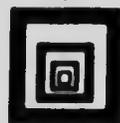


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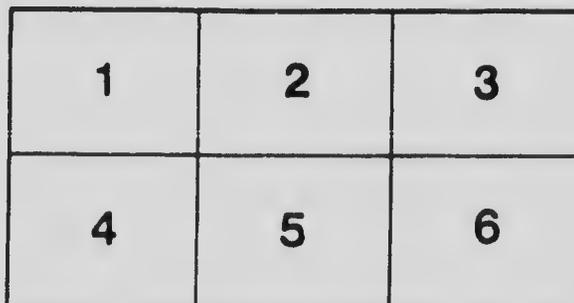
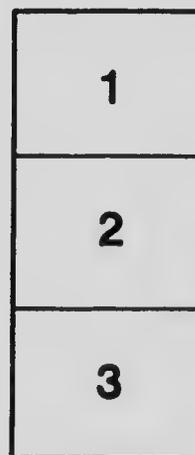
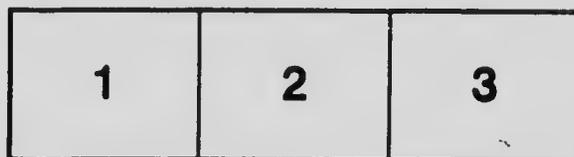
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OTTAWA, CANADA

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TOBACCO DIVISION

BRIGHT TOBACCOS

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*A Tour through South Virginia and North Carolina*

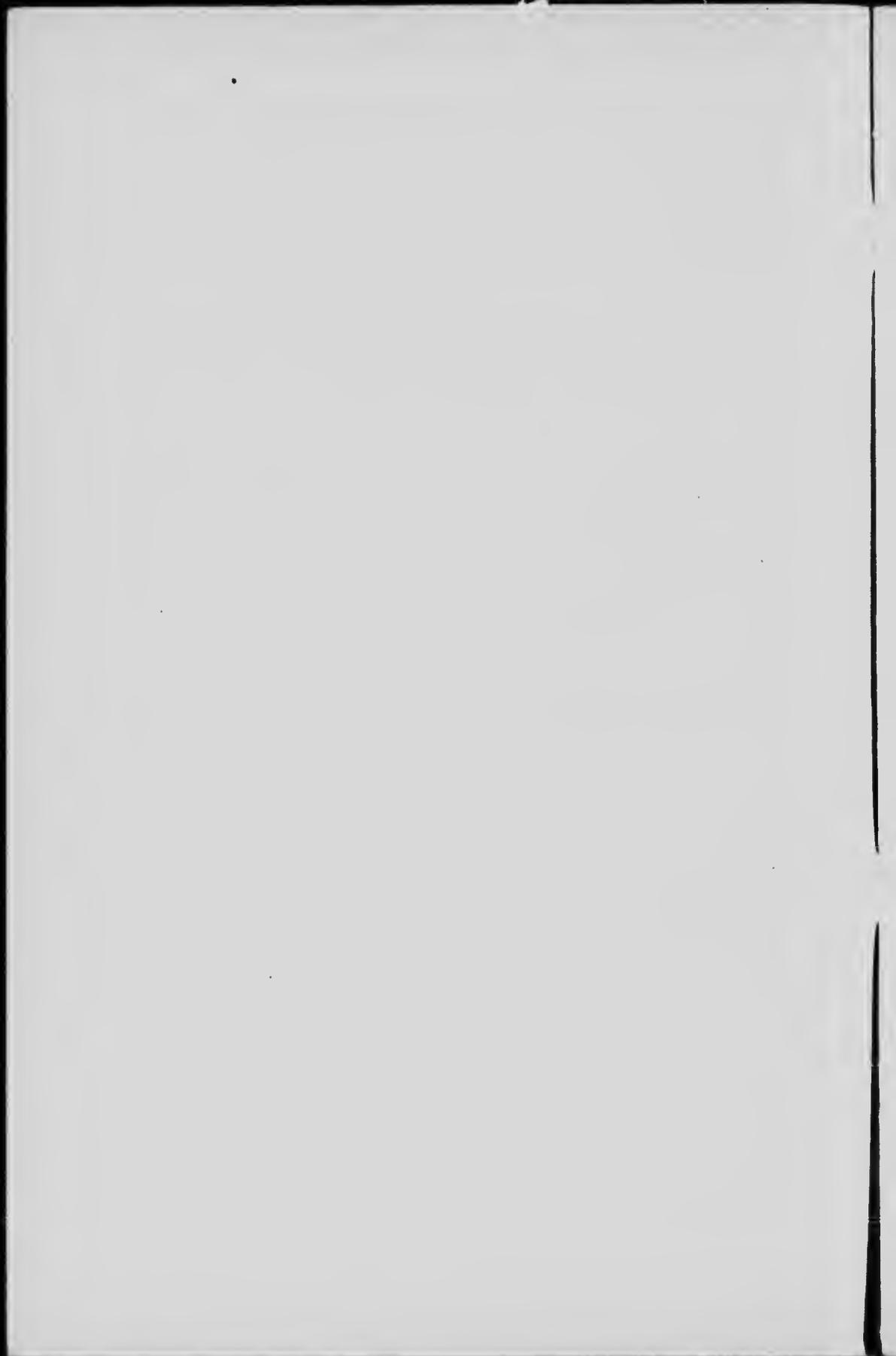
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Tobacco Bulletin No. A 7

