed to be a disease of the sap, or caused by some unknown insect laying its eggs on the twig, but it is now proved beyond a doubt that it is a parasitic plant, the spores of which float about in the air and fasten themselves upon the young twig. The next season they rapidly grow into the knot like moss. When the disease commences, be sure to remove the diseased part, or cut out the limb at once and burn it.

THE PLUM CURCULIO,

or as it is commonly called the Curculio, is the great insect enemy of the plum. The female beetle makes her appearance early in spring, and as soon as the fruit is formed she alights on it, and with her minute jaws makes a small cut just through the skin of the fruit. Into this hole she drops an egg, and goes to perform a similar operation on another plum. In about a week there hatches from the egg a tiny soft, footless grub, which begins at once to feed upon the green flesh of the fruit. The fruit containing the grub does not mature, but falls to the ground generally before the grub is full grown. It often remains in the fallen fruit some days before it descends into the ground to complete its transformation, from which it emerges a perfect beetle. From this it is evident that if hogs or fowls are allowed to run among the trees to destroy the grub before it enters the ground, they will completely check the ravages of the insect. For years the hens and chickens have run among the plum trees, and I have never been bothered with insects; but when these remedies are not practised, spraying the trees with Paris green just after the blossoms have fallen, and the jarring method are both effectual.

To jar small trees a nail may be driven into the tree as it does no harm, or a limb may be sawn off an inch or so from the trunk, and struck with a hammer. When the trees become larger a forked stick five or six feet long, the forked portion being wound with a cloth to prevent bruising, is the most convenient to jar the trees. Approach the tree gently and let the jar be sudden. Shaking the tree will not answer. Sometimes in the middle of the day, if it be warm, the beetles will fly off the sheet before they are caught. Sprinkling the sheet will prevent that. If each tree be shaken every hour of the day while they are at work, all or nearly all of them may be destroyed, although they may come from neighbouring trees and

destroy the crops. As they are dull and inactive morning and evening, this is the best time to effect their capture.

For Rot there is no certain remedy. The idea that they only rot when they lie on the tree so as to touch, is incorrect. Picking the fruit as soon as the rot appears does not do any good. It is stated that if the fruit were picked carefully as soon as it commenced to rot, and then placed in a pail of water to prevent the spores of the decayed fruit from rising and lighting on the fruit remaining on the tree, then carried away and buried deeply in the ground, afterwards sprinkling the tree and fruit liberally with lime, it would prove a certain remedy. It is also stated that if the decayed fruit be left under the tree the spores will cause the fruit to rot the next season. It often happens that when fruit rots once on a tree, it continues to rot year after year, although I have never known it to appear until after several crops were raised.

VARIETIES.

It is not so difficult to make a good selection of plums as of apples. I shall only mention a few of the best varieties cultivated in Nova Scotia and New Brunswick.

Marsters—A strong growing, healthy tree, free from Black Knot, originated in Kentville, N. S., fifty years ago; one of the best plums grown.

Moore's Arctic.—A vigorous, rapid grower; an immense and early annual bearer, often injuring itself by over-bearing, but extremely hardy. Fruit medium size, round, dark purple, of a pleasant but not a rich flavor.

Bradshaw.—Large, color dark purple, stalk three-fourths of an inch long, flesh a little coarse, becoming light brownish purple. Tree hardy, vigorous, an annual and prolific bearer.

Lombard.—One of the best and most prolific varieties cultivated. Fruit large, color violet red, oval shaped, flesh deep yellow and of fine quality. Tree hardy, very prolific, well adapted to light soils.

Red Magnam Bonum (Purple Egg).—Very large, coarse quality, surface deep red in the sun, firm and valuable for cooking. Tree, good grower.

Coe's Golden Drop.—Light yellow, often dotted red in the sun, medium size. Flesh yellow, firm, very rich. Season late. Tree not very vigorous. An excellent sort when the season is late.

Yellow Egg.—Very large, oval, skin yellow, quality coarse but firm, becoming better and richer when kept. Tree very thrifty.

PEAR CULTURE.

