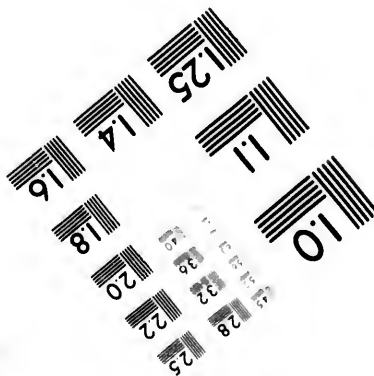
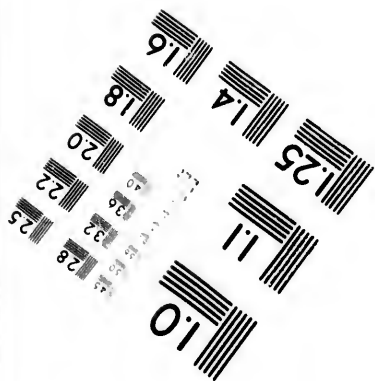
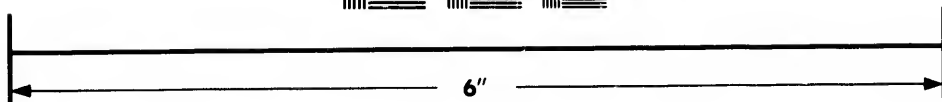
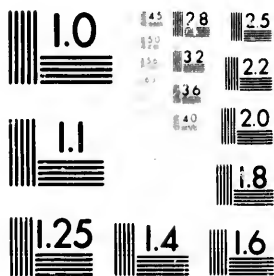


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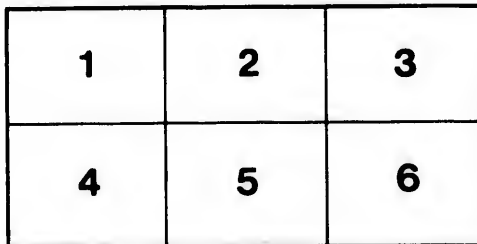
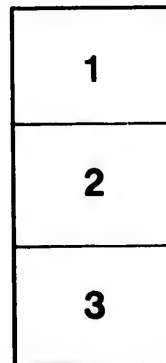
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A YEAR AMONG THE ORCHARDS OF NOVA SCOTIA

BY
MR. CECIL H. HOOPER, M.R.A.C., F.S.I.

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A YEAR AMONG THE ORCHARDS OF NOVA SCOTIA.

By Mr. CECIL H. HOOPER, M.R.A.C., F.S.I.

[Read January 31, 1899.]

THE peninsula of Nova Scotia is situated on the eastern side of the Dominion of Canada and south of the entrance of the Gulf of St. Lawrence. The climate is very pleasant, in spite of a long and rather severe winter; the frost is of great advantage in pulverising the soil. The country is remarkably well supplied with water by its countless little springs and its numerous lakes, as well as by the heavy falls of snow in winter and frequent and heavy showers during the summer months, the latter generally falling at night, leaving the days bright, warm, and cloudless. The growth of vegetation is very rapid after the snow has disappeared. The scenery is beautiful, the abundance of native trees rendering it particularly attractive. The most common of these are spruce, fir, pine, larch, birch, maple, ash, alder, and oak. The acacia tree is often seen, and also in some parts the French willow and English elm have been introduced and thrive well. Nova Scotia is said to have the largest variety of flowers, mosses, and ferns of any country. Wild eatable berries are also very plentiful; they include strawberries, raspberries, blueberries, huckleberries, blackberries, and cranberries.

THE CORNWALLIS AND ANNAPOLIS VALLEY.

The Cornwallis and Annapolis Valley is the principal fruit-growing district of Nova Scotia. It is one continuous valley of about 100 miles in length, and varying in width from six to eleven miles, situated between two nearly parallel ranges of hills of about 600 feet in height. The North Mountain shelters the valley on the north-west, and from the strong winds off the Bay of Fundy; the South Mountain, which is a little higher, bounds it on the eastern and southern side, and runs N.E. to S.W. In the middle of the valley there is a watershed, the Annapolis River running S.W., the rivers of the Cornwallis district running N.E.

These rivers are small; but owing to the great rise and fall of the tide (60 feet), the salt water runs up far inland, carrying with it enormous deposits of alluvial mud or silt, and allowing ships to go several miles inland.

Near the mouths of the rivers there are salt marshes which are overflowed by the tide, and grow salt hay, which is eaten by the cattle during winter. Higher up are the dyked marsh lands reclaimed from the sea, forming very rich meadow land. Grand Pré, the district rendered famous by Longfellow's "Evangeline," the scene of the expulsion of the Acadians, lies in the eastern part of the valley, on the shores of the Basin of Minas, across which Cape Blomidin, the termination of the North Mountain, is clearly seen. Owing to the beauty of the country, its historic interest, and the cooler temperature, it attracts many visitors from the United States during the summer months. Apples and plums are grown throughout the valley, and in the centre, near the towns of Middleton, Aylesford, and Berwick, raspberries, blackberries, and strawberries are grown, also some peaches and a few grapes. One farm I visited had 6 acres of strawberries. Most of the soft fruit is sent to Halifax and Boston, but the market for these fruits is at present rather limited. In the centre of the valley there is a large area of bog land, which, it has been found, is well adapted to cranberry-growing, an industry that is rapidly increasing.

The greater part of the valley was originally covered by forest, which has been cleared, save at the foot and sides of the mountains.

THE SOIL.

