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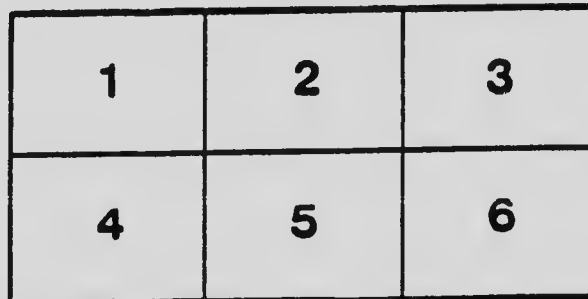
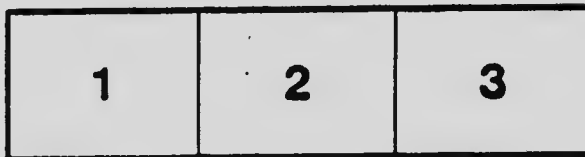
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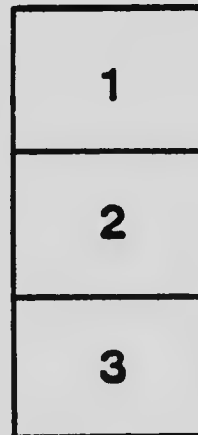
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DOMINION OF CANADA
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DOMINION EXPERIMENTAL FARMS

TOBACCO DIVISION

TOBACCO GROWING IN CANADA

BY
F. CHARLAN
Chief of the Tobacco Division.

BULLETIN No. 25, SECOND SERIES

Published by direction of the Hon. S. F. TOLMIE, Minister of Agriculture, Ottawa, Ont.





PL. 1.—Plantation of Constock Spanish.—(Manure and a complete chemical fertilizer applied.)

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The Honourable
The Minister of Agriculture,
Ottawa.

Sir,—I have the honour to transmit herewith, for your approval, the manuscript of Bulletin No. 25 of the Second Series, entitled "Tobacco Growing in Canada," and prepared by Mr. F. Charlan, Chief of the Tobacco Division.

The increasing interest in tobacco growing in those parts of Canada where this crop can be produced to advantage, has added materially to the demands for information and literature on the subject.

This bulletin, discussing in a simple manner, as it does, the more important considerations in connection with tobacco production, such as soils, hot-beds, cultural methods, harvesting, curing, etc., should prove valuable to anyone interested in this crop.

Although somewhat of the character of a revise of No. A-3 on the same subject, this publication contains so much new material that it should, in my opinion, be sent to our complete list of tobacco growers.

I have the honour to be, sir,

Your obedient servant,

J. H. GRISDALE

Director.

OTTAWA, November 30, 1915



The Director,
Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit herewith Bulletin No. 25 of the Second Series entitled "Tobacco Growing in Canada."

It is intended to take the place of Bulletin No. A-3 on Tobacco Growing, which was issued in 1907, and is now out of print while the demand for a publication of this nature, especially by beginners in tobacco growing, remains active.

The present bulletin is, then, a revision of Bulletin No. A-3. No attempt has been made to deal exhaustively with certain special features of tobacco growing. These will be treated in later publications each taking up a certain phase of the culture and preparation of tobacco.

I have the honour to be, sir,

Your obedient servant,

F. CHARLAN,

Chief of the Tobacco Division.

November 11, 1915.

INTRODUCTION.

Although the tobacco remains on the land a comparatively short time (from seventy to one hundred days, according to variety) the farmer who takes up the industry must, to be successful, give his attention to it for a much greater length of time.

In Canada, the seed beds are made usually in the early part of April; and from that date until the crop is sold, or is in such condition that it may be kept without risk, say by January or February of the following year, the tobacco must receive intelligent and constant care. There must be such care to obtain a good crop, and, to prevent its deterioration, a continuation of such care after the crop has been harvested.

It will be readily understood that in such a long space of time as has been referred to above, from April to the following January or February, the tobacco plant will require various sorts of attention, according to the different phases of its growth and preparation for the market. A review of these various phases will be found in this bulletin.

TOBACCO GROWING IN CANADA.

SELECTION AND PREPARATION OF THE LAND.

SELECTION OF SOIL.

Selection of Soil.—All soils are not suitable in an equal degree to the growing of tobacco. Rich and light soils, containing a good supply of vegetable matter, will yield the best results.

Soils deprived of humus, however rich they may be in mineral elements, are not suitable for tobacco growing. Tobacco is a plant which, during the greater period of its growth, affords poor protection to the soil against evaporation; and moreover, in spite of its endurance, it may be expected to suffer from the effects of a protracted drought.

The plant, which is a weak seedling when transplanted from the seed bed to the field, has a rapid growth, and should be able to throw out easily a large number of roots; and to this end a deep soil, which retains moisture and is more easily drained, is preferable. Such a soil facilitates 'hilling up,' and thus permits the adoption of the flat cultivation system, which is cheaper than the method of ridge cultivation.

Good drainage of the subsoil water is essential; for an excess of moisture will do even more injury than a prolonged drought. Sufficient drainage must be provided in any soil where an accumulation of subsoil water is to be feared.

The soils of hill-sides with a gentle slope generally yield excellent results, mainly on account of the rapidity with which an excess of water drains off.

Low and marshy soils yield tobacco of a coarse and loose texture which cures and burns badly. Such soils should be avoided altogether. The same may be said of soils containing an excess of lime, which yield a leaf lacking in elasticity.

Good crops may be obtained on clay soils, provided the latter contain a sufficient proportion of sand and humus to be easily brought to and kept in a good state of tilth with the plough, harrow and cultivator. Such soils, known as "heavy," are common in some parts of Canada. Some, however, contain a rather large proportion of lime, giving them a marly appearance, and these yield a tobacco of thicker texture than do the light soils, while the difficulty of getting them into proper shape is a serious defect, the favourable time for ploughing being hard to determine.

The best soils for the growing of tobacco are those which contain a sufficient proportion of clay and humus to enable them to retain a good supply of moisture, and which are known under the general appellation of "loamy soils," and classed as sandy loams, loams, clay loams or heavy loams, as the proportion of clay increases. Stiff clay soils are the least suitable.