This is a favorite fruit, excelling the apple in richness of flavor, juiciness and beauty. While not so universally used for cooking, it is excellent when evaporated, baked or canned. That it can be successfully grown in all the counties of Nova Scotia is no longer a matter of conjecture. The late Rev. Dr. Burnet of Pictou, N. S., for many years president of the F. G. A. of Ontario, and one of the best authorities on pear culture, having cultivated over three hundred varieties of this fruit, speaking of pear culture in eastern Nova Scotia in 1884, says:—"I am persuaded that fire blight, so disastrous and discouraging in the pear culture of the Upper Provinces, is very much modified in the county of Pictou. A pear tree in front of my residence does not show the least symptom of the blight, and this is equally true of all others with which I am acquainted. Pear blight is a terrible scourge in Ontario. Should this not be the case here, pear culture will prove not only pleasant but profitable." Again, he says:—"In Pictou we cultivate the *Beurre Bosc*, which even in Western Ontario is found to be on the tender side. We have not yet found it to be too tender for the eastern section of this province. The tender tips of none of the twenty varieties cultivated in our patch have even been scathed by the winter frost. The lengthened fall season is a wonderful help to the fruit grower. A favorable comparison can be truly made between Ontario and Nova Scotia in this respect. Our autumn weather is perfect, and highly favorable to the production of ripened wood and fruit buds. There are few facts connected with fruit culture more encouraging to the horticulturist than this.

Pear culture is receiving more attention recently than ever before, and it has proved profitable both as standards and dwarfs. Indeed, the labor and difficulty of growing pears does not greatly exceed that of growing apples. The Leaf blight is the most serious evil to contend with in pear culture. It is more formidable some seasons than others. Commencing about mid-summer, earlier or later, it is first indicated by the leaves in certain parts turning brown, then black, until they all fall off. As a necessary consequence all growth ceases. If they are attacked early, and have made little previous growth, they are nearly ruined, and may fail to survive the following winter.

The cause of the disease is proved to the satisfaction of many by Prof. Burrill, to be bacteria; creatures so small as to enable thousands upon thousands to sport in a single drop of fluid with as much freedom as fish play in the ocean. No remedy is suggested beyond cutting off the limb one foot below the diseased point, and using great care in not spreading the disease by knives when pruning. High cultivation and an application of unleached hardwood ashes will also prove beneficial. Some recommend iron rust or scales from the forge. But as yet this scourge has caused little loss here, and some varieties are quite free from it.

Pears grafted upon pear roots are known as Standards. Dwarf pears are grafted or budded on quince roots. For orchard culture, and in most parts of the country where the pear flourishes with great vigor, pear stocks will always be found preferable to all others. Dwarfs are not so long-lived as Standards, and they require more thorough and fertile cultivation and care in pruning. But they have some important advantages, such as coming early into bearing, occupying a fifth part of the ground, thriving in many soils where pear stocks will not, and in some varieties improving the quality of the fruit.

Of the list of varieties of pears the Bartlett always takes the lead. It has almost every good quality to recommend it. The tree is a hardy, vigorous, erect grower, delighting in being fed with plenty of well-rotted barn yard manure. It is an early and heavy bearer, sometimes having the habit of bearing over-much. The fruit is of the finest quality, and always a favorite in the market. No other variety bears so young, so regularly, or so abundantly as the Bartlett.

Clapp's Favourite which ripens a week or ten days earlier than the Bartlett, is another valuable variety rapidly coming into favor. Tree of vigorous, upright growth, and remarkably productive of very large, handsome fruit, having a beautiful light yellow skin, and a dull blush on the sunny side. The fruit has a melting vinous flavour, and should be picked before entirely ripened.

These two varieties I would strongly recommend for early varieties. For autumn varieties the Buerre Lapertin and Beurre Bosc. For winter Lawrence and Easter Beurre succeed well in this climate.

CHERRY CULTURE.

Although cultivated here and there all over the country, the cherry seldom receives the attention that it deserves. While other fruit trees have been receiving much attention of late years, the cherry has been neglected; and yet few are more attractive in appearance, or more marketable and profitable when tastefully packed, fresh or evaporated.