The soil of the valley is partly formed by the disintegration of the Trap rock of the North Mountain, partly from the syenitic granite of the South Mountain, together with the red loam and coarse-grained sand of the New Red Sandstone in the valley, which abounds in oxide of iron, lime, and gypsum, forming a fertile soil admirably adapted to the cultivation of apples, plums, and various fruits, as well as of potatoes, swede turnips, oats, maize, pumpkins, beans, &c. Wheat growing and beef production have lately decreased, owing to the competition of the western provinces. The dairying industries are, however, increasing.

THE FARMS.

The farms are, almost without exception, occupied by their owners, most of them small compared with the average size of English farms, and still smaller, of course, compared with many farms in the West of Canada and the United States. The labour is largely performed by the farmer and his sons, with but little hired help. The farmhouses and buildings, for the most part, are neat, comfortable, and give the impression of prosperity. They are almost all constructed of wood, painted white. They are generally situated near the high road; and, as the farms are long and narrow, extending often back into the wood and down through the marsh land to the river, the farmhouses are many of them within a quarter of a mile of one another, which enables life to be of a sociable nature, if desired. Prohibition of intoxicating drinks is rigidly enforced throughout Nova Scotia, with the exception of a few

towns. There is consequently very little drunkenness. Roughly speaking, the area of these farms varies from 20 to 120 acres, consisting of about equal parts of grass and arable land, the latter including 1 to 5 acres or apple orchard. There are a few farms with as many as 60 or more acres of orchard, but a large proportion of this has been planted within the last ten years, and is not yet in full bearing. Many orchards are fifty years old, and a few apple trees remain which were planted by the French more than 150 years ago. The apple tree certainly thrives here, and the orchards are generally neatly laid out and well cared for; the growth of the trees is more rapid, and they attain a larger size than is common in England. The fruit is usually large, well coloured and abundant, and of pleasant flavour, particularly the 'Grauvenstein.' Owing, no doubt, to quicker growth and shorter season, the flavour generally is not quite as nice as that of good English apples. Although the shape of the trees, the cultivation, and the fruit in the best English orchards equal, I think, anything I saw in this valley, the average of the two countries is much in favour of Nova Scotia.

Throughout the valley there is a telephone system which connects railway stations, shops, doctors' dwellings, and many of the farmers' houses. The charge is £5 for installation; £2. 10s. yearly. On one occasion I sent a cable to England from the sitting-room of the farmer's house in which I was staying, and received one back.

Co-operative cheese and butter factories stud the valley every few miles. These encourage the keeping of dairy cattle, which industry profitably accompanies fruit-growing. The local agricultural societies own pedigree cattle for the improvement of native stock. At Canning, in the Cornwallis Valley, there is a vegetable evaporating factory (Kerr's), which was busy drying vegetables for the soup of the miners at Klondyke. It has in former years fulfilled contracts to the satisfaction of the English Government for naval and military supplies, its only difficulty being sudden large orders, with very limited time for manufacture.

PRUNING AND TRAINING.

The trees are, as a rule, well-shaped, as the farmers begin early in the life of the tree to shape it. They like their trees to have a central leader, with the main branches distributed evenly about it, there being thus less risk of the tree splitting. The height of the branches from the ground is regulated so as to allow horse cultivation under them.

It is found by experience that it is best to saw off the branches as close against the trunk as possible. If it is necessary to remove a large limb they commence by sawing in a short distance from below upwards, in order to avoid splitting the wood and tearing the bark. Large wounds grow over best when the edge is smoothed off with a knife, and then covered with some substance to exclude moisture and thereby prevent decay. Gum shellac dissolved in wood alcohol is found to be the best substance for this purpose, though white lead paint or grafting wax are both good.

Generally speaking, summer pruning, of which a good deal is done, promotes fruitfulness; winter pruning tends more to wood growth. Pruning in Nova Scotia is chiefly done at the end of winter, whilst snow is still on the ground; when the trees are bursting into bloom is found to be a good time, though the opinion is that pruning may be done any time during winter without disadvantage to the trees, the discomfort being that of the man who prunes.

In case of a tree being split at the forking of the branches, a hole is bored with an auger right through the tree at right angles to the split, and the parts are drawn together by an iron screw-bolt and nut with large heads; this damages a tree less than binding together with a hoop of iron.

On Mr. Ralph Eaton's farm (Kentville), in order to train the young tree to grow upright, in case of the trunk bending, a screw-hook is screwed into the tree, and by means of a wire attaching the hook to a peg in the ground (in some cases two wires and two pegs are used), the tree is drawn into the desired position; these hook eyes and wires are also used to train the branches into correct position where necessary.

GRAFTING AND RE-GRAFTING.

Most of the fruit trees are purchased from nurseries in Ontario and the U.S.A., but some farmers raise apple and plum trees. The apple stocks are from seeds of cider or eating kinds, and not from the crab. They are root-grafted during winter, being kept in a cool cellar. The whip graft is bound together usually by knitting cotton or strips of calico which have been dipped in grafting wax: by the spring the scion and root stock have partly united, and they are planted out.

There is a tendency, by selection of the most suitable market kinds, to decrease the number of varieties; consequently in spring there is a great deal of top-grafting done; the cleft graft, with one or two scions according to the size of the branch, is the method usually employed. The grafting wax commonly used is made by heating together 2 lbs. resin, 1 lb. bees'-wax, $\frac{1}{2}$ lb. tallow, either applied warm with a brush, or made up into a ball and applied by the hand. Grease is rubbed on to the hands, to prevent the wax sticking to them.

THE FERTILISING OF ORCHARDS.

