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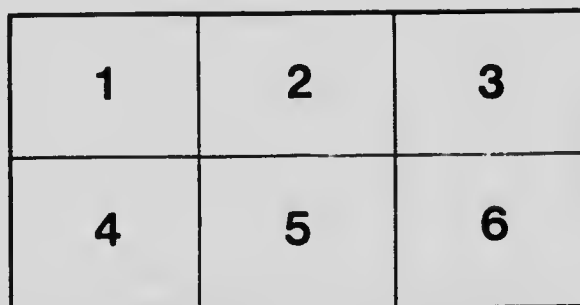
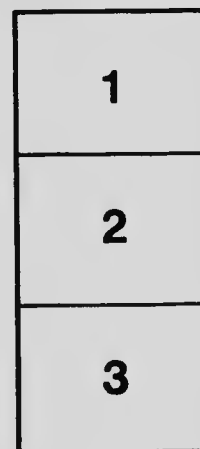
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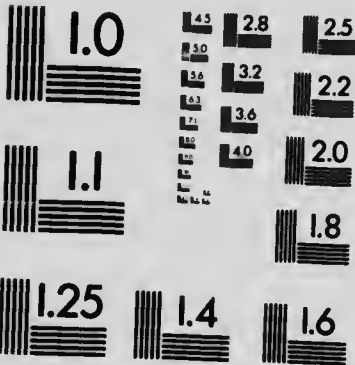
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PROVINCE OF NEW BRUNSWICK

DEPARTMENT OF AGRICULTURE



BULLETIN No. 2

BY

A. G. TURNEY
HORTICULTURIST

CONTENTS

1. The Renovation of Old Orchards
2. Top Grafting Old Trees
3. The Orchard Spraying Campaign

MARCH, 1910

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To the

HONOURABLE D. V. LANDRY,
Commissioner for Agriculture.

Sir,—I have the honor to submit for your approval a Bulletin for the encouragement of Fruit Growing, dealing with the renovation of old orchards, the top grafting of old trees and the orchard spraying campaign, prepared by Mr. A. G. Turney, Provincial Horticulturist, with a view of giving briefly definite and timely information upon those methods which should be adopted if the apple trees now upon the farms of the province are to become as profitable as they may be.

That neglected orchards may, by the careful practice of the methods advised, produce heavy crops of fine quality has been amply demonstrated.

There are today in the Province over 565,000 apple trees, fully two-thirds of these are of bearing age and should average a yield of one barrel per tree. If these trees were all in good condition and well cared for, they would produce at least 375,000 barrels of apples of excellent quality, a quantity which would go far towards supplying our own markets. At present very large quantities are imported into the province. When our home demands are satisfied, the markets of the world are open to us. As yet but the merest fringe of our orchard land has been occupied.

Before new orchards are planted extensively however, it would undoubtedly be sound policy for our orchardists to renovate, top graft with choice varieties and spray the trees they now have and thus secure almost immediate results. It is with the desire to assist this work that this bulletin has been prepared.

I have the honor to be, Sir,

Your obedient servant,

W. W. HUBBARD
Secretary for Agriculture.

Department of Agriculture,
Fredericton, N. B.
March 24th, 1910.

The Renovation of Old Orchards

Is my old orchard worth renovating is a question uppermost in the minds of many farmers today. In reply I would say that if the trees are not more than thirty-five years of age, have not been allowed to develop their bearing wood too high up, and are not too badly broken through disease and neglect, the task of putting them in a profitable condition is comparatively simple. Undoubtedly there are some orchards in the Province, which, although they have never received any care, being covered with moss and lichen, are yet strong, thrifty and in a condition to yield handsome returns under proper treatment. To renovate such orchards proceed as follows:—

1. Remove all dead and broken limbs, taking care to leave as neat and short stubs as possible. Prune, but not too heavily at first, removing enough limbs to admit the entrance of sunshine and circulation of air to the centre of the tree. Work as far as possible from the outside of the tree. The work may be done in March, or the first two weeks of April. Do not attempt to take out all the wood that should be removed in one year, but content yourself with removing one-half the first year and completing the thinning operation the second spring. Coat all large stubs and wounds with a heavy white lead paint to which has been added enough green paint to color it.