The fact that they grow vigorously and often bear immense crops when planted along the roadside or by the fences, where the soil is never cultivated, shows what might be accomplished by proper cultivation. The cherry is a tree that bears transplanting well, comes early into bearing, and though it enjoys good culture and manuring, it can get along without. It may be planted in the same orchard with plum trees, and receive the same treatment. It is subject to the same diseases and insect enemies. The birds often prove troublesome, but generally do more good than harm by destroying insects. I believe it would prove profitable to plant a few cherry trees in every orchard to attract the birds to destroy the insects that attack all kinds of fruit trees.

Of the different varieties of cherries the following are recommended by the best authorities:—Black Eagle, Black Heart, Black Tartarian, Windsor, Coe's Transparent, Morello, Early Richmond.

SMALL FRUIT.

STRAWBERRY.

Of the small fruits cultivated in Nova Scotia, first in order, first in excellence, first in profit, and first in cultivation, undoubtedly comes the strawberry. It is certainly a most delicious fruit, having lost none of its original flavor by cultivation, and will always be in demand when taken to market in good condition.

It is exceedingly prolific, and will, under good cultivation, give as many bushels per acre as a crop of potatoes. Numerous instances are given where 8000 quarts have been produced from a single acre, which at the usual market price of 15 cents per quart, would amount to \$1200. Of course it requires extra labor and expense to produce such a result; but I have known small areas devoted to straw-

berries give a profit at the rate of \$300 per acre, with only a fair share of attention.

Strawberries can be made to do well on almost any kind of soil, provided it is well drained and properly enriched. A good rich loam will, however, generally give the best results. The ground should be thoroughly prepared the season before planting. If possible, a field should be selected that has been growing hoed crops for a year or two previously, thus leaving the ground mellow, free from weeds and the larvæ of the June bug, so injurious to the roots of strawberry plants. The ground should then be ploughed deeply, and harrowed until the soil is broken up fine. It should be heavily manured with well-rotted stable manure, then cross-ploughed and harrowed until the manure is thoroughly mixed with the soil. If the planting is to be done in the spring, part of the work may be left until then, but it is always best to have the ground thoroughly prepared in fall, as the planting must be done as early as possible in spring to insure success. The ground should be rolled with a heavy roller to leave the surface smooth and firm. Then mark out straight furrows three feet apart, and about three inches deep. The ground is now in condition to receive the plants.

A boy goes ahead of the planter, and from a basket drops the plants at a distance of about one foot. One boy will be able to drop for two or three planters. The planter takes the plant in his left hand, puts it in its place, and with a sweep of his right draws in the loose earth round the roots. After he has planted a row, he may take a hoe and level off the earth, and tread it down firmly around the plants.

This is the quickest and most profitable way of preparing the ground and planting on a large scale, but when only a small plot is to be planted more care and time can be taken. The field should be cultivated throughout the summer, all blossoms and runners removed the first year. Cultivation until the fall is necessary to secure the vigorous growth of plants and the production of fruit buds.

As soon as the ground freezes up the whole surface should be covered with a mulching of straw, salt hay, leaves, or some material easily obtainable. Spruce brush makes an excellent covering. The litter must be removed in the spring from the crowns of the plants, but should be left between the rows if no cultivation is to be given until after the crop is picked. It thus serves to keep the fruit

clean. After the fruit is picked the mulch should be raked off, and the ground get a top dressing of bone dust, ashes, or some commercial fertilizer, and again thoroughly cultivated if it is to be kept for another year. Three or four profitable crops may be got in this way; but sometimes it is best to plough up after the first heavy crop. If the ground should become weedy it is easier to plant a new plot than to clean out an old one.

Some strawberry growers allow the runners to grow and cover the ground, except a small patch in the centre. This is certainly less labor, but fruit of the largest and best quality cannot be got in this way, nor can the field be kept free from weeds.

The strawberry is comparatively free from diseases and the attacks of insects. Indeed, no crop that the farmer raises suffers less from enemies. Leaf blight and mildew sometimes occur on heavy soil, but seldom do serious injury. The larva of the June bug is, perhaps, the worst enemy of the strawberry, especially when planted on old sod land; but thorough cultivation with the aid of birds almost frees us of this pest.

The strawberry worm and the strawberry leaf-roller occasionally appear, but I have never known them to appear in sufficient numbers to do any damage. Dusting the leaves with lime when wet with dew or just after a shower for the former, and picking off and burning for the latter, are effectual remedies.