The colour of soils influences the colour of tobacco grown thereon. Light-coloured tobacco is obtained more easily from a light-coloured soil.

Sandy loams or even loamy soils will give the best results with light tobaccos, such as Havana Seed Leaf, Connecticut Seed Leaf, Constock and Zimmer Spanish. Tobaccos with a rather heavy texture will do best on loams, or clay loams.

Special mention may be made of certain Ontario soils, found close to the border of Lake Erie, which are being more and more devoted to the growing of bright tobaccos "flue-cured."

Some gravelly soils appear to be suitable to the growing of small varieties of Canadian tobacco, such as Canelle and Petit Rouge, but analyses of these soils show that they may be classed as clay loams, allowance of course being made for the larger particles.

PREPARATION OF THE LAND.

Tobacco being a very exacting crop, and its period of growth of comparatively short duration, the soil in which it is grown should be rich and frequently manured.

The land selected should be ploughed as early as possible the preceding fall, in order to be well aerated and properly provided with moisture. It will be better to plough twice; once at the end of August or the beginning of September, and again, say two or three weeks before the hard frosts and heavy falls of snow.

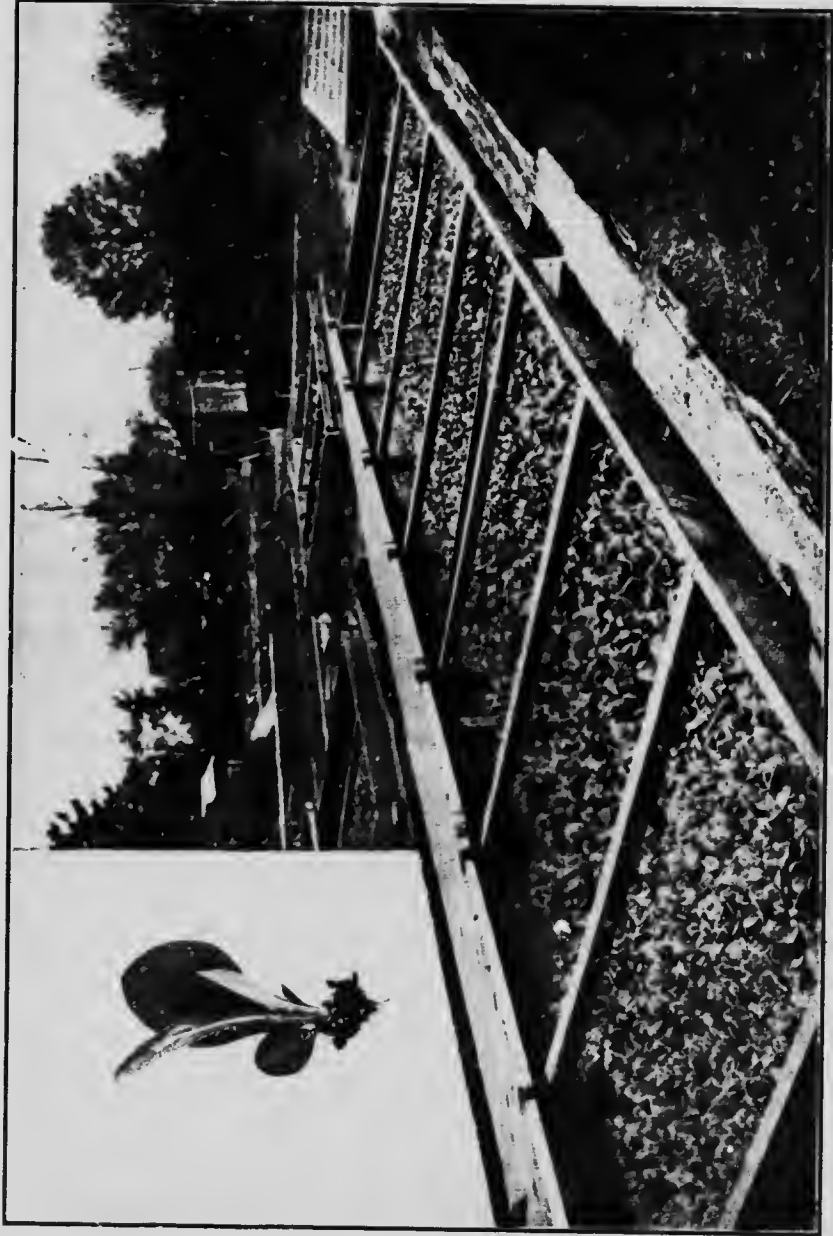
The farm-yard manure which is available at that time should be ploughed in at the last ploughing. Only well decomposed manure should be used. The advantage of applying the manure in the fall is that it will have time to nitrify during the winter months, that is to say, the elements of the manure will have time to change into soluble plant food before the seedlings are put in.

Spring work on the tobacco land should be done as early as possible and, if manure has been applied the previous autumn, should be so performed as not to bring the manure up to the surface. The work is completed by harrowing with spring tooth and disc until the soil is in a fine condition.

Spring manuring should be done as early as possible. The manure may be buried by the plough, or spread over the field after ploughing, and mixed in by the disc harrow. Green manure may be used in the spring, but care should be taken to let sufficient time elapse between the time of manuring and setting out. Manure should be applied in the proportion of twelve to eighteen tons per acre.

Commercial fertilizers are applied in the spring. When the plants are to be in close together, such fertilizers may be sown broadcast, and incorporated with the soil by the disc harrow. When the plants are to be set wide apart, in rows, the fertilizer may be spread so as to be buried under the ridges, or as nearly as possible on the location of the future rows. A few growers even wait until the seedlings are set out, and distribute the fertilizer around each plant, mixing it with the earth. This is a rather expensive method, but, judiciously practised, it gives fairly good results.

Commercial fertilizers may be used in the spring as an addition to an application of farm-yard manure put on in the preceding fall; and in such cases they are applied at the rate of 400 to 600 pounds of complete fertilizer per acre. They may also be used exclusively, at the rate of one thousand to twelve hundred pounds per acre; but this is not as good a method.