2. The trunks and main limbs of neglected trees will be covered with shaggy bark, moss, and lichen which furnish a beautiful winter home for insects and spores of fungous diseases. To remove these, the trees should be well scraped. A short handle fitted into a small hoe, or better still, into a small triangular shaped hoe, makes a very efficient implement for the work. Spraying will be made much more effective when the trunk and main limbs of the trees have been rid of their rough covering and the surplus limbs thinned out.

3. Spraying must be systematically and thoroughly undertaken. It would be well to spray first before the growth starts, using the following solution: Concentrated Lye, 1 lb. Lime, 30 lbs., Water, 40 gallons. Slack the lime, make up to 40 gallons with water, and then add the lye. Strain through a fine mesh before using. This solution will successfully combat the Oyster Shell Scale and help to remove old bark, moss and lichen. Succeeding sprayings with Bordeaux Mixture and an insecticide should be applied as per spraying instructions given below. Thorough and systematic spraying kept up for a few years will overcome the results of neglect.

4. In many old neglected orchards the soil is very poor and run down, having been depleted of much of its plant food. We must, therefore, endeavor to build up the fertility of the soil. There is nothing better for this purpose than well rotted barnyard manure. Apply a good top dressing in the spring, and turn under shallow. If the sod is not too thick and tough, it might be worked up with a disc harrow instead of ploughing.

5. Improve the physical condition of the soil by the adoption of cultivation wherever possible. After the ground had been ploughed in the spring as above recommended, keep cultivated until the first week in July, and then seed down with a leguminous cover crop—if crimson or red clover is used—sow from 12 to 15 pounds per acre. This should give a good stand by the fall of the year, check the green growth, ripen up the wood, and help to hold the snow through the winter. It should be ploughed under in the spring, serving as a green manure crop to improve the physical condition and fertility of the soil. This completes the first season's operations. Repeat next year with modified pruning.

The first season's work will result in increased vigor of the trees, cleaner, but probably not more fruit. The second season the fruit will show a decided improvement over that of the first year, and in the third year, but not until then, you may expect the orchard to be in a good condition and to bear heavily.

Remember, the results cannot be accomplished in one year only, but there will be improvement each year, if you do the work thoroughly. The treatment outlined above has never failed to bring satisfactory results where properly applied. It is useless to undertake this work unless you are prepared to exercise care, patience, and thoroughness in all the operations.

Top Grafting Old Trees

The practice of top grafting among orchardists is steadily increasing and of its many uses the following are most common:

1. To render profitable trees which produce poor or unprofitable fruit.
2. To grow varieties, which when grown on their own roots, in certain localities and climates prove a failure, on account of winter killing, sun-scalding, etc.
3. To bring desirable varieties, which ordinarily grown are late-bearers, into early bearing.

Most of the top grafting yet performed in this country has been done on old or bearing trees producing fruit of inferior or undesirable quality.

Top grafting should be done in the spring before growth starts, but if the scions are quite dormant it may be successfully done when the trees are just coming into leaf: the later the operation the less the

chances of success. With large trees three to four years should be taken to entirely change over the top. By using a greater number of scions a large tree may be changed over in two years, but three years is much safer. Cleft grafting is the method generally practiced in top-working trees.

The largest size of the branches to be grafted is from an inch and one-half to two inches in diameter. Branches of greater diameter may be used, but with less chance of success, and more scions must be inserted to take the sap flow. Select the branches to be grafted with a view to the ultimate symmetry of the tree. In cleft-grafting the stock is cut off squarely, and the stub is split to a cleft of one and a half to two inches by means of a mallet and strong knife or grafting chisel. It is then held open for the reception of the scion by a wedge. Scions should have three strong buds and should be cut wedge-shaped from the base of the lowest bud downwards, one side, however, being a little thicker than the other. Now insert two scions in the cleft with the thick side of the wedge on the outside, and thrust them down until the lowest or basal bud is almost in a line with the edge of the stub. Do not force the scion to its place, but admit it freely by placing enough leverage on the wedge. When inserting the scion, give it a light outward slope, so that the inner bark of both scion and stub shall cross at the same point. The union of these two inner barks or cambium layers is essential to the success of the operation. When the wedge is withdrawn it will be seen that the scion is held tighter on account of the outer surface of the cut portion being thicker. When properly cut and inserted the scion should fit tight all along. To exclude the air and secure the scion in its place, cover the cut parts with grafting wax. If both scions grow, remove the weaker one after most of the surface has healed over. Give the scion room for development by removing all or part of the water sprouts as may be necessary.

SCIONS.