The greatest drawbacks to strawberry culture are frosts and droughts. For the former it is recommended to plant on hillsides, where the frost is less liable to strike. For the latter artificial watering may be employed, but it is doubtful if it could be made profitable on a large plantation.

In the list of varieties, for hardiness, vigor and productiveness, Wilson's Albany still holds the first place. The Crescent Seedling is noted for great productiveness. The Sharpless and Manchester produce large fruit, of better quality than the former varieties, but are not so productive.

The Crescent and Manchester are pistillate, and require to be planted alongside of some perfect flowering variety to produce fruit.

These four varieties will probably give better results than any others. Farmers should leave the testing of new varieties to those who have more time and money to devote to the work.

THE RASPBERRY AND BLACKBERRY.

Raspberries and Blackberries are familiar examples of cane fruits. They can easily be propagated by several different methods. (1.) By seed. This is principally for the production of new varieties.

(2.) By roots and root cuttings. A large proportion of the varieties in cultivation produce suckers from the roots, or what may properly be called underground stems.

(3.) By layering or bending the top over and sticking it into the ground. To succeed with this mode the layers must be put down early in the season, as soon as the young canes are of sufficient size to handle.

(4.) By cuttings. There are but few varieties that cannot be successfully grown from ripe wood cuttings. All the varieties of Raspberries and Blackberries will grow rapidly from green wood cuttings by the same process used by propagators in multiplying the grape and other plants, but there are so many other methods of multiplying them that it will seldom be necessary to resort to this one.

The canes of all varieties are only biennial, that is, the canes that are produced one year bear fruit the next and then die. The roots, however, may be several years old, as they are perennial. As soon as growth ceases and the leaves drop off, the old canes should be cut away.

Thorough preparation of the soil before planting is just as important for the raspberry and blackberry as for other fruits. Plough and prepare the ground as for potatoes or other crops. Mark off the rows six feet apart, and set the plants four feet distant in the rows. Some varieties may require more room, some less. Blackberries require more room than raspberries. The tops should be cut down to within a few inches of the ground, that the roots may become well established before they supply nourishment for long tops of green foliage. The ground should be stirred and thoroughly cultivated with the horse and cultivator, to keep the land free from weeds. Care should be taken not to disturb the roots by too deep cultivation near the plants. They can be cultivated both ways, thus affording perfect cultivation.

In the fall, if the canes need protection, they can be bent over and held down by a shovelful of soil placed on their tops. In the spring they are lifted up and tied to stakes.

There are several ways of holding up the canes when loaded with fruit. Stakes are commonly used. Sometimes a hoop is passed round the canes and nailed to stakes. A very simple method is to tie half the canes of one hill to half the canes of the next, and so on all along the row. If this is done in the direction of the hills four feet apart, plenty of room is given for the pickers to pass between the rows planted six feet apart.

But so various are the changes that can be made in every department of fruit culture, that to give them all in detail would require one or more large volumes for each species in cultivation.

VARIETIES.

Raspberries: Gregg, Ohio, Cuthbert.

Blackberries: Taylor, Gamor, Snyder.

CURRANTS AND GOOSEBERRIES.

Currants and Gooseberries are familiar examples of what is known as bush fruit. It may be doubted if there are at the present time any small fruits more easily cultivated and more profitable for the family or market, if the right soil and climate are selected for planting. They are so much alike in their culture that they may be treated together.

They are propagated in four different ways:

(1.) By seeds for the production of new varieties.

(2.) By cuttings. This is the usual method of propagation. Select good, strong wood of the present season's growth. To secure the best results it should be taken off as soon as the wood is fully ripe, making the cuttings about six inches long, cutting them off smooth just at the base of a bud. When a variety is very scarce and valuable, the cuttings may be made very short, two or three inches in length, but they require extra care until they become well rooted. If planted early in the fall they usually become well rooted before winter sets in, and will make a much more vigorous growth the next season than if the planting is deferred until spring. If not convenient to plant in the fall, the cuttings may be tied in bundles and buried in the open ground or cellar until spring, when they should be planted as early as possible, as both the currant and gooseberry start into leaf very early.