Seed-plots of Corn - Spanish, (Sown at the rate of $\frac{1}{2}$ of an ounce per 100 sq. ft. of plot). Type of plant desired.

SEED BEDS.

In view of the smallness of the tobacco seeds and the need of sheltering the young plants during the first period of their growth, the use of covered seed beds, especially in Canada, is most necessary.

Sowing may be done on hot, semi-hot, or cold beds. The second are preferable, owing to the fineness of tobacco seed, and they afford better protection to the young plants against the inclemencies of the weather where such are to be feared. In most parts of Canada, even in the Province of Ontario, owing to the occasional severity of the spring, the use of semi-hot beds can scarcely be dispensed with.

The operation of sowing has been dealt with at length in Bulletin No. 21, Second Series, of the Experimental Farms, so that the subject need not be dealt with here; but a copy of the bulletin referred to will be furnished upon request.

An advantage would be gained by having semi-hot beds really warm; that is, maintained at a temperature of from 70° to 80° Fahr., so that they could be ventilated from time to time, even on cold days, by lifting up the glass sashes. They would rapidly regain the few degrees of heat which this operation might cause them to lose.

By this means the plants are protected from those fungous diseases which develop during long periods of rainy weather and which are almost always caused by an excess of moisture and a lack of aeration.

The whitewashing of the glass tops or sashes, in order to protect the young plants against deadly sunstrokes is recommended, in addition to the use of cloths for the same purpose. The absorption of outside heat by the bed will be reduced by this method, but the absorption will be more regular, and the possibility of damage from neglect is less than when cloths alone are used. However, it is well to use the latter at night, and during a snow fall, if such should happen to occur, though in the case of a snow fall a covering of boards would answer the purpose better.

For setting out, the plants should be from three to three and a half inches high. Plants of this size will be easily obtained on thin beds. It is a convenient size for either hand or machine transplanting, and ensures a good new start for the young plant.

In order to promote the development of the roots of the young plant in the beds, it will be necessary to reduce the frequency of sprinkling toward the end of the stay of the plants in the beds. In order to harden the plants before the time of setting out, the sashes should be lifted up gradually a little more each successive time, until they may be completely removed on fine days.

The amount of seed to sow on a given area depends on the quality of the seed, and above all, on its germination power. A good stand is obtained by sowing from $\frac{1}{2}$ to $\frac{1}{7}$ of an ounce to each one hundred square feet of seed bed.

The seed should be mixed with from 100 to 200 times its volume of fine sand, corn meal, or other inactive material, to permit of its being sown evenly. We prefer fine sand, which has been burned. The meal is convenient to use but often molds after contact with the moist earth, thus forming a favourable medium for the development of disease.

The practice favoured by some growers of causing an exaggerated degree of germination of the seed before sowing cannot be recommended. It is better to use seed simply swollen, or even dry seed.

A good semi-hot bed, sown with dry seed from the 10th to 15th April, will easily yield plants ready for setting out about May 25.

SETTING OUT.

PREPARATION OF THE SOIL.

The soil of the tobacco field should be in a perfect state of tilth at the time of setting out or transplanting. It should then be prepared according to the system of planting to be adopted, viz.: level or ridge planting.

Flat, *i.e.*, level cultivation is preferable on deep and well drained lands. Ridge cultivation will give better results on soils lacking in depth and in which an excess of moisture is to be feared. For planting on the level, the field should be marked both ways with a marker, into checks or regular squares, the points where the lines intersect being the points where the plants are to be put in. A child may be employed to go ahead and distribute the plants, that is, lay a plant down at every cross section of the lines, while men follow, and set the plants in. A peg may be used in planting, to make a hole to set the plant into; though in very light soils the hand may be used. The plants are set at a moderate depth, to the collar, immediately above the roots. Care should be taken to avoid setting the plants on pieces of undecomposed manure, and to avoid bending the roots, which might cause the plant to become diseased.

Cloudy weather is favourable to the revival of the young plants. Evaporation is then less active, and the plants do not wilt so much. Planting should be done during the cool hours of the morning or early evening. Whenever the soil is too dry, each plant should be watered carefully as soon as set in.

In taking up the plants from the hot beds, the greatest possible care should be used to avoid breaking the roots or shaking off the earth clinging to them.

To this end, the bed should be well watered half an hour or so before taking up the plants.

For setting out, care should be taken to select well-formed plants, green and thick-set, well provided with roots, and all as equal in size as possible, in order to obtain regularity of growth and size in the field.

Hand planting is rather tedious and costly. On large plantations, a planting machine is used. Such a machine, drawn by a team of horses, and operated by three men, will set out some twenty thousand plants in a day, doing the watering at the same time. The machines may be had from agents in Canada for from \$100 to \$135.

The distance apart at which plants should be set varies according to the variety. Such varieties as Canelle and Petit Rouge may be planted 24 inches apart between the rows, and 12 inches apart in the rows. Other varieties, such as Havana Seed Leaf, are planted 2½ feet by 1½ feet apart. Very satisfactory results, so far as growth is concerned, have been obtained from a plantation of Comstock Spanish set out 26 by 18 inches, in spite of the drought which prevailed during the year. As a general rule, it may be said that the varieties Havana Seed Leaf, Comstock and Zimmer Spanish, when grown in Canada, should not be planted wider apart than 2½ by 1½ feet.

When the rows are 26 inches apart, it will be possible to give the three hoeings necessary with a horse cultivator, even though a very heavy horse should be used, before the development of the plants interferes with this work.

Some varieties with large, spreading leaves must be set further apart. The Burley variety is set three by three feet apart, and sometimes even three and a half by three feet.

There is another system of planting called the quincunx system, which has the advantage of affording much room for plant development. By this system the plants in each row are set so as to face the open space between the plants in the next row.

RESETTING PLANTS.

The plantation should be visited a few days after the setting out, and all plants which have been destroyed by insects or which did not succeed should be reset (replaced.)

Resetting should be done early, in order to obtain a plantation as uniform in size as possible. Early resetting is particularly necessary in the case of close-set plantations; for, in this case, late plants are checked in their development by the first ones, the growth of which has been normal since the start.