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.  
September, 1909

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To the Honourable  
the Minister of Agriculture.

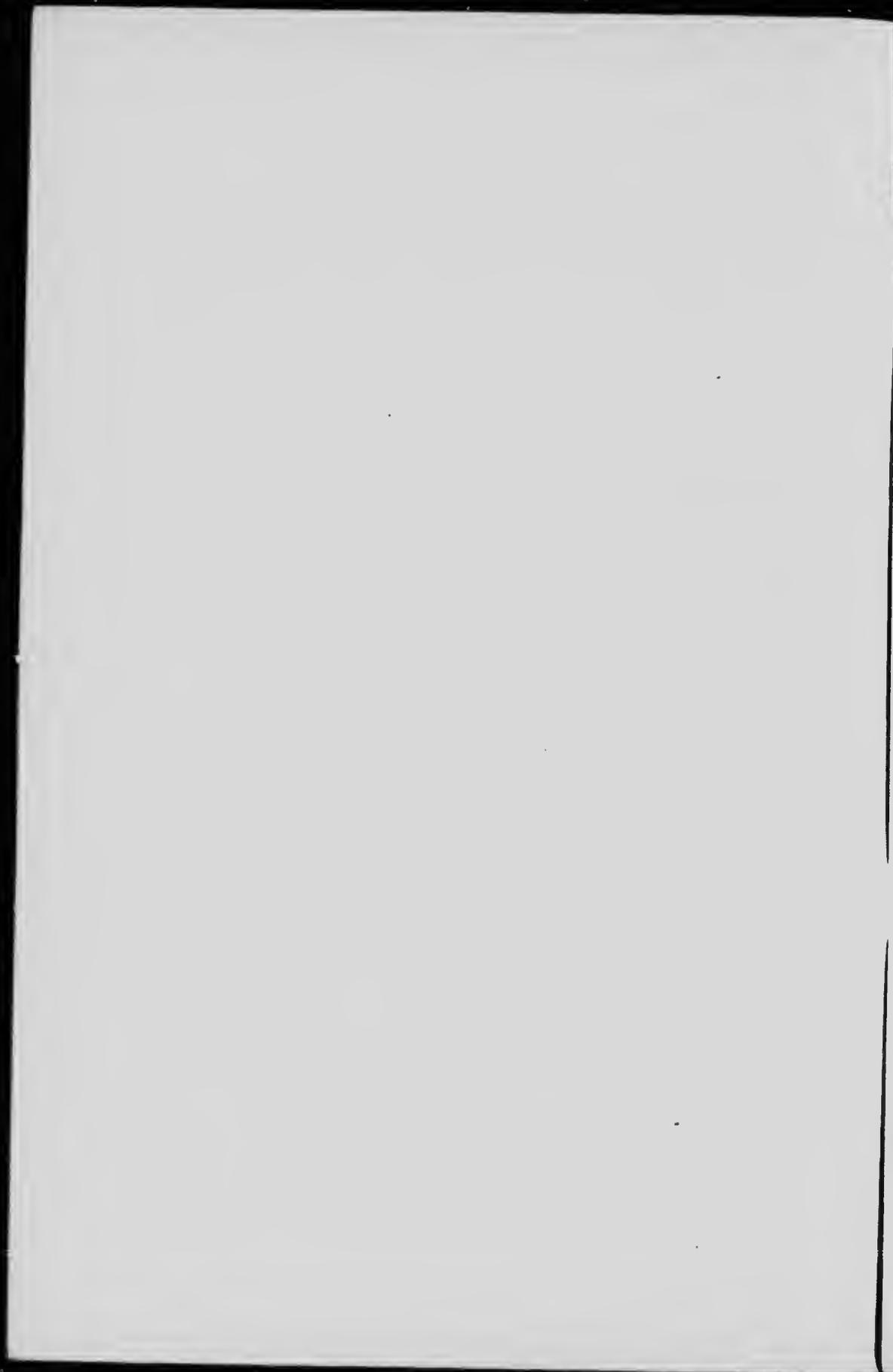
SIR,—I have the honour to submit herewith bulletin No. A 7 of the series of the Tobacco division, entitled 'Bright Tobaccos,' which contain the observations made in the course of a tour through Virginia and North Carolina at the beginning of last fall.