Rotation in the fertilisers applied to the orchard is recommended as advantageous, for example, cattle or horse manure one year, chemical fertiliser another. Farmyard manure greatly benefits old, neglected orchards requiring nitrogen, but its use should be discontinued where trees run too much to wood and leaf, without fruit, and some manure containing potash and phosphate usually proves beneficial. Professor Shutt considers farmyard manure, as a fertiliser for apple orchards, is deficient in potash, and that potash in some form should be given in addition.

Green manuring or cover-cropping is much employed in Nova Scotia to supply vegetable matter.

In Canada, wood ashes are the best possible manure. They are applied at the rate of twenty to forty bushels per acre, those from hard wood being better than those from fir trees. The ashes contain, when not washed by rain, about 5 to 7 per cent. potash, 2 per cent. phosphoric acid.

As the available supply of farmyard manure and wood ashes is very limited, commercial fertilisers are largely used: the two in most common use are finely ground bone meal, at the rate of 5 to 8 cwt. per acre, to supply phosphoric acid (23 per cent.) and nitrogen (3 per cent.), and muriate or chloride of potash, at 1 to 3 cwt. per acre, to supply potash (50 per cent.). Sulphate of potash is more rarely used: it contains about the same amount of potash.

In the adjoining valley of the Gaspareau there is a bone mill, to which farmers take bones to be ground.

Nitrate of soda is not, from what I noticed, much used in the Nova Scotian orchards, save sometimes to give young or old trees increased vigour.

In a paper on Fertilisers for Orchards in Nova Scotia, published in *The Farmers' Advocate*, the following ingredients were recommended:—

For small fruits (strawberries, raspberries), per acre:—

150 lbs. nitrate of soda	=	23 lbs. nitrogen.
250 lbs. muriate of potash	=	125 lbs. potash.
800 lbs. bone meal	=	{ 18 lbs. nitrogen. 184 lbs. phosphoric acid.

For apple orchards:—

100 lbs. nitrate of soda	=	15½ lbs. nitrogen.
200 lbs. muriate of potash	=	100 lbs. potash.
550 lbs. bone meal	=	{ 16½ lbs. nitrogen. 126 lbs. phosphoric acid.

For orchards with clover:—

200 lbs. muriate of potash	=	100 lbs. potash.
250 lbs. "Thomas" phosphate (basic slag), at 16 per cent. phosphoric acid	=	41 lbs.

E. B. Voorhes, of the New Jersey Experiment Station, said:—

"To provide vegetable matter and to improve the physical quality of poor soils, apply yard manure once in four years, in fall or winter, at the rate of from five to ten tons per acre. To aid in the decomposition of vegetable matter, and to ensure a sufficiency of lime as plant food, apply lime at the rate of twenty-five bushels per acre once in five years. To provide, in addition, an abundance of all forms of available plant food at

the times needed for the development of the tree and fruit, apply annually chemical fertilisers in the following proportions:—

100 lbs. nitrate of soda	=	15½ lbs. nitrogen.
100 lbs. South Carolina rock superphosphate	=	15¼ lbs. phosphoric acid.
200 lbs. ground bone	=	{ 6 lbs. nitrogen. 44 lbs. phosphoric acid.
200 lbs. muriate of potash	=	100 lbs. potash.

“The amounts to be applied depend upon the character of the soils, the kind of fruit, and the age and vigour of the tree; these given perhaps mark the minimum. In a number of best orchards the quantities applied are very much larger than those here indicated, and the larger application is believed by the growers to be proportionately profitable.”

Frank T. Shutt, Chief Chemist of the Dominion Experimental Farms, wrote:—

“Assuming the leaves of a full grown apple-tree to weigh 50 lbs., and reckoning forty trees per acre, the manurial value contained in the leaves is equal to:—

Nitrogen	17.74 lbs.
Phosphoric acid	3.88 lbs.
Potash	7.84 lbs.

“The leaves are returned to the soil, but the fruit is exported; this, in the case of an orchard twenty-five years old, producing 160 barrels of 140 lbs. 10 tons per acre, is a loss to the soil of approximately:—

Nitrogen	8.9 lbs.
Phosphoric acid	5.3 lbs.
Potash	32.8 lbs.”

Professor Shutt recommends for apple orchards:—

100 lbs. bone meal	=	{ 3 lbs. nitrogen. 23 lbs. phosphoric acid.
100 lbs. superphosphate	=	15 to 20 lbs. „ „
75 lbs. muriate of potash	=	37 lbs. potash.

Professor E. E. Faville, the late professor of the N.S. School of Horticulture, in a paper on Fertilisers for Fruit Plants, gave as the yield and composition of fruit per acre:—

	Tons.	Nitrogen.	Potash.	Phos. acid.
Apples	15	30 lbs.	15 lbs.	3 lbs.
Pears	10	12 lbs.	36 lbs.	10 lbs.
Plums	2	16 lbs.	8 lbs.	2 lbs.
Berries	11½	Trace	7 lbs.	2½ lbs.

The following is given as another useful formula for manuring orchards:—

Good rotten barn-yard manure	10 to 15 tons per acre.
(1 ton = 12 lbs. nitrogen, 12 lbs. potash, 6 lbs. phosphoric acid.)	
Kainit (13 per cent. potash)	300 to 700 lbs.; or
Muriate of potash (50 per cent. potash)	100 to 200 lbs.
Bone meal (fine ground)	100 to 200 lbs.
. (2 to 3 per cent. nitrogen, 22 per cent. phosphoric acid); or	
Superphosphate	125 to 250 lbs.
(16 per cent. phosphoric acid.)	

ORCHARD TILLAGE.

The apple trees are planted 33 to 40 ft. apart, in a few instances with plum trees between, in one direction of the lines.