This is also the time for spreading poisonous mixtures if traces of injuries caused by insects are observed.

There are many formulae for the preparation of poisonous mixtures. One of the best is made by adding one pound of Paris green to 50 pounds of bran. This is thoroughly stirred several times to ensure even mixture and should be prepared some 24 to 48 hours before it is to be used. At dusk, it should be spread around the plants, care being taken not to sprinkle it on the plants, the young heart leaves of which might be burned thereby. After a rain the operation must be repeated.

DATE FOR TRANSPLANTING.

There are many points in favour of early planting. There is the possibility of early fall frosts, and also the difficulty of obtaining a thorough curing of tobacco in the shed before the severe weather sets in: so that all varieties of average size, such as Havana, Connecticut and Comstock, should be planted toward the early part of June. As to Canelle and Petit Rouge, which ripen early, they may be safely set out from the 15 to the 20th of June.

When the plants are set out early, toward the end of spring, they find sufficient moisture in the soil to enable them to make a good start. They throw out an abundance of roots and are thus better prepared to withstand dry weather, their roots drawing the water necessary to their growth from the subsoil. It has frequently been observed that fields set out early (from June 1 to June 10), suffer less than fields later planted, and yield a better developed product.



Airing the seed-beds. (Hardening period. Seed sown at rate of $\frac{1}{4}$ oz. to 100 sq. ft. Note shelter fence.



Airing the seed-beds. (The sashes are left flat.) No cover for use at night.

CULTIVATION.

Cultivation should start soon after the setting out of the plants; that is, as soon as the plants are well established, and the plants which have been set out to replace unsuccessful ones have got a good start, which will be about ten or twelve days after planting.

The object of cultivation is not only to destroy the weeds, but also to keep the soil loose. It facilitates aeration, and, on the other hand, checks the too rapid evaporation of the water in the surface soil. The earth always gets packed during the operation of setting out and resetting, and in view of this the first stirring of the surface soil should be effected as early as possible.

Cultivation by the horse cultivator is not sufficient. To complete the work, each plant must be hoed around by hand.

Subsequent cultivation is effected at varying intervals, according to the more or less rapid growth of weeds and the atmospheric conditions. Heat, following a heavy rain, generally causes a thick crust to form upon the soil, and cultivation is then necessary for the aeration of the soil. Horse-hoe cultivation should continue until the time when, owing to the development of the plants, the passage of animals or machines might injure them.

HILLING.

This operation can scarcely be dispensed with in the case of flat cultivation. It is easily done by means of a small, double mould board plough, the spread of which is regulated according to the distance between the rows, and which throws the earth from both sides toward the rows of plants. The first result of hilling is to firm the plants.

Before hilling, cleaning should be done; that is, the small leaves which are at the lower part of the plant should be removed. These leaves are left scattered around the plants and they decompose rapidly as soon as they are covered with earth in the hilling process. Short roots, called adventitious roots, develop in their places, and contribute in a large degree to the rapid and vigorous growth of the plants.

Hilling should be done when the plants are about six or eight inches high, and not before the ground has been cultivated at least twice.

Do not hill up when the ground is either very damp, or too dry, as in a drought. In the first case, the earth would pack closely and aeration would be checked; in the second case, the opening up of the soil at such unfavourable time would cause it to dry out completely.

In spite of its advantages, hilling, properly so called, is seldom practised in Canada.

The same effect is produced, to a certain extent by directing the soil towards the plants, as far as possible during the successive cultivations. This can only be done, however by the use of special cultivators, the teeth of which are formed to push the soil away slightly to each side. The small spike tooth cultivator, although doing good work on the soil, cannot be used for the above purpose.

PRIMING AND TOPPING.

Priming consists in removing from the lower part of the plants all of the leaves which, being close to the soil, become torn or dirty. Priming should be done as high

as three or four inches above the earth where hilling is practised, and still higher in the case of ridge planting where no hilling is done and where cleaning, which precedes hilling, is not practised.

The utility of priming will be easily understood. It relieves the plant of all valueless leaves which would never come to maturity, and which, owing to their being close to the ground, afford a harbour for insects. Through the removal of such leaves, all the vigour of the plant will rise to the higher parts of the stem.

TOPPING.

It is only after a proper priming that the grower is able to determine just how much of the plant should be topped, that is to say, to judge of the number of leaves which should remain on each plant, proportionate to the plant's vigour and the weather conditions.

Topping should be done early, *i.e.*, as soon as the plant has formed the required number of leaves and the operation may be done without injury to the top leaves. As far as possible, the stem should be cut or topped on a level with the highest leaf left on the stalk.

Early topping affords more time for the complete development and better ripening of the top leaves. Late topping may cause the top leaves to remain small and thick and of inferior quality. On a properly topped plant, the top leaves should be almost as fully developed as the mid-stem leaves.

SUCKERING.

After the topping is done, numerous suckers will appear at the base of the leaves and the top of the stem. They should be carefully removed.

Suckering is done to allow the plant to reserve all its strength for the nutrition of the remaining leaves. However, it is not necessary to destroy all of the short suckers as soon as they appear. This operation need not be started until the suckers are four or five inches long. The whole plantation should be gone over systematically, row after row, starting from the end which has been topped first, until the other end is reached, assuming that the topping has been done in the same systematic way.

Generally speaking, it will be sufficient to do this operation three times, in order to keep the plantation in good condition.

The last suckering should be done one or two days before harvesting. On no account should suckers be taken into the curing barn.

SEED PLANTS.

Plants reserved for the production of seed require close attention. Such plants are, of course, not topped. The best plants in the plantation should be selected for this purpose, and the selection should be made early. They should be marked or tagged, and their development watched with the greatest care. Any plants showing the slightest sign of disease or of a weak constitution, should not be kept for seed, but only such as will unite, with the best possible conditions of growth, all the characteristics of the type which it is desired to propagate.

Undesirable cross breedings may be avoided by covering the flower heads of the selected plants with gauze, or light paper bags, shortly before the opening of the first flowers.