(3.) By suckers. With nearly all varieties of currants and gooseberries suckers spring from the roots in great abundance. These may be clipped off at the base and planted out as is usual with other plants. But plants got from suckers are not usually so good as those produced from cuttings.

(4.) By layers. Branches, when bent over and covered with a thin covering of earth or mulch, will readily take root. The spring is the best time to perform this operation, as by the fall the layer becomes well rooted when it may be separated from the parent plant. Layering is less practiced with the currant than with the gooseberry.

The soil should be prepared and fertilized as for other crops, and the plants placed in rows about four or five feet apart, and four feet in the row. Clean cultivation can then be kept up, if the plants have been regularly set, by running the cultivator both ways. Like all other fruits, they should be kept well pruned and thinned out.

INSECTS AND DISEASES.

Currant and gooseberry bushes are very subject to the attacks of several varieties of insects which very much resemble one another; and unless closely watched they are often defoliated in a week after leafing out. The prompt use of powdered white Hellebore scattered over the plant when wet with dew, or mixed in water and applied by aid of a sprinkler, will soon rid the bushes of these pests. Tobacco water and Lime are also used with good results as a preventative, but the hellebore is considered the most effective.

But an enemy less easily combated is the gooseberry mildew, which attacks principally the European varieties, and is the great drawback to their successful cultivation in this country. The external appearance of the fungus is well known, showing on the young wood, leaves, and fruit as a whitish downy coating, usually appearing soon after the leaves are fully expanded. Successful results in the treatment of this disease are reported by Prof. Goff of the Agricultural Experiment Station of Wisconsin, by the use of Potassium Sulphide, at the rate of one ounce dissolved in four gallons of water. Spraying was commenced when the leaves were partly expanded, and repeated several times during the summer.

Varieties of currants :—Red Dutch, Victoria, White Grape, and Black Naples.

Varieties of gooseberries :—Downing, Smith's Improved. The old Houghton is too small to sell well in the market. The others are just as prolific, hardy, and free from mildew.

Currants and gooseberries have many good qualities to recommend them for general cultivation ; among which are their hardiness, early culture, great productiveness, and the certainty of a full crop every year.



— THE —

Provincial School of Agriculture,

TRURO, NOVA SCOTIA.



THIS institution was established six years ago, and has had a steady growth, both in students and efficiency of instruction. The school has in a measure kept growth in its equipments, so that to-day, as will be seen elsewhere, it possesses excellent conveniences for the study of the natural sciences in their relations to agriculture. It is the aim to present such a course of study, and such instruction, that any young man can obtain a suitable education here if he but possesses a fair common school education. It is not desirable to have students enter who need instruction in the common branches; these they should obtain in the local schools; but to those who have done this, or to those who have but a limited time to attend school, and who wish to get, in that time, as much instruction and insight into intelligent farming as they can, our doors are always open. There is one rule that is invariably followed—that is, to make the School available to the needs of the young men who will soon till our farms. Have you doubts whether you can enter? then write and ask. The student is taken at that point where he is able or prepared to commence, and is conducted as far in his studies as he desires. Young men have attended from all parts of the province, nearly. Let every county be represented! Farmers, this School is for your benefit. No such opportunities are offered to farmers in any other country in the world, so freely, and at so little cost. It is no longer a question if you can afford to have an agricultural education; you cannot afford to be without it. It is a rational understanding of your life-work, and the reason for all its operations.

THE FARM.

In September, 1888, a Farm was purchased for the School. It consists of fifty acres of arable land, thirty acres wood, and twenty acres intervale. It is situated near the town of Truro, and only fifteen minutes' walk from the R. R. Station, on a hill called "Bible Hill." It overlooks the vast marshes of Cobequid Bay and its waters on the west, the fertile fields of Onslow on the north, and the valley of the Salmon River on the south and east.

[OVER.]

SCHOOL TERMS.

The School has four terms. The FALL TERM extends through the months of AUGUST, SEPTEMBER and OCTOBER; WINTER TERM — NOVEMBER, DECEMBER and JANUARY; SPRING TERM — FEBRUARY, MARCH, APRIL; SUMMER TERM — MAY and JUNE.