For the first few years the ground is ploughed deeply (8 in.), in order to break up the soil and to encourage the roots to grow down to a sufficient depth to escape injury in case of drought, and to be below the reach of the plough. The whole surface of the orchard is tilled from the beginning. In ploughing, the plough is turned partly out when within a few feet of the trees and runs shallower (4 in. deep), as the roots near the butt are closer to the surface; immediately round young trees the surface is generally lightly forked over. Between young trees potatoes are frequently grown, using bone meal and muriate of potash as fertiliser. The deep ploughing needs only to be kept up for a few years in order to establish root growth.

The kind of plough in general use has no wheels: it has a sharply curved mould-board. The latter, although it increases the draught, yet is more than compensated for by the more perfect pulverisation of the soil. The ploughing is done either in the fall or early spring. In Canada fall ploughing is not recommended for clay land, as it tends to puddle it and make it become hard and stiff; the frost consequently enters to a greater depth, and root injury may result. In ploughing, one aim is to obtain a level surface. Thus one year the soil is ploughed from the trees, the next towards them; one year east and west, the following north and south. Most of the farmers whose land runs down to the river bank, dig and haul the salt marsh mud on sleds during winter, and spread it on the orchard land; this is disintegrated by frost and more carefully spread in spring. This mud has manurial value, and also the silt in it probably aids in keeping the land moist. Early tillage saves the moisture accumulated during winter and early spring, and puts the soil into fine condition to warm up and get the trees quickly to work. As thorough cultivation renders plant food available and is the best conservator of moisture, tillage is begun early by ploughing as soon as the snow has thawed and the land is sufficiently dry to be worked. Harrowing follows, which stirs the ground thoroughly to the depth of about 3 in.; this is performed about every two weeks until late in the summer—the drier the soil the oftener it should be done. The varieties of harrow used include the spring tooth, the spike

tooth, the disc, and aeme. If the wood growth of the trees is too luxuriant, it may be checked by lessening the tillage and by withholding nitrogenous manure. As the orchard trees stop growing about midsummer, vigorous tillage then ceases, so that the new growth may ripen sufficiently to stand the cold of winter: and as the trees can now spare considerable moisture, catch crops are with advantage sown, such as tares and buckwheat.

THE CROPPING OF ORCHARD LAND.

Young orchards, say for the first twelve years, generally have some crop grown in them, such as early potatoes, maize, beans, and other hood crops. These crops need cultivation during the early part of the season, and are removed about the middle of July or first week of August. Buckwheat and oats are also grown, but are not as satisfactory, as the land cannot be thoroughly worked. Some space is allowed around the trees, so as not to grow crops directly over the roots of the trees. For these crops bone meal and muriate of potash are frequently sown in the drills.

In the older orchards the land is generally uncropped, but frequently harrowed. I have seen orchards almost weedless, due to this frequent cultivation. In some cases, after the trees are about twelve years old, clover is sown and left down for three or four years and mown for hay. This is, however, exhaustive unless some fertiliser is used.

ORCHARD COVER CROPS OR GREEN MANURING.

The object of cover crops or green manuring is to gather and return vegetable matter to the soil, and to protect the roots of the trees from the effects of severe frosts, especially when unprotected by snow.

For this purpose the orchards are very thoroughly cultivated during the early part of the season, and after the close of active growth, about July or August, the surface is sown with some crop which will grow quickly and be large enough to protect the soil during winter.

Crimson clover (*Trifolium incarnatum*), in parts of Canada and the United States where it stands the winter, is found admirably adapted to supply nitrogenous vegetable matter to orchards at little cost. It is, however, rather a risky crop in Nova Scotia.

Mammoth clover is found to be the next best, sowing 14 lbs. per acre. Tares, lucerne, common red clover, peas, buckwheat, rye, and oats are also employed for this purpose. A fair growth will be obtained the same season, which is ploughed in early the following spring, in order not to retard the spring growth of the trees. These crops help to keep down weeds, and, where successfully grown, enrich the soil at less cost than with farmyard manure. Where clover and other plants of the leguminous family are grown, nitrogenous manures may be omitted, as these plants have special power to take up nitrogen.

SPRAYING FOR FUNGI AND INSECTS.

In Canada both insects and fungi, where they do exist, appear to be more plentiful and more destructive than at home. Canker in apple trees

is, however, very rare. Woolly aphid is not common, and it is said to have come from Europe, and that Europe did not derive it from America.

For horticultural purposes insects may be divided into two classes: (1) those that chew their food, such as caterpillars; and (2) those that feed by sucking the juices, such as scale insects and aphides.

The chewing insects may be destroyed by distributing poison over those parts of the plant upon which they feed.

In Canada spraying is almost universally practised. Useful pumps are manufactured for the purpose, provided with a paddle to agitate the liquid. The pump is usually fitted into a paraffin barrel; the hose-pipe is



FIG. 1. ORCHARD SPRAYING IN NOVA SCOTIA.

10 to 15 feet long, often lengthened by a light bamboo tube rod 6 to 10 feet long, in order to reach high up into the trees; the spraying nozzles are mostly of the Vermorel pattern. The barrel is mounted on a cart or low waggon ("sloven"), and drawn by a horse through the orchard, taking two or three persons to drive, pump, and direct the spray. The reproduction of a photograph (fig. 1) illustrates this. In some cases orchards are sprayed quite early in spring to clean the bark of the trees from scale and moss, using $\frac{1}{2}$ to 1 lb. caustic rock potash to 1 gallon of water, or this may be applied to the trunks with a vegetable fibre (not hair) lime-wash brush either at this time or in June. For spraying with the stronger potash solution men sometimes wear old macintoshes, rubber gloves, and strap a macintosh over the horse.