Scions for top grafting are cut from wood of one season's growth. The best time to cut them is in the fall as soon as the wood is well ripened. If they are cut in cold weather they contain less sap and will dry out more readily, and if cut in considerable quantities may injure the trees from which they are taken. However, they can be successfully cut in winter or early spring. Cut only from healthy bearing trees and preferably from the most productive trees. Do not use water sprouts or young shoots. When taking scions the entire season's growth may be cut and packed away until required for use, when it should be cut in pieces from four to six inches long—each piece having three well developed buds—the centre piece of one season's growth is to be preferred. Immediately after cutting place scions in moss, sawdust, sand or forest leaves, moist but not wet, and place in a cool cellar to keep dormant until needed.

GRAFTING WAX.

The most common in use consists of resin, 4 parts by weight; bees-

wax, two parts; tallow, one part; melt together and when thoroughly mixed pour into a pail of cold water. When cool enough grease the hands and pull until it is nearly white. If too hard heat before using. It may be softened enough to apply like putty, or melted and applied with a brush.

The Orchard Spraying Campaign

There are many fruit growers who profess to believe that just sunshine and rain are enough to produce the best fruit—who tell you that nature is all-sufficient.

Is there anything that grows that cannot be improved with care and attention? Isn't it true that in all nature the same inscrutable source which nourishes the plant provides also the pest to destroy it?

Spraying is absolutely essential to successful fruit growing.

The man who raises the fine healthy crop year in and year out is the one most ready to acknowledge this fact.

It's the man who raises the **POOR FRUIT** who is the most active in finding excuses, in blaming the soil, weather, etc.—everything but his lack of proper attention to the trees.

Go into your orchard and examine your trees.

Don't you know that the moss sucks the sap out of the trees, and closes the pores of the bark? Do you notice the cracks in the bark—the rough appearance—and the scale.

Is it any wonder that your trees become stunted and unhealthy, and your fruit shriveled or worm-eaten? It is a question of **HOW LONG** trees will stand such treatment even on the finest soil.

You may depend upon it that larger, cleaner fruit, and more of it always comes from the healthy trees with clean, smooth bark, free from moss and scale.

Destroy the insects and fungi, and it will add fully one-fourth to the producing capacity of your trees, and an equal amount to the market value of your fruit.

There is just one way to do it—and the only way—**SPRAY**.

In the spraying mixtures recommended below the lime and sulphur is omitted. At this time of the year it is deemed too late to advise its use to men who have had no experience in spraying, because: 1. The grower's first experience in making it is not likely to be entirely satisfactory unless he has had clear instruction. 2. The commercially manufactured article is not as yet handled in the province. 3. Its results may largely be produced by the Lime and Lye and Bordeaux mixtures which are easier of preparation for the beginner.

SPRAY NO. I.

For old orchards that have never been sprayed and for young orchards badly infected with Oyster Shell Bark Louse spray before growth starts with lime, 30 lbs., lye, 1 lb., water, 40 gallons. This spray may be applied any time during the dormant season of the trees. Slack the lime gradually, make up to the required amount with water and add the lye.

If fresh lime is not procurable, air dried lime may be used. Strain the mixture through a fine mesh before using. This mixture acts as a general cleaning spray for old trees.

SPRAY NO. II.

Verdeaux mixture and Arsenate of Lead or Paris Green to be applied before the buds burst in the spring.

Blue Vitriol.....	3 lbs.
Lime.....	5 lbs.
Water.....	40 gallons.
Arsenate of Lead.....	2 lbs.

If Paris Green is used eight ounces to 40 gallons is sufficient. This mixture is applied for the control of apple scab, codling moth, bud moth and minor pests. Arsenate of Lead is a safer and more reliable insect poison than Paris Green, as it is uniform in composition, is not adulterated, stays in suspension longer and is thus better distributed over the tree, remains on the foliage longer and does not cause injury by burning. The relative cost of these two insecticides per one barrel of spray mixture is approximately as follows:—

Paris Green, 8 ounces at 30c. per lb.....	15c.
Arsenate of Lead, 2 lbs. at 15c. per lb.....	30c.

By purchasing arsenate of lead in 5, 10 and 25 lbs. packages it can be got for 30c. or so per pound. Whereas the cost per barrel of spray mixture is apparently twice as much as for Paris Green, in reality it is the cheaper insecticide on account of its greater efficiency and reliability. Where procurable its use is strongly recommended over Paris Green. Before incorporating either the Paris Green or Arsenate of Lead in the spray mixture, make into a thin paste with water.