The information presented in this bulletin will be useful to Canadian farmers who desire to try the growing and curing of such tobaccos, and I recommend that it should be printed for distribution.

I have the honour to be, sir,  
Your obedient servant,

F. CHARLAN,  
*Chief of the Tobacco Division.*

OTTAWA, June 10, 1909.



# BRIGHT TOBACCOS

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## A TOUR THROUGH SOUTH VIRGINIA AND NORTH CAROLINA

By F. CHARLAN

### VIRGINIA.

The object of this trip was to ascertain the nature of the soils on which bright tobaccos are produced, the varieties grown and the methods of curing in use. One of the best growers of the district, to whom we had been directed on the strength of letters of introduction from Canadian tobacco manufacturers, put himself entirely at our disposal, and gave us an opportunity to study the curing of two crops, from beginning to end.

*Soils.*—There are two distinct classes of soils in the district, known respectively as 'red soils' and 'grey soils.' The red soils, thus called on account of their deep red brick colour, are more or less light or heavy according to the districts. The gray soils are much lighter in colour, and some of them have a yellow hue. The subsoil generally consists of clay mixed with a rather large proportion of gravel. The surface soil is comparatively shallow. Nothing has been done to keep up the supply of humus, the land having been cropped for years without any returns being made, and the depth of tillable soil, or ploughed land, is not increasing, owing to the shallow ploughing in use (5 or 6 inches).

For the growing of tobacco, the lightest loams, as light coloured as possible, and poor in lime, are selected. These soils, which consist of rather fine sand, of a light yellowish gray colour with a clayey and almost impervious subsoil, are found among the gray soils.

However, the drainage offers no difficulty, as the country is very uneven, and the tobacco is generally grown on slightly inclined hillsides. Sometimes also, red soils, more or less deep in colour, are used for the growing of tobacco, but it has been observed that the products obtained are coarser, and do not easily take the required colour while curing.

We experienced a great deal of difficulty in getting farmers to name the varieties they were growing. Generally speaking, the growers have produced their own seed for a number of years, and an average type appears to have become established in the district. However, the various varieties grown in the vicinity of Danville: Big and Little Oronoko, Warne, Sweet Oronoko, White Oronoko, White stem Oronoko, and even Flanagan,—can all be traced back to one primitive type—'the Oronoko,'

slightly modified by the various methods of culture and the nature of the soils. The Yellow Prior seems to be a hybrid; the products of this variety have a good colour, but they are larger and have coarser fibres than products of other varieties.

But the dealers do not seem to attach much importance to the question of variety. Qualities of tissue (elasticity, resistance, colour, gum) and aroma are the chief consideration. Nor do they concern themselves about the shape of the leaves, provided the width is sufficient. However, an exception should be made for some varieties well known for their narrow leaf, such as Flanagan, One Sucker, &c., but colour and body appear to be the chief characteristic qualities of bright tobaccos. In a well grown crop, the aroma generally bears a close relation to body and elasticity.

Apparently, the grower endeavours to obtain a leaf well filled, elastic, not too thick, and with a good colour. Such products generally give a good yield per acre, and obtain a good average price, leaving a fairly good profit. Although fancy tobacco commands a high price, it does not seem to be always profitable for the grower to go in exclusively for colour.

*Manuring.*—Fertilizers are used very sparingly. Generally speaking, growers are opposed to the use of barn-yard manure on the ground that it tends to produce fibrous tobacco, with a poor texture and a poor colour, the product being slow to ripen and hard to cure.

Barn-yard manure is therefore generally applied only in very small quantities, commercial fertilizers being chiefly used at the rate of 500 to 1,000 lbs. per acre. The fertilizer is spread around each plant with a spoon, or simply buried under the low ridges on which the tobacco plants are set.