Keep only the main flowering stem; and remove all branching stems, which generally yield seed too light and of poor quality.

It is a bad practice to remove all the leaves from the plants kept for seed. The leaves are absolutely necessary to the life of the plant, and their complete removal is a practice that should never be followed.

The leaves of the seed plants are generally of inferior quality, and are very often damaged by the fall of the fragments of flowers. Their loss must be regarded as a matter of course, the only aim being to obtain seed as heavy as possible.

A part of the leaves may be removed only when the ripening of the pods is proceeding too slowly and it is desired to hasten it. But this should not be done before the brown colouring of the pods is sufficiently developed. The lower leaves are removed at first, and the rest, if necessary, are taken off slowly and gradually as the season advances and renders the operation more urgent.

Progress may be considered as satisfactory if the seed is ripe before more than half of the leaves of the plant have been removed.

When the leaves are removed too soon, the seed is light and of inferior quality, showing lack of nourishment.

When some pods are too long in ripening, it is better to cut them off with scissors and destroy them.

The stem may be cut with the pods on, the latter being left on the stem until they are dry; or the cluster of pods may be removed and hung up in a dry and well ventilated place. The latter method seems to be better.

A systematic study of the culture of seed-plants has led us to adopt the following practice: A little before the tobacco harvest, say about August 10, the top and bottom leaves of the seed plants are taken off leaving only about 7 or 8 middle leaves on each plant. About August 20 this number is reduced by about a third, the leaves being taken from the top and bottom. At least four leaves are left on until the seed is gathered. When the seed harvest is very late, one may remove all the leaves in exceptional cases, but this should only be done at a late date, when the pods are well formed and the seeds filled, with some of the pods beginning to turn brown.

The seeds are left for the winter in the pods, the latter being shelled out only shortly before sowing time. The seeds should be carefully sifted. They may be kept for years in bottles not tightly corked, so as to permit of the access of air, in bags, or in wooden boxes.

HARVESTING.

MATURITY.

Tobacco plants should be harvested as soon as they are ripe.

A leaf of tobacco may be considered as ripe when it becomes spotted with small yellow markings, which first make their appearance at the edge and tip of the leaf, and extend toward the mid-vein. The tip curves and hardens. On bending, the leaf breaks straight across with a sharp, characteristic sound. Sometimes, when the

ripening is far advanced the leaf becomes slightly corrugated. In some varieties, the characteristic yellow spots are scarcely visible, but the tip of the leaf curves inwards, and the leaf itself hardens, and seems to become thicker. Fields of ripe tobacco exhale a characteristic penetrating odour, especially in hot weather.

Ripening proceeds from the bottom leaves to the top ones. When harvesting is done by cutting the stalks—the usual method in Canada—the date chosen should be when the top leaves are ripe enough to take a good colour in curing, and before the bottom leaves are over ripe. When the bottom leaves have been left too long ripe on the stem, they have no longer any weight, elasticity or firmness.

Generally speaking, the cutting should be done eight days after the appearance of the signs of maturity on the mid-stem leaves, and when they begin to appear on the top leaves.

There are some cases, however, when ripening proceeds very irregularly.

A long drought will cause the leaves to ripen before they have attained normal development, thus causing a serious loss in the weight of the crop.

It may happen that, with the conditions of ripening satisfactory, and the growth normal, just as the grower prepares to harvest a rain occurs, and the plants get green and start to grow again.

On no account should harvesting be done then as such plants, cut in the full period of growth, would be hard to cure and would take on a green colour. It will be necessary to wait until the signs of maturity have reappeared, but no longer, and then harvest as rapidly as possible. Besides the poor condition in which they are for curing, tobacco plants harvested immediately after a rain are deprived of the gums or resins which exude from ripe tobacco. Such plants are called "washed."

Harvesting should be done in dry weather, when ripening is progressing satisfactorily.

Do not start cutting early in the morning, when the leaves are still covered with dew, and are brittle, as they are too liable to break then, and the water would injure the tissues.

The best time for harvesting is on a bright day, when the dew has all evaporated, and when the leaves, having regained their softness, hang down slightly, and are less liable to break. Under such conditions, the wilting takes place rapidly, and the handling which follows is facilitated. The cutting may be continued until late in the afternoon.

Harvesting may be done either by cutting the stalks or stripping the leaves, (Priming.)

With the first method, the stalk is bent with one hand and cut at the base, as near the ground as possible with a hatchet or strong knife. The stalks are put together, in bunches of from four to eight, according to their size, and are left to wilt on the ground for a certain length of time regulated by weather conditions (cloudy or bright sky.)

When the wilting is done, the stalks are speared upon a lath by means of a V-shaped spear which fits upon the lath. In order to facilitate the operation of spearing, which requires some effort, these laths are laid upon special trestles, or held upright, one end upon the ground. The length of the laths corresponds to the inside dimen-

sions of the curing barn; generally speaking, they are about four feet and perhaps a few inches more in length, and from six to eight plants may be speared upon a lath, according to the size of the plants.

After being "loaded," the laths are hung in special wagons fitted with frames in about the same way as the curing barn, though, on the carts, the laths are closer together. This reduces the risk of bruising the leaves during the hauling from the field to the curing shed. They may also be loaded flat in small heaps, the layers being put crosswise and the tops of the stalks inward, but when this method is followed, care should be taken to unload the wagon as soon as possible, as over-wilting might result from a long exposure in heaps.

Care should be taken not to leave the plants too long lying in the field. A proper wilting will ensure a good colour, as well as a greater degree of firmness and elasticity in the leaves, provided the curing be not carried on too rapidly at the beginning. An extreme wilting will reduce the elasticity of the tissue, and very often cause an appreciable loss of weight.

When the priming method, or harvesting leaf by leaf, is practised, the leaves are stripped from the stems gradually as they become ripe. The work begins with the lower leaves, which are the first to ripen, and continues progressively until the top leaves are reached.

The leaves are strung on pieces of strong twine, which are stretched in place of laths in the curing barn. The leaves are put on the string back to back, so as to avoid too close fitting and to insure better ventilation.