SPRAY NO. III.

The same as above applied when most of the blossoms have fallen, and while the little apples are still standing upright with the calyx lobes open. Do not wait until the little apples have turned downwards, as it is then too late for efficient spraying. This spray is the main spray for the codling moth.

For most of our fruit growers it is strongly advisable to use all three sprays. If it is only possible to spray twice use sprays Nos. II. and III., and if you can only make one application let it be spray No. III.

SPECIAL SPRAYING MIXTURES.**Kerosene Emulsion.**

For green and black aphids and as a summer spray for oyster shell scale, apply as soon as the pests are noticed at work on the trees. In spraying for aphids use elbow attachment permitting the thorough spraying of the under surface of the foliage.

FORMULA FOR PREPARATION OF KEROSENE EMULSION.

Kerosene (coal oil).... 2 gallons
 Rain Water (free from dirt particles)... 1 gallon.
 Soap.... ½ lb.

Dissolve the soap in the full amount of water and when this solution is boiling hot remove from the fire and add the kerosene. Stir the mixture violently by driving it through a force pump back into the vessel until it becomes a creamy mass that will not separate. This requires usually from five to ten minutes. For use, dilute one part of the emulsion with 8 or 10 parts of water for scale insects and hard-bodied insects like the chinch bug. For soft-bodied insects, such as plant lice, lice on animals, etc., use one part emulsion to 15 or 20 parts of water. The stock emulsion will keep good for months if kept in air-tight vessels.

Kerosene emulsion kills by contact, and therefore the application should be very thorough. It may be used against a great many different pests, but is especially valuable for destroying those with sucking mouth-parts for they cannot be killed with arsenical poisons.

CAUTION—Only the dilute emulsion, 1 part emulsion to 15 or 20 of water, should be used when the trees are in leaf, and in all cases it should be kept thoroughly stirred; also apply only on bright, sunny days, otherwise the foliage or even the twigs will be injured.

ARSENICAL SPRAYS.

For leaf eating pests such as tent-caterpillars, tussock-moths, spring canker worms, etc., which may cause considerable damage after the regular sprayings have been applied, either Paris Green or Arsenate of Lead may be used as follows:—

PARIS GREEN.

Paris Green.... 8 ounces.
 Lime.... 3 pounds.
 Water.... 40 gallons.

Where Paris Green is used without the Bordeaux mixture three pounds of freshly slaked lime is added to prevent burning of the foliage. Make the Paris Green into a thin paste before adding. Keep the poison well in suspension by thorough stirring.

ARSENATE OF LEAD.

Arsenate of Lead.... 2 lbs.
 Water.... 40 gallons

If the commercially made Arsenate of Lead is not procurable, or if it is desired to make it yourself, use the following formula:—

Arsenate of Soda.... .. 4 ounces.

Acetate of Lead 11 ounces.

Water... .. 5 gallons.

Dissolve the ingredients separately in from one-half to one gallon of warm water; mix together thoroughly and add one-half of the mixture to 40 gallons of water. Add milk of lime from two pounds of freshly slaked stone lime. By making arsenate of lead yourself, the cost is no more than that for Paris green, as the raw materials can be bought wholesale for about nine, and seven cents per pound respectively.

SPRAYING POINTERS.

The observance of these will ensure profitable spraying.

If you spray at all, **spray well**; otherwise it is a waste of time and labor. Watch the work, and be sure the pressure is high, material well mixed, and no limbs overlooked.

Spray intelligently, having a definite aim in view, and knowing the results that are expected to follow.

Spray all your trees, whether you expect to market the fruit or not.

Use plenty of lime in making up your mixtures. It is cheap. It is good for both trees and soil, and prevents burning of the leaves.

Don't fail to spray every season. It is impossible to tell in advance whether or not the tree will be attacked.

Don't wait until the fungi have attacked the tree. It may be too late to save the plant after the disease has developed. **Fungicides prevent** merely the fungus growths and must be applied before the disease gets a start.

Do not attempt to spray directly after a shower or heavy dew, as much of the solution may be washed off, or it may collect in spots.

Spray under the leaves as well as on top. The insects usually hide on the under surface.

Never spray fruit trees when in bloom. The spraying is apt to wash off the pollen and when this occurs no fruit will set. The bees of the neighborhood may also be poisoned.

Label all poisons, so that you will know just what they are.