Powdered caustic potash is sold at most grocery shops in Canada, as it is used for soap-making. A 1-lb. tin costs about 5*d.*; this is a very convenient form for spraying purposes.

Spraying for fungi, black spot, or scab on apples (*Fusicladium maculatum*) may be done before the blossom or foliage opens in order to kill the spores. For this copper sulphate alone (3 lbs. to 40 gallons of water) can be used without lime, as there is no foliage to burn. The first spraying jointly for fungi and insects, caterpillars of the Codlin moth (*Carpocapsa pomonella*), Tent or Lackey moth (*Clisocampa Americana*), Canker or Winter moth (*Anisopterix pometaria*), is done when the fruit buds begin to unfold, but before the flowers expand; the second time just as the last blossoms fall; and if caterpillars are numerous or black spot shows on young fruit or leaf, the spraying should be repeated, say once every two or three weeks.

The mixture in common use is the Bordeaux mixture as the fungicide, Paris green as the insecticide.

To save time for the former, stock solutions of sulphate of copper and lime are made separately; the Paris green is added direct.

The formula commonly adopted is:—

	For Apple.	For Plum and Peach.
Copper sulphate	4 lbs.	3 lbs.
Quicklime	4 lbs.	3 lbs.
Water	40 gallons.	40 gallons.
Paris green	4 ozs.	3 ozs.

Copper sulphate is soluble in cold water, but more readily so in hot. The solution is made by hanging the crystals, contained in a sack or basket, in a barrel of water near the surface, so that it is partly or just covered by the water. Vessels of wood or earthenware should be used for dissolving the sulphate; dissolve 1 lb. of copper sulphate per gallon of water for a stock solution. Thus take 40 lbs. for a 40-gallon barrel. Take, say, one bushel of lime, which is the better for being freshly burnt; place it in another barrel, and pour about 10 gallons of water on it to slake it; afterwards add enough to make it into a creamy mixture like putty pour on a little more water to exclude the air and prevent change in character; then cover the mouth of the barrel to prevent evaporation.

For making up a 40-gallon barrelful of the spraying mixture, fill the barrel, say, one-third full of water, then add 4 gallons of the copper sulphate solution. Then take some of the lime putty, mix it with water and add it to the solution, straining it through a funnel-shaped box with a fine copper wire mesh strainer at bottom. In order not to add an unnecessary amount of lime, thereby risking the clogging of the machinery, it is advisable to test the mixture so as to ascertain whether the sulphuric acid has been neutralised by the lime. For this purpose a solution of ferrocyanide of potassium (1 oz. in 1 pint of water) is used. After stirring, take a small quantity of the mixture from the barrel in a white saucer or a glass, and add a few drops of the ferrocyanide solution. If a brown colour appears, the mixture needs more lime; if there is sufficient lime no discoloration takes place. Next weigh or measure out about $\frac{1}{4}$ lb. of Paris green, put it into a cup and make it into a paste with water; add this to the mixture in the barrel.

In Nova Scotia, Paris green is sold at most of the hardware stores in

The soap and water are boiled together, then paraffin is added. The mixture is well stirred or agitated with a garden syringe. For use, 1 part of the mixture is added to 9 of water, and applied to the bark either as a spray before the leaf opens or with a brush in summer.

Dr. Fletcher recommends a solution of washing soda so strong that no more will dissolve in the water, then dilute the soap to the proper consistency.

To counteract mildew on the leaves of gooseberry bushes, potassium sulphide, 8 ozs. to 25 gallons of water, is employed.

FRUIT TREE BANDING.

The placing of bands of sticky material to prevent the ascent of the female Winter moth, in America called the Canker moth, is practised to some extent in Nova Scotia, though it is generally considered that if spraying is thoroughly done at the right periods grease banding is not necessary.

The substances chiefly used are bands of tarred roofing paper painted with printers' ink, or castor oil and resin applied direct to the tree. Professor Craig recommended, for winter use, 2 lbs. castor oil to 3 lbs. of resin warmed together, but not boiled, applied warm with a 2-in. paint brush; and for spring use, 2 lbs. castor oil to 4 lbs. resin. These mixtures are applied after scraping off loose bark, either direct or on the surface of paper. The band is placed about 2 feet from the ground, is about 6 in. wide, and is put on at the end of October or early in November.

Grease banding seems specially useful in the case of large trees, which it is difficult to spray thoroughly.

APPLE PICKING AND PACKING.

The kind of ladder commonly used for apple picking is one fairly broad at the base, but the sides of which at the upper end terminate in a point; this construction is liked, as the ladder can be so conveniently placed among the branches. The baskets used are of a rounded shape, with swing handle, holding a little more than a peck. These are convenient for emptying the fruit gently into the barrels, in which they are removed from the orchard without sorting. Fallen apples are picked up and sent to Halifax.

The barrels of apples are placed either in a special apple-packing house, or more generally in the cellar under the barn or house, ready for sorting and repacking. The apples are sent over to England chiefly between the end of September and the end of March. For sorting, the apples are poured out of the barrels on to a table, usually about 5 feet long and 3 feet wide, with a ledge all round 4 or 5 inches high, covered with carpet, felt, or sacking. The sorting divides the apples into:—

- 1st. Of good size and quality;
- 2nd. Smaller, but of good quality, both shipped to England;
- 3rd. Scrubs, which are sound, but scabbed, ill-formed, or otherwise defective, sent to local market; and
- 4th. Rotten, for pigs.