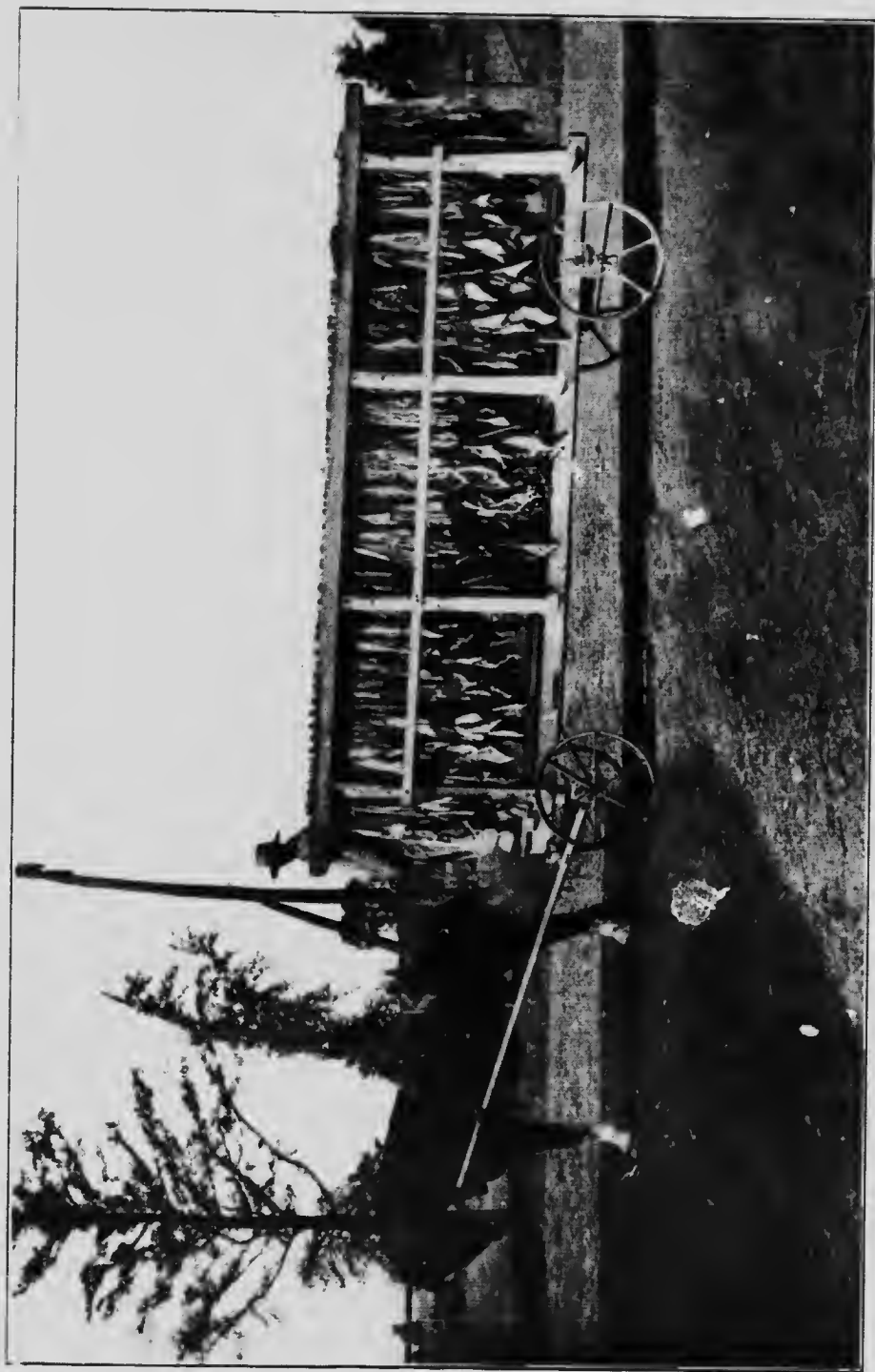
Long exposure of the primed leaves on the field is still more objectional than in the case of stalk cutting. A slight wilting is sufficient. The curing should, at first, be conducted more slowly than in the case of curing on stalks.

MOVABLE RACKS.

In order to carry out the wilting process without danger of injury to the leaves and to prevent their becoming soiled from lying on the ground for a considerable time, the loaded laths may be hung on movable racks, and allowed to remain thus on the field for some days, before being placed in the curing barn. A very slow drying process goes on during which the leaves lose a notable amount of water, which helps to shorten the length of the drying process in the curing barn. When so put on racks in the field the tobacco is not injured by a rain and may, moreover, be covered with canvas. The covers may also be used at night in case of danger from a frost which would delay the drying process. On these portable racks the laths are placed much closer together than in the curing barn; the plants may touch each other but should not be pressed together to any marked degree.

CURING BARNS AND CURING.

Curing barns.—Buildings specially fitted for the curing of tobacco are termed curing barns. Any clean building may be used for this purpose, except when the curing is to be done by means of fire or hot air, but the best results will be obtained in tight buildings where aeration may be easily controlled, increased or decreased, or even entirely suppressed.



Special wagon for hauling crop to shed. A strong horse can draw 75 loaded loads (about 500 pounds)

Small trap doors to permit entrance of air should be provided at the base of the building; and there should be air flues in the roof, for which there are various plans. The number of top ventilators in a building is of course regulated by the length of the building.

The ventilation of the central part of the house will be more easily done if the building is of only a moderate width, say twenty-eight to thirty-two feet.

The choice of location of the curing house is an important matter. The curing barn should be built on dry ground. If necessary, the site should be raised in order to avoid dampness. Low places, situated near marshes or running water, should be carefully avoided, as well as hilltops or too high places where strong winds might influence the curing process. The best location is a well drained site in an open space, but not exposed to the wind. The building should be placed lengthwise with the direction of the prevailing winds during the curing season.