Keep all poisons away from children and domestic animals.

Never use a tin vessel in making the Bordeaux mixture or other solution containing copper.

Spray only enough for the leaves to hold. If too much is put on the mixture will run off.

After using, pump some clean water through the sprayer, especially through the hose. Hang the hose so it will drain out.

Do not allow your pump to freeze with water in it, as the valve seats and passages may be spoiled. It is best to take the pump out of the barrel at the close of the season.

Buy a pump that is large enough.

Don't expect to spray the orchard as efficiently with a bucket pump and in the same time as you can with a proper outfit.



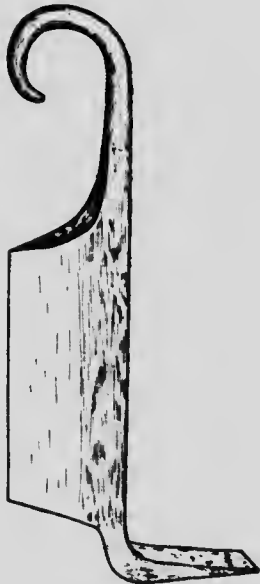
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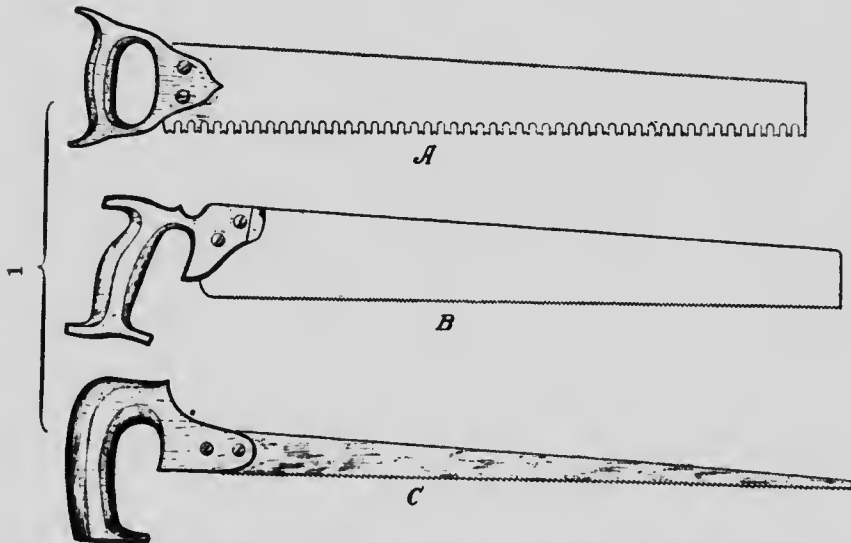
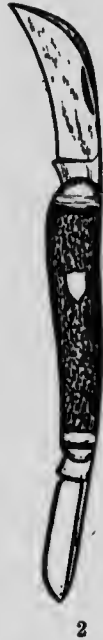
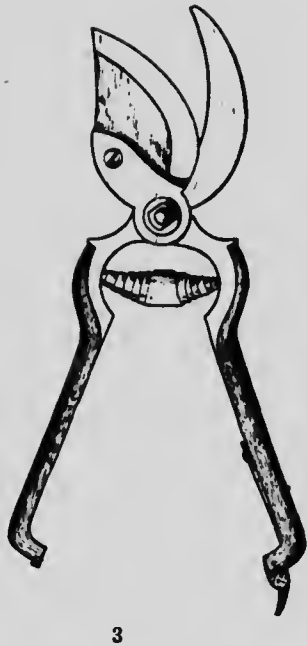


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1, Scion ready for insertion. 2, Cleft stub, with scion properly inserted; note position of basal bud. 3, Stub waxed over. 4, Grafting iron made from old horse rasp, showing hook for hanging on limb when not in use, blade and wedge for holding cleft open for insertion of the scion. 5, Grafting mallet.



1, Types of Pruning Saws—(a) Note special edge for trimming out dead wood; very useful in renovation of old orchards; (b) Also a good saw; (c) Ordinary keyhole saw, very useful where limbs are close together. 2, Budding and grafting knife. 3, Pruning Shears—Will take out all wood up to $\frac{1}{2}$ -inch diameter. 4, Scraper, for cleaning up trunk and main limbs of old neglected trees.

Persons desiring further information on any points treated of in this bulletin and intending purchasers of orchard tools and spraying outfits, are cordially invited to correspond with this department.