ADMISSION.

Students are admitted at the commencement of each term, which will always be the first Monday after the first Wednesday of the first month of the term. Students can always study at the School, and work in the shops or on the farm during vacations,—these will consist of two weeks at Christmas, two weeks before the Winter term, and from July 1st to the Fall term.

REQUIREMENTS FOR ENTRANCE.

Any young man can enter the School who has a good moral character and a fair common school education.


No charge nor fee of any kind is exacted from the student.

EARNINGS OF STUDENTS, AND INDUCEMENTS.

A student having a good practical knowledge of farm work can earn about three dollars per week. It is not desirable to devote thirty hours per week to farm work, and as a rule no student will be permitted to exceed thirty-five hours. On the other hand only so much will be required of students as will give them the proper skill in manual operations. Each student will be paid in proportion to the amount of application, skill and intelligence he bestows on his labor. All the work which students require is provided at all seasons of the year.

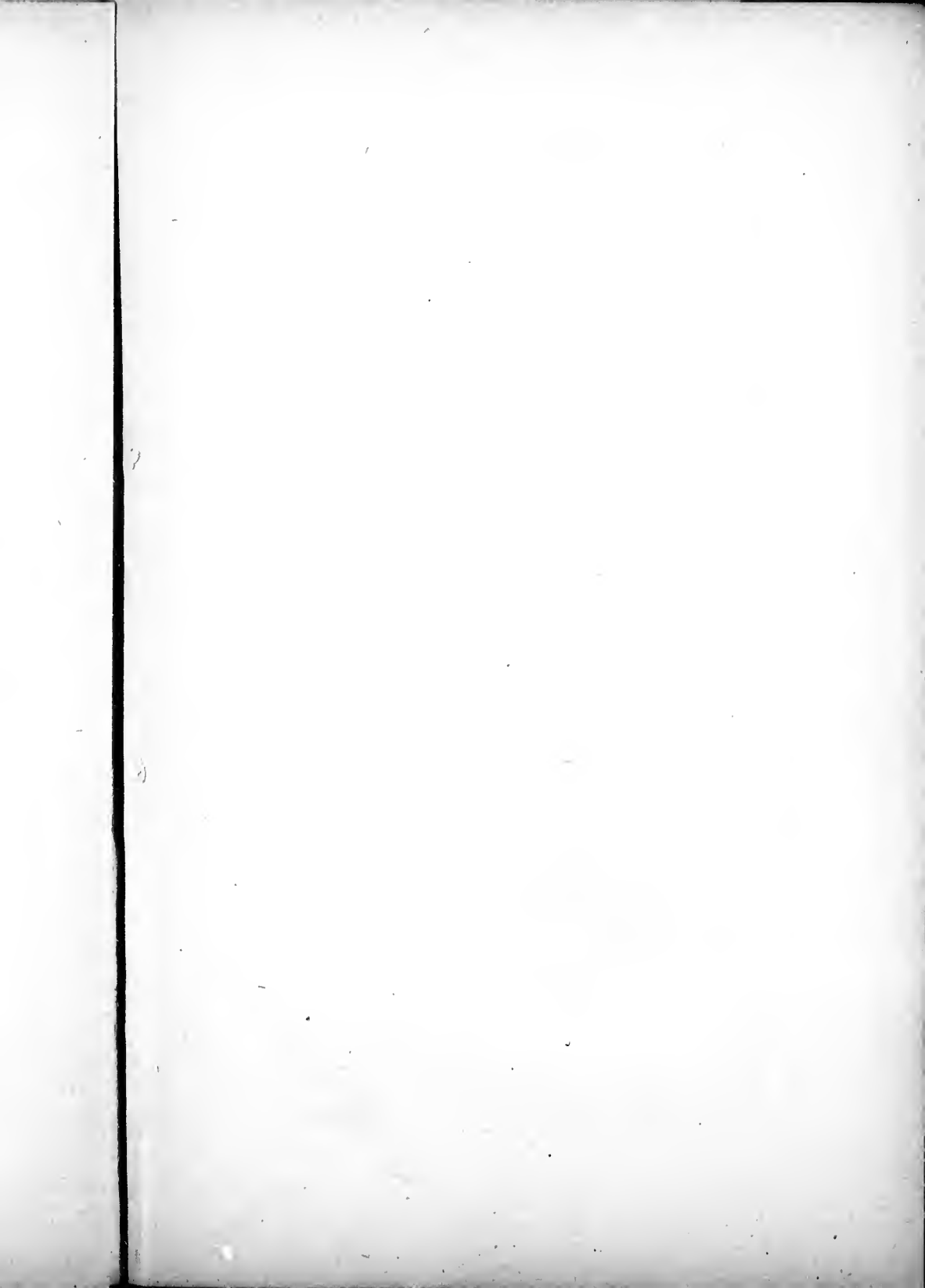
SPECIAL INDUCEMENTS FOR TEACHERS.