In arranging for the hanging of tobacco, care should be taken to have the laths far enough above each other, so that when the tobacco is hung there will be sufficient ventilation space between the tips of the stalks or leaves of the top tier and the ends of the stalks or leaves of the tier below. The space between the laths of the different tiers will be determined by the average size of the product, *i.e.*, the length of the stalks or plants; or by the variety of tobacco. If the leaves are hung on twine, as has been referred to, there will of course be much less space between the various tiers of twine than between the tiers of laths.

Laths should be placed side by side, six inches apart at least. The lengths of twine should be at such a distance from one another as to leave a space between the leaves of half the width of the hand when the wilting is completed, thus allowing for ample ventilation.

The bottom tiers should be placed high enough above the floor to leave a space of at least two feet between the latter and tips of the tobacco.

CURING.

The curing should start very slowly, in order to obtain a good yellow colour; after which more air may be admitted. To hasten the yellowing, the curing barn may be kept closed a day or two at the start; that is to say, the side trap doors should be closed, but the ventilators at the top should remain open, so as not to suppress ventilation altogether. The ventilation may be increased as soon as the edges of the leaves have turned brown, and when the mid-rib of the leaf has become supple. On warm and damp days, the curing barn may be completely opened. On a very windy day, care should be taken to close the openings facing the wind, in order to avoid breaking the leaves or too rapid curing.

In continued damp weather, it will be necessary to dry artificially the air of the house, to avoid mould. Little fires of smokeless materials such as dry, scentless wood, charcoal, etc., should be started at various places on the floor of the curing barn, in order to dry the air evenly in all parts of the building without causing too high an elevation of temperature. Continued dampness might cause the products to turn dull and grey, instead of taking on a bright colour. Artificial drying will remove this danger. A tight curing barn is indispensable for this operation.



Roughly made racks used to wilt tobacco in the field



Tobacco curing barn in course of erection

The best results will be secured when the leaves remain slightly supple all through the curing period, until the time of taking them down. Tobacco cured under such conditions is generally more elastic, and the leaves are less mottled.

STRIPPING, BULKING.

A careful examination of the mid-rib of the leaf will show whether or not the drying is complete.

The tobacco may be taken down from the laths when the colour of the leaf tissue is normal, light brown and when the ribs are wrinkled in their whole length. On being opened up, the ribs seem to consist of a mass of independent fibres, and only the ligneous, or woody, tissue should remain. No water should come out of the rib when the latter is squeezed near its lower extremity. Sometimes a viscous substance will come out when this means of verification is adopted, but such substance should not be mistaken for water. The tobacco should also be supple, but not damp, with enough elasticity to regain its former shape after being squeezed with the hand.

For taking down the tobacco from the laths, a day should be chosen when the weather is neither too dry nor too damp.

In very dry weather, the tobacco will become brittle and would be in a poor condition for the handling which is to follow. In very damp weather, the tobacco might absorb too large a quantity of water, which would interfere with its keeping qualities. Weather generally known as "mild" is the most suitable.

As soon as the curing is completed, the tobacco should be removed from the tiers. A longer stay would injure its quality. The leaves are affected by changes in the moisture content of the air: they turn dull, lose their firmness, and even get mouldy by a prolonged contact with the stalks.

The leaves are stripped from the stalks, and piled into small heaps or "bulks," in which they remain supple until the time of grading and tying into "hands."

The "bulks" should be only moderately high. The leaves are placed in two rows tip to tip inside. They should be frequently examined, in order to make sure that no rise in temperature takes place. When such a change is observed, the bulks should be broken up and rebuilt upon another spot. Cloths are laid over the bulks, in order to retain the elasticity of the tobacco, but no weight should be put upon them, as fermentation might result. If the leaves possess the right proportion of humidity when put in bulks, the bulking improves their colour, which becomes more uniform, and light streaks disappear.

TYING.

The tying, or putting into "hands," of tobacco, consists in putting together a certain number of leaves, from 15 to 50, and binding the "hand" with another leaf, wound around the larger end of the rib, the tip of the binding leaf being tucked conveniently into the "hand." Before tying the leaves into "hands," the grower should carefully grade the leaves, so as to pack only a uniform quality of product into each bale or box. In grading, the points to be considered are: the length of the leaves, their thickness, their elasticity, and their colour. Torn leaves should never be graded with leaves in good condition.

Grading is a rather delicate task; that is, it requires a nice sense of discrimination and therefore some training. However, the necessary skill and judgment may be rapidly acquired. The value of the crop is always increased by careful grading.

After being gathered into "hands," the leaves are again piled into bulks. Two rows of "hands,"—with the tips inside and slightly overlapping—are piled up to a height of three feet, at most. These bulks are covered with cloths to prevent their drying, and slightly weighted down. The tobacco in these "hand" bulks should be examined more frequently than in the leaf bulks, as the "hands" pack down much more easily and are therefore much more liable to ferment, or sweat.

However, tobacco may be kept in bulks for a fairly long time, provided the temperature of the room is not too high. Care must be taken, of course, to protect the tobacco from frost, and the bulking should be done in a building where such a thing as frost is not to be feared.

Cold and damp locations should be avoided; in these, the tobacco sometimes moulds without showing the least sign of fermentation. When tobaccos are kept in a cold place it should at the same time be dry.

Below a temperature near freezing the tobacco dries very slowly. If a little stiff when taken from the temporary bulks, the leaves quickly become supple when placed in a warmer and slightly humid atmosphere.

The tobacco is packed just before marketing. In packing, the hands should be arranged slightly overlapping, with the tips always in the centre. The bales are submitted to a light pressure, until they have acquired sufficient compactness to withstand the handling they will necessarily receive during transportation. The bales are wrapped with cloths, or thick paper, and secured with straps or bands which are wide enough not to cut into the leaves.