However, it is a question whether a somewhat thicker plantation, with a normal application of manure, would not give as light products as those that are obtained with this system of half manuring, which leaves the soil exhausted and makes it difficult to follow a good rotation.

The following is the average composition of the chemical fertilizers used by the tobacco growers of the district: Nitrogen, 3 per cent; phosphoric acid, 8 per cent; potash, 4 per cent. As will be seen, there is a large excess of phosphoric acid, which can be utilized only if the rotation includes a grain crop.

However, rotations are not altogether unknown. On this particular farm, where most of our observations were made, a two years' rotation is in use: tobacco and grain. Sometimes grain is followed by clover, but it is claimed that tobacco grown after clover ripens slowly and does not readily take on the right colour in curing. Sometimes two crops of tobacco are followed by one crop of grain. Very few cattle are kept on the farms around Danville. Horses or mules are used for farm work. Farm help almost exclusively consists of coloured people, and the salaries range from 50 cents to 75 cents per day.

*Seed-beds.*—The area where the seed-beds are to be established is previously burnt with wood fires. The beds are sown by the end of April. Canvas, stretched above, is used for shelter.

*Setting the plants.*—The plants are set 3 feet or  $3\frac{1}{2}$  x 3 feet apart, on small ridges. The setting is generally done by hand.

The seedlings are generally ready for planting by the beginning of June, and the setting is done any time between the 25th of May and 20th of June. Cutting and harvesting take place between August 25 and September 15. Therefore, the tobacco remains on the land from 90 to 100 days.

*Cultivation and care of the crop.*—The crop is apparently well cared for. Weeds were rather scarce at the time of our visit and the plants free from suckers. Cultivation is started early, and continued at intervals so as to keep a loose layer of soil, or a 'mulch' over the surface of the ground at all times. This mulch is very useful; it keeps a sufficient supply of moisture in the rather shallow surface soil, and enables the crop to withstand droughts. The plants are hilled pretty thoroughly with a light single mould-board plough.

Priming is the general practice; sometimes also a 'cleaning' is done before hilling. The time at which this 'cleaning' or first priming is done, varies, but the 'thinning' or 'priming' proper is generally done at the same time as 'topping.' Some growers prime later in the season and harvest and cure the leaves that have been removed instead of leaving them upon the ground. The product obtained is called 'lugs.' It is a very poor product and for which only a low price can be had. The 'lugs' are marketed in the same time as the stocks left over from the previous year. However, the best growers prefer to prime earlier, and do not pay any attention to the lower leaves taken off.

In other cases, priming is done only on a moderate scale, and a part of the lower leaves remaining are cut towards the end of July or the first days of August to be cured after the ordinary process of 'flue curing.' The products obtained are called primings. Considering the work it entails, it is doubtful if this practice would pay in a country where help is somewhat costly.

*Topping.*—Topping is done early, as soon as the terminal bud shows a tendency to shoot out. A plant properly primed and topped generally bears from 8 to 9 leaves. This number is considered as the most satisfactory; it is feared that a larger number of leaves would give products lacking in body, or ripening too early. The aim is to get top leaves as large as possible, and ripening early.

*Cutting and harvesting.*—The cutting is done between the 20th of August and the 15th of September. It is generally over by the 31st of August in favourable years.

The tobaccos are cut when very ripe. A double-bladed well-sharpened tool, lightly bent at the point, is used for this operation. The stem is first split from the top to the bottom, to within a few inches from the ground, then cut across close to the ground. Plants split in this way can be put astride the laths on which they are taken to the curing shed and hung in the latter. They are strung upon the laths immediately after being cut, and at once taken to the curing shed. No time is allowed for wilting or drying in the sun.

Sometimes, but very seldom, special wagons, fitted with racks, are used for hauling the laths of tobacco to the shed. Generally a flat car is used, on which the laths loaded with plants are carefully laid. Two heaps are made, if the length of the car permits it, and in these heaps the plants are always placed, the tips of the leaf inside.

The curing sheds are generally within close proximity of the tobacco fields, but, in certain cases, the tobacco has to be hauled one mile or more.

*Curing sheds.*—The curing is done in tight sheds built specially for the purpose and made of square logs. The cracks between the logs are filled with clay.