Sometimes the extra good apples are picked out as specially "selected."

The barrel most commonly used in Nova Scotia is made of fir staves with birch hoops, holding 120 to 140 lbs. fruit, and costing 10*l.* Barrels with staves of maple or elm, with elm hoops, are used to a lesser extent, but are commonly used in Ontario and the U.S.A.; these hold 140 to 150 lbs. of apples, and cost 1*s.*

In packing, the bottom and bilge hoops are first nailed, then a thin layer of wood-wool, called "Excelsior," is placed at the bottom, next a sheet of white paper the same size as the end of the barrel. A layer of "headers" is then laid; these are apples of average size, those best coloured being chosen. These are placed stem downwards. The barrel is then filled by carefully emptying in the fruit, using hinge-handled baskets. The barrel is gently shaken each time fruit is added, so as to pack the fruit closely. It is filled 1 or 2 inches above the rim. In order to get the apples tightly packed, so that they do not move after packing and become "slack" in travelling, a round board lined with sacking or saddlers' felt is placed, padded side downwards, on the top of the apples; the barrel is rocked on the floor, if of cement, or, if not, on a heavy plank. The apples, thus shaken and pressed, sink to about the level of the rim; any spaces are filled with small apples. Then another piece of white paper is placed on the apples, the chime hoops are knocked up to loosen them, to allow the lid to enter the mouth of the barrel; then the lid is laid on, and the screw or lever-press is applied to the barrel to press the lid into position, followed by the tightening of the chime hoops and the nailing of the head and hoops.

The name of the apple, together with the owner's name and address, are stencilled on the top of the barrel; the name of the salesman on the bottom.

The cost of sending over to England—London or Liverpool—from the Annapolis Valley, *via* Halifax, is about:—

	<i>s.</i>	<i>d.</i>
Rail (60 to 160 miles)	1	8
Steamer (3,000 miles)	2	6
	<hr style="width: 10%; margin: 0 auto;"/>	
	4	2 per barrel.

The salesman's commission in London is usually 5 per cent.

Mr. S. C. Parker tells me the average net price received by the grower was, per barrel, for the crop of 1896, about 1*s.* 2*d.* (\$1); for that of 1897, 8*s.* 4*d.*; and for 1898, 6*s.* 3*d.*

The grower considers 8*s.* per barrel, clear of expenses (barrel, freight, and commission), a very good price, but occasionally they do not pay expenses, due to inferior fruit, bad packing, or glutted market.

The apples are sometimes bought on the trees at so much a barrel throughout the orchard; and if packed by the grower, 1*s.* per barrel is paid for picking, packing, and hauling to the station.

There are several large apple buyers who have large stores and packing sheds, capable of holding several thousand barrels. These are generally situated close to a railway station, to enable the barrels to be loaded direct into the cars.

The *London City*, by which I returned, carried 14,050 barrels; the

Furness Line, to which this boat belongs, receives a subsidy from the Canadian Government to run a fortnightly service of steamers.

CRANBERRIES.

Around Berwick, Waterville, Auburn, Aylesford, and Cambridge, in the middle of the valley, cranberry-growing is fast increasing. Here the soil is moist, but not stagnant; it consists generally of one or more feet of peaty soil over sand. In 1896 there were about 200 acres of cranberry bog, and in 1897 about 2,500 barrels were raised. They keep well in barrels for fully nine months; when required for shipment they are sorted and cleaned by hand or machinery, and sell in London at 25s. to 35s. per barrel. The cranberry beds take four years to come into bearing, and are said to



FIG. 2.—“NONPAREIL” APPLE TREE, CORNWALLS RECTORY, NOVA SCOTIA.
PROBABLY 150 YEARS OLD.

last about forty years. The crop is said to average about forty barrels per acre. The rows are planted 15 to 24 in. apart; plants 4 or 5 in. apart.

Once in three years the bogs are sanded about $\frac{1}{2}$ in. deep, taking fifty two-horse loads per acre. During the winter the plantations are in many cases flooded, in order to destroy insects. One company owning a large area of cranberry bog which had been badly infested with “fire-worm,” at the recommendation of the Canadian Department of Agriculture, sprayed the plantation with arsenate of lead ($\frac{1}{2}$ oz. arsenate of soda in 1 quart water, $\frac{3}{4}$ oz. acetate of lead in 1 quart, pouring the two together and adding 5 gallons water). This insecticide has been found very effective, and may take the place of Paris green in orchards, as in a trial at the Central Experimental Farm, Ottawa, in 1895, the percentage of wormy apples (Codlin moth) was even less than where Paris green was used.

For useful information as to cranberry culture, I would recommend purchasing the Report of the Nova Scotia Fruit Growers' Association for 1897. I believe cranberries would be a remunerative crop on moor and heather land in England and Scotland, as I consider the land is of similar character to that of Nova Scotia, in which cranberries thrive so well.

Mr. S. C. Parker writes to me that, on the recommendation of Messrs. Notlard & Lowe (Pooley Street, London), cranberries have been generally shipped this season in boxes holding 10 lbs.; this package gave good results, netting about 2s. 6d. per box.

NOTES OF THE YIELDS OF FRUITS.

At Cornwallis Rectory there is an old French 'Nonpareil' apple tree, probably 150 years old, measuring 10 ft. girth 1 ft. from the ground. The Rector, the Rev. F. J. H. Axford, told me that during the twenty years he has been there the amount of fruit from it has varied from two barrels up to sixteen, the average being nine barrels. A photograph of this tree (Fig. 2), taken by his daughter, is given.