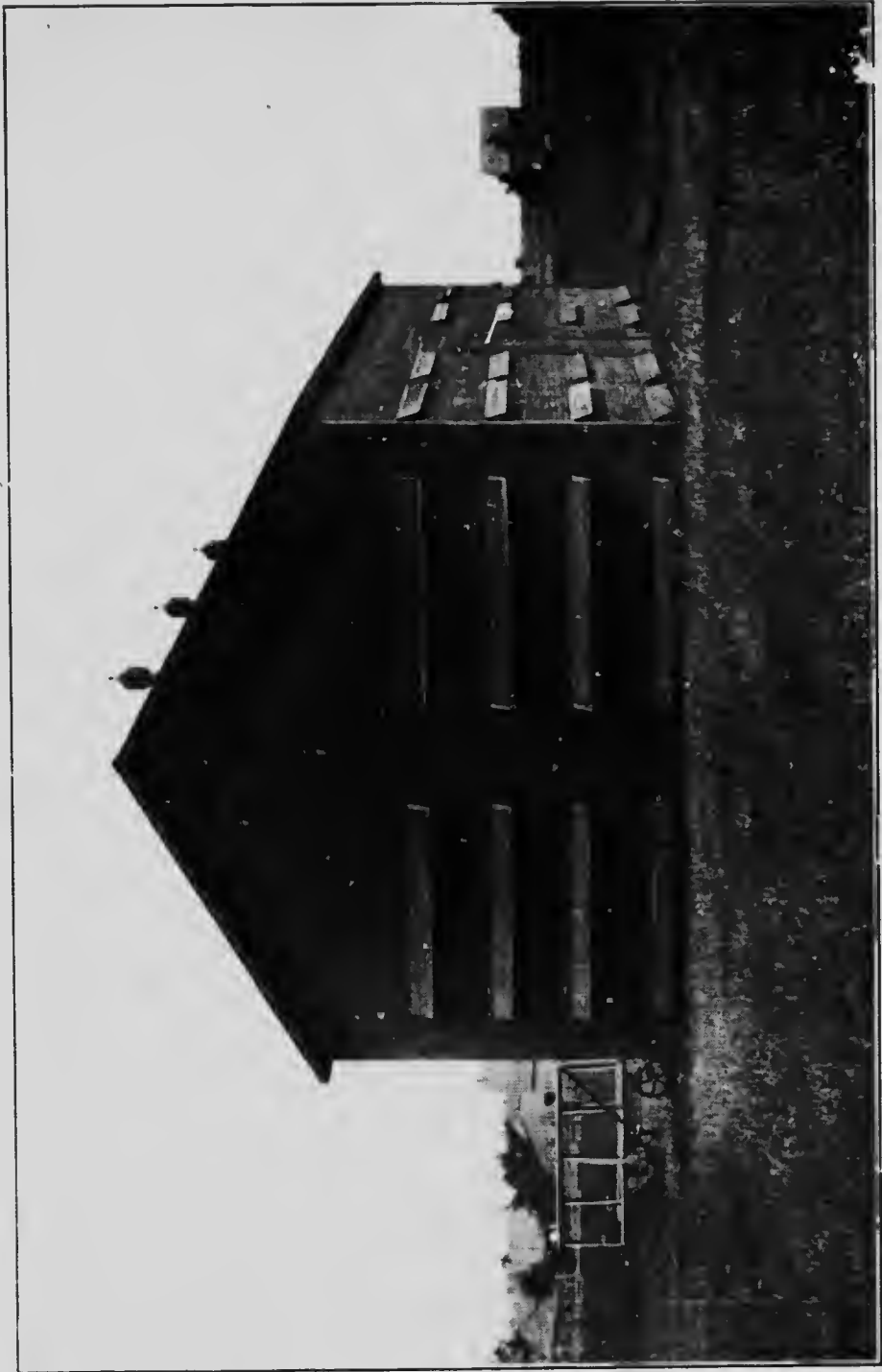
FERMENTATION.

Tobacco which are not to be marketed at an early date keep better if they are fermented.

As soon as the leaves are put into "hands" the latter are piled into bulks 5 or 6 feet high. A thermometer is placed in the centre of the heap or "bulk." The temperature rises more or less rapidly, according to the proportion of moisture in the leaves, the size and height of the bulks, and the temperature of the room in which the tobacco is bulked; but it should never be allowed to go above 120° to 125° Fahr. When the thermometer gives this reading, the bulk should be broken up and rebuilt, care being taken to place in the centre of this new heap the "hands" which were at the bottom and at the top of the first bulk. This exchange of position of the "hands" will ensure a uniform fermentation of the total bulk.

The first bulk should be broken up not only when the temperature threatens to rise above the maximum at which an injury may occur, viz., 125° Fahr.; but also when the fermentation decreases and when the heap shows a tendency to cool off.

The temperature will rise again in the second bulk, but not so rapidly, and not so high as during the first fermentation. This second bulk is allowed to cool off until the temperature of the tobacco is the same as that of the room. Packing may then be started.



A type of curing barn recommended for Quebec. Has also given excellent results in Southern Ontario.

When dealing with a great quantity of tobacco, large bulks containing several rows of overlapping "hands" may be built. Fermentation is thus made easier and more regular, the loss of heat not being so great. But the building and the care of such bulks require a certain amount of practice, special equipment, and expert management.

Fermentation may also be carried on in boxes, in which the tobacco is packed. It will start during the course of the following summer, or as soon as the boxes are placed in rooms with suitable temperature. Boxes of suitable size are prepared, and the "hands" packed in, butts outward. A pressure of some 275 to 300 pounds per box is applied. Facilities for the escape of gases produced by the fermentation are provided by leaving an empty space at each end of the box. This is done by putting in boards one and a half or two inches thick, one at each end of the box, before filling, and withdrawing these boards after the box has been filled and the pressure applied. The corresponding parts of the boxes are put together so as to provide for a free circulation of air.

With this mode of fermenting, it sometimes happens that fermentation does not proceed with the same uniformity at the centre and near the sides of the box. The chief objection to this process is that no control can be kept over the progress of fermentation; and when the boxes are opened, it is sometimes found that a part of the tobacco has been injured by over-fermentation, while another part has not had sufficient fermentation.

Fermentation can also be carried on in bales. These are piled up to a height of 3 or 4 tiers, and taken down from time to time in order to put in the centre the bales which were at the top. Of all methods, however, this one is the least worthy of recommendation.

Never pack tobacco in bales or boxes until the leaves are reasonably dry, although still supple, and the ribs are completely shrunk. To neglect this precaution will be to court certain failure.