The roof of these sheds is slightly slanting. Small openings are left at the top for the excess of moisture to escape. The building is laid on a stone foundation, through which are left openings communicating with the fireplaces, built outside. Through the lower part of these curing houses pass two galvanized iron pipes, of 10 or 13 inches diameter, laid in such a way that the heated air produced by fuel (generally wood) burning in the outside fireplace may circulate twice in each pipe.

The smoke escapes on the side where the fireplaces are, the return pipe being slightly higher than the top part of the opening to the fireplaces.

Curing sheds are of various sizes. The average dimension is 24 feet square and 20 feet high at the wall plate. This is considered as a large shed; it would be hard to heat evenly a larger bulk of tobacco. Strong poles, several tiers high, are laid inside, at 4 feet intervals from pole to pole, and 3 feet from tier to tier. The laths holding the plants are placed upon these poles. The distance left between the laths varies from 7 to 10 inches according to the size of the products and their condition when put in the curing shed.

The number of stories or tiers of poles varies according to the height of the building. Each tier is placed 3 feet above the one below. The first or lower tier must be placed at such a height that the tobacco hung up will be at 6 or 8 feet from the floor of the shed. This space is necessary to allow for the examination of the products from time to time and to avoid the immediate contact of the lower leaves with the heated pipes, which would result in their being over-heated. There are two doors in the shed, opposite each other, in an axis perpendicular with the direction of the pipes.

The furnaces or fireplaces intended for the heating of the curing sheds are generally built of bricks. They start from the outside of the curing shed and run across the stone foundations. They are 12 inches square, inside, and 6 feet long as an average (length of the sticks of wood used as fuel). The pipes or flues through which the hot air generated circulates fit closely in the inside opening of the furnace. It is important that the fitting be very close, otherwise the tobacco might take a smoky taste.

*Curing.*—The curing shed should be filled as rapidly as possible so that all the plants which it contains may be exactly in the same condition as regards humidity and maturity.

Sometimes when the tobacco is not as ripe as desired, the doors of the curing shed are closed immediately after filling, before the fires are made, for 24 to 36 hours. A kind of wilting is thus secured, after which the light colour desired is more easily obtained.

The tobacco which is thus left for a rather long time in a close atmosphere, does not appear affected. The advanced stage of maturity probably prevents the pole burn or pole rot which would inevitably occur in other kinds of tobacco, cut less ripe for special uses, and holding therefore a larger proportion of water.

The curing of tobacco by the 'flue curing system' comprises several phases. The temperature is gradually increased in each succeeding phase, until the desired colour is obtained, and the stems and the ribs are completely shrunk.

The first phase is the 'yellowing' or 'wilting.' It is done at a comparatively low temperature—about 90 or 95 Fahr.—and takes from 24 to 36 hours according to the degree of maturity of tobacco and the outside atmospheric conditions. The temperature should not be increased too rapidly, or the result would be green tobacco which could never regain the light yellow colour desired.

It is rather difficult to tell when the operation is over, for in most cases the leaves do not show a straight yellow colour. As a matter of fact, the leaves of the lower tier are greenish yellow, and the tips of some are even slightly brown.

During the whole curing process, the tobacco should be kept elastic. A leaf, on handling, should give the same sensation as a warm and damp rubber leaf.

The next phase is called 'fixing the colour.'

The temperature is put up gradually to 100 degrees and, slowly, to 120.

During this phase, the leaves dry gradually, while retaining the yellow colour they showed at the moment the temperature was being increased. The operation should go on slowly, so that it may proceed gradually from the edge of the leaves to the mid stem; the time necessary is about from 18 to 30 hours (24 hours as an average).

This is the delicate phase of the operation. Should the temperature be increased too quickly or too slowly, or should the humidity be too high or too low inside the curing barn, injuries are to be feared which greatly damage the colour and the texture of the products. Chief among these are 'sponging' and 'blotching.' Sponging is caused by too high a proportion of humidity in the curing shed resulting in a condensation of moisture over the surface of the leaves. Blotching seems to be due to too high a temperature, and too dry an atmosphere, which causes the exterior part of the tissues to harden, and stops the circulation of water in the leaf, making the latter swell.

An expert curer is able to detect the first signs of these injuries, and he at once checks their spread by regulating the fires and ventilation in such a manner as to maintain the proper conditions of temperature and humidity.

Some expert curers distinguish two phases in this part of the curing. The first, from 90 to 100 or 105 degrees, is called 'fixing the colour.' This is comparatively short. The other, from 100 to 120 degrees, is called 'curing the leaf.' The curing of the leaf tissue takes place during the latter phase.