At Wolfville, in 1896, from Mr. Elliot Smith's orchard twenty barrels were gathered from three 'Gravenstein' trees twenty-five years old. In the same year, from the farms on Canard Street, 50,000 barrels of apples were gathered within a distance of 3½ miles along the road.

In the Gaspareau Valley, 1,700 barrels were gathered from thirteen acres of orchard belonging to Mr. Gartridge.

Strawberries: 100 bushels, or 3,200 quarts, per acre is said to be an average yield, 5,000 being exceptionally good. Price, usually 5d. to 7½d. per quart, but sometimes as low as 2½d. Strawberries are grown on the "matted row" system.

Raspberries: 2,000 quarts average, 5,000 very good; price, 4d. to 6d. per quart.

Blackberries: 2,000 average; about the same price as raspberries.

Cranberries: 50 to 100 barrels of 150 lbs.; price, 25s. to 30s.

Price paid for picking all berries, ½d. per quart.

Potatoes are extensively grown and exported to Cuba in barrels. Burbanks, early and late rose, and Chilis are among the varieties most grown. The average yield is about 200 bushels per acre; price varying from 1s. 3d. to 3s., according to season.

VARIETIES OF FRUIT CHIEFLY GROWN IN NOVA SCOTIA.

APPLES.

'Gravenstein' and 'Banks' Red Gravenstein' are fit for shipping about the middle of September. 'Baldwin' and 'King of Tomkins County.' 'Nonpareil' commands a high price, and is in its prime in the following May and June, and it is mostly grown in Annapolis County. 'Ribston Pippin,' the best apple of English origin. 'Golden Russet,' 'Ben Davis,' and 'Northern Spy.' 'The Bishop Pippin' or 'Belle Fleur,' introduced by Bishop Inglis, the first bishop of Nova Scotia, is much grown for home use, but does not stand shipping. 'Blenheim Orange,' 'Fallawater,' and 'Rhode Island Greening.'

PEARS.

'Bartlett' or 'Williams' Bon Chrétien,' 'Clapps' Favourite,' 'Flemish Beauty,' as standards. (In Ontario, 'Duchesse d'Angoulême' is much grown as a dwarf.)

PEACHES.

'Early Crosby' and 'Early Alexander.'

PLUMS.

'Moer's Arctic,' 'Lombard,' 'Greengage,' 'Magnum Bonum,' and 'Bradshaw.' The wood of the European and American varieties is subject to a very destructive fungoid disease, 'Black Knot' (*Plowrightia morbosa*), which I trust we may never get in England; but from this disease the Japanese varieties are almost entirely free. 'Burbank,' 'Wickson,' and 'Abundance' are the most popular Japanese sorts.

GOOSEBERRIES AND CURRANTS

Are but little grown. The American varieties of gooseberry are small, the best being the 'Downing.' English varieties of gooseberry mildew badly. Red currants fruit well, but black currants do not thrive.

RASPBERRIES.

'Cuthbert,' 'Marlborough,' both of American origin.

BLACKBERRIES.

'Snyder,' of American origin.

STRAWBERRIES.

Wilson's and Crescent Seedlings are most grown in alternate rows, 'Parker Earle,' a new variety, is highly recommended. European varieties do not thrive on the American Continent.

CHERRIES

Are largely grown around Bear River and Digby; it is a district in which wild cherry and oaks grow naturally in the woods. Black and white hearts and French are the varieties most grown.

CRANBERRIES

Are got wild from the North Mountain and near the lakes.

THE ORIGIN OF THE VARIETIES OF FRUIT.

Professor Bailey tells us that, speaking generally, fruits of American origin are the best adapted to American conditions, notwithstanding the fact that there are some foreign varieties which thrive over large areas of the country. The strawberries, raspberries, gooseberries, and grapes are almost entirely from wild American plants, and succeed better not because they are superior to those of European origin, but because they are more perfectly adapted to their surroundings (climate, insects, fungi, &c.).

Thus, speaking roughly, two-thirds of the best varieties of apples and eleven-twelfths of the best peaches are of American origin from foreign parents; half of the best plums and a quarter of the best pears are American, the pear and plum being the most peculiarly European of the various fruits. American fruits constantly tend to diverge from the foreign types which were their parents, and they are as a rule better adapted to their environments than foreign varieties are.

ORCHARD IMPLEMENTS.

Some of the best orchard implements I saw in use in Nova Scotia were:—

“Pomona” pump (Gould’s Manufacturing Co., Seneca Falls, New York), of which a figure is given. (Fig. 3.)

“Eclipse” pump (Morrill & Morley, Benton Harbour, Michigan). Both



FIG. 3. THE “POMONA” SPRAYING PUMP.
WITH AGITATOR. ALL WORKING PARTS OF BRASS.

of these pumps have hard brass working parts complete, fitted on a 40-gallon barrel, with hose, bamboo rod, and double Vermorel nozzle, £3. 15s.; costing singly about 24s. additional for carriage to London.

Orchard spring-tooth harrow (Syracuse Chilled Plough Co., Syracuse, N.Y.), £1. 19s.

As an example to us in co-operation amongst farmers and Government aid to agriculture, I will give a short account of the work of the

Nova Scotia Fruit Growers' Association, its school of horticulture, the Nova Scotia Office of Agriculture, and the Canadian Government Department of Agriculture :—

THE NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

Was formed in 1863, when the acreage under fruit was probably about 2,500 acres. In 1893 it was estimated that there were 12,000 acres of bearing orchard, with 8,000 more of young trees. In 1871 apples were first sent to England. In 1896, a good year, it is estimated that 750,000 barrels were produced, of which 450,000 were exported to England. The Association has for its objects :—

The increase of cultivation of the various kinds of fruit.