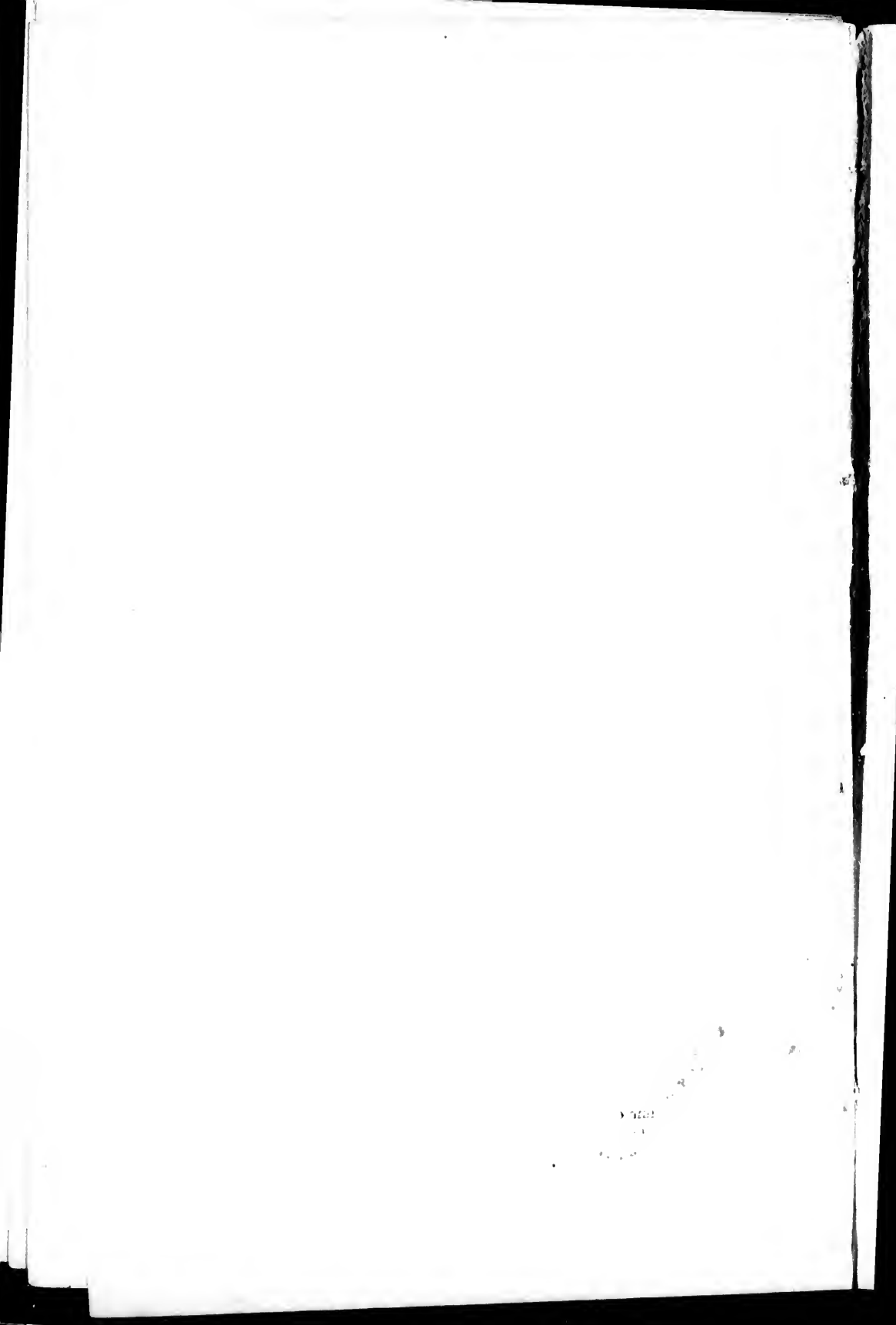
Teachers who possess, on graduation, an A or B license, receive a teacher's diploma, and the best five taking the course receive \$50 each as prizes. As agricultural teachers, they receive \$100 additional to their salary per year, if they teach "agricultural schools."

 For further information apply to

PROF. H. W. SMITH,

Truro, N. S.





→ **ALBERT NURSERIES.** ←

TESTIMONIALS.

West River, N. S., Oct. 20th, 1891.

I have bought at different times over four hundred apple trees, besides other stock, from the firm of Tingley, McLane and Fillmore, and have found their stock all they recommend it to be. W. O. CREIGHTON.

North Rustico, P. E. I., Oct. 25th, 1889.

To W. A. FILLMORE :

Dear Sir,—The trees that were got from you have done exceedingly well, better than any I ever had. I raised some very fine English Red Streak this fall, and I got first prize for Winter Boughs at the Charlottetown Exhibition.
Yours, &c., COLIN C. MCNEILL.

Green Hill, N. S., Aug. 20th, 1891.

W. A. FILLMORE :

Dear Sir,—I want more trees next spring. The hundred and fifty I have from you are the only trees that have given me satisfaction. The fruit is excellent. The Yellow Transparents this summer are a perfect picture.
Yours truly, JAMES M. MCLEAN.

West New Amman, Sept. 21st, 1891.

MR. W. A. FILLMORE :

Dear Sir,—The apple trees I got from you have done better than those I got from any other nursery. They are hardier, grow better, and what is something uncommon, as they come into bearing they all prove true to name ; and I may add that out of the whole eleven hundred I got from you, a smaller per centage of them have failed than any others I have tried.
Yours truly, ROBERT ANDERSON.

Wallace, Sept. 24th, 1891.

To W. A. FILLMORE, ESQ., Amherst, N. S. :

Dear Sir,—Your enquiry received, and in reply I have to inform you that the fifty ornamental trees, comprising Horse Chestnuts, Mountain Ash, Weeping Willows, Silver Leafed Maples, Scotch Ash, Cut Leaf Birch, &c., &c., purchased from your agent here, are making a good growth. We are all well pleased with them, as they are a good size and well shaped.
Yours, &c., J. W. MORRIS,
Sec. & Treas. Wallace Cemetery Co.

Cavendish, P. E. I., Oct. 21st., 1889.

To W. A. FILLMORE :

Dear Sir,—I have much pleasure in recommending your nursery stock to any intending purchasers, having had a trial of it for over twenty years. I pronounce it the best in the market. The specimens of Winter Bough, R. I. Greening and Autumn Strawberry, are very fine, and I received first prize for Gravensteins at the Charlottetown Exhibition this fall, all of which were grown on trees purchased from your firm.

Yours truly, WILLIAM J. SIMPSON.

Alma, Pictou Co., Sept, 18, 1891.

To W. FILLMORE :

Dear Sir,—Please send me another hundred roots Rhubarb. Three years ago I got one hundred roots from you and the very first year I got seven hundred pounds from it, and two years ago I got another hundred, and this summer, from the two hundred roots, I sold over one hundred dollars.
Yours truly, EDWIN ARCHIBALD.

— See Adv. next Page. —

ALBERT NURSERIES.

TINGLEY, McLANE & FILLMORE, PROPRIETORS.

WE KEEP CONSTANTLY ON HAND A LARGE STOCK OF

Apple, Plum, Pear

—AND—

CHERRY TREES.

ORNAMENTAL TREES IN GREAT VARIETY.

Grape Vines, Roses, and Ornamental Shrubs.

ALL WARRANTED TO GROW, AND TRUE TO LABEL.

WE ALSO SELL TO THE TRADE.

For further information address

**W. A. FILLMORE,
AMHERST, N. S.**