The spreading of information as to the best methods of cultivating, packing, and shipping fruit.

The discussion of subjects of mutual interest : as freight rates by rail and steamer, ventilation on steamer, handling of barrels on embarking and disembarking to prevent damage, condition of fruit on arrival in markets, possible new markets.

Once a year, in January, it has a three days' session at Wolfville, at which papers are read and discussed. I attended it in 1898, and thought it must be very valuable to the farmers, who attend in large numbers. Each member receives the printed report.

The yearly subscription is a dollar = 4s. 2/.

The Secretary is Mr. S. C. Parker, Berwick, Nova Scotia.

At the Halifax Industrial Exhibition in October there was a fine exhibition of apples, plums, cherries, peaches, and grapes, from Nova Scotia and New Brunswick, under the management of the Association.

THE SCHOOL OF HORTICULTURE, WOLFVILLE, NOVA SCOTIA.

Was established in 1891 by the Nova Scotia Fruit Growers' Association, assisted by a Government grant. Horticulture, Botany, and Microscopic Botany are taught by an able professor, Mr. F. C. Sears. The school consists of a class-room, with a good collection of English, Canadian, and American books on horticulture, horticultural journals, about twelve good microscopes, and a collection of pressed wild plants. Beneath the class-room is a potting shed or workshop, and, adjoining, a glass house with economic and ornamental plants and flowers, in which grafting, budding, and propagating are taught during winter. There is also a root cellar, in which apple stocks for root grafting during winter are kept. Surrounding the school are ornamental grounds, with a nursery of young fruit and other trees and plants close by.

The horticultural course is at present confined mostly to the propagation of plants and to fruit-growing—dealing with wind-breaks, protection from frost, setting out and planting, tillage, manuring, cover crops, renovation of old orchards, grafting, budding, the life histories of fungi and insects, spraying, harvesting, and packing of the fruit, cold storage, &c. The School of Horticulture is attached to the Wolfville University.

The classes are held during the winter months, from the beginning of

November to the end of April. Having myself attended the course, I cannot speak too highly of it.

The course is free, and farmers are invited to come and look round at any time, attend any lecture, and bring any questions. Although there are such exceptional advantages, there are but few who attend regularly.

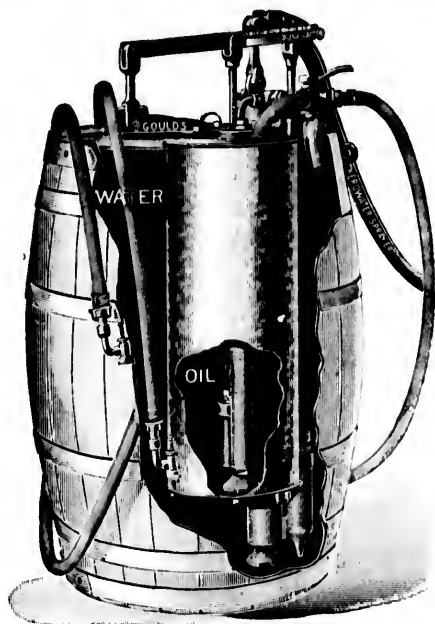


FIG. 4. "KEROWATER" SPRAYER.
FOR MIXING AND SPRAYING PARAFFIN AND WATER.

The following were the text-books used at the School of Horticulture in winter 1897-8. They are excellent books:—

"The Principles of Fruit-Growing," by Prof. L. H. Bailey, of Cornell University. 5s.

"The Spraying of Plants," by E. G. Lodeman. 4s.

"The Nursery Book," by Prof. Bailey. 4s.

"The Pruning Book," by Prof. Bailey. 5s.

All published by Macmillan & Co., London and New York.

THE NOVA SCOTIA OFFICE OF AGRICULTURE

In 1897 issued free to all farmers and others interested in the subject, a useful pamphlet, "Practical Hints to Fruit Growers," upon insects, fungi, spray machinery, insecticides, and fungicides.

The Provincial Government has an agricultural and dairy school with model farm at Truro, which deals also with the growth and care of fruit. Lectures on agriculture, dairying, and horticulture are given throughout the province, with field demonstrations which appear to be well attended,

judging from the one on spraying which I attended on Mr. Ralph Eaton's farm, near Kentville.

THE CANADIAN DEPARTMENT OF AGRICULTURE

Issues at frequent intervals valuable bulletins on agricultural and horticultural subjects, sent free to farmers. It has an experimental station in each province for trial of different varieties of corn, vegetables, and fruits. That of Nova Scotia is at Nappan. The central experimental station is near Ottawa, where soils and fertilisers are analysed free to farmers, insects are identified, and advice given on matters connected with agriculture and horticulture.

In 1897 it sent over an expert, Mr. J. E. Starr (himself a large apple grower), to report on the condition of the fruit arriving in England and Scotland from various parts of Canada, to see whether any improvements in packing, cold storage (for grapes, plums, &c.), steamer accommodation, marketing, could be suggested, or new markets found.

In conclusion, I can recommend Nova Scotia as a pleasant country to farm in, and as a delightful holiday resort, where a good deal may be learnt in agricultural methods. The people are very kind and sociable, and willing to give information. And, finally, I would here like to record my best thanks to my friends across the Atlantic, and to my wife for the two photographs illustrating the paper; also to the Gould's Manufacturing Company for the use of electrotypes illustrating two of their pumps, the "Pomona" and the "Kerowater." This latter has only recently been introduced and patented this year. It mixes and sprays a combined spray of water and paraffin: the proportion of the latter can be regulated from 5 to 25 per cent.