The third phase is the 'curing of the stem.' When the leaf is completely dry, and the desired colour is fixed, the temperature may be increased rather rapidly without much danger.

The stem is then dried, and for this the temperature is gradually increased from 120 degrees to 140 degrees. This operation requires from 6 to 13 hours.

The fourth phase of the process is the 'curing of the stalk.' This is done by increasing the temperature gradually, but rather quickly, to 140-175 degrees, some-

times as high as 180 degrees, until the stalk is completely dry. This operation requires from 12 to 24 hours, according to the size of the stalk.

When the curing is done the fires are slowly extinguished, and the tobacco is cooled down to the outside temperature, the doors being opened if required.

During the various stages of the curing process the temperature is ascertained by consulting a thermometer hung up in the centre of the shed, at the level of the lower tier of leaves. At no time during the curing operations which we watched did we observe an abundant transpiration; the curing shed was frequently opened for the examination of the thermometer. It may be that the partial ventilation obtained by this opening of the doors is favourable to the successful carrying on of the operation.

The heat given off by the fireplaces is regulated by increasing or decreasing the number of sticks of wood, and by pushing them more or less inside the furnace. A slow fire is started, kept going with a stick placed at the front part of each fireplace; towards the end of the curing, a clear wood fire is made and the sticks are pushed in 5 or 6 feet inside.

The wood used for fuel is hard, very dry. It is prepared a long time beforehand.

Experts are of opinion that curing sheds, made of boards and heated by coal fires or by steam, will give just as good results as the shed above described. The price of the fuel has to be taken into account, and in parts of Canada where the growing of Virginia tobacco is possible, heating with steam on a fairly large plantation may be found more profitable than heating with wood, on account of the cost of the latter.

We have only briefly mentioned the extremes of temperatures at which the tobacco is submitted during the various phases of the curing. However, specialists will note that the temperatures given are the same as those employed in the various processes in use for the fire curing of bright tobacco. In fact the methods differ little. They are all based upon the same principle: Colour the leaf yellow by artificial wilting at a low temperature (90 Fahr.), then dry it so as to fix the colour, while taking care to avoid the oxydizations, to which damp tobacco is liable in the course of the slow curing which is obtained by hanging in the open air. The chief difficulty is to obtain favourable conditions of temperature and humidity in the second phase of the process, these conditions varying with the season, the nature and the degree of ripeness of the products. In some cases the curing may be effected in three days, while in other cases it may require 4 to 5 days. To determine the best method of curing among the various processes in use, a special study of the tobacco of the district is necessary.

As a matter of fact, each grower utilizes a special process, and this process undergoes a multitude of modifications according to the nature and the quality of the crop and the atmospheric conditions prevailing.

*Preparation for the market.*—As soon as the curing is completed, the fires are stopped, and if the weather is fine the doors are opened.

Sometimes the colour of the tobacco is still slightly on the green side; or, again, the leaves break on being handled. The bright yellow colour develops quickly enough, especially if the weather is warm and not too damp. When the nights are fine and warm, the sheds may be left open, which hastens the growth of the colour.

To supple the leaves, the shed is left open at night, the leaves then become easy to handle, and the curing shed can be emptied if it is required for another curing. One night is enough for the tobacco to become supple. When the weather is damp, it is better to close the shed as the colour would become too dark.

If the curing shed is not required for another operation, the tobacco may be left there for a few days, no particular endeavour being made to supple the leaves. On fine, calm days, the doors are opened, and the colour gradually improves, until it becomes a fairly uniform light yellow.

When the curing shed is required at once, the cured products are taken to a special shed, used as a storehouse, and equipped in about the same manner as the curing shed. They are sometimes piled in heaps upon the floor until the yellow colour has developed, after which they are hung up, the laths, this time, being put as close as possible to each other. In this way, one storehouse, not larger than one curing shed, will hold the contents of 4 or 5 sheds. While the plants are in this condition, the colour still improves slightly. Tobacco stored in this fashion should not be too damp, otherwise the colour would become darker, or again heating might occur.

The best growers dig a cellar in the ground, under the storehouse, which they utilize for suppling the tobacco when the time has come to assort the leaves prior to sending them to the market.

A rough sorting of the tobacco is done by the growers themselves. The leaves are divided into various grades known as 'lugs,' 'fillers,' and 'wrappers.' This sorting is generally done over and completed by dealers and packers, but such as it is, it greatly facilitates the sale of tobacco in the warehouses.

*Marketing.*—The lugs, and sometimes the primings, are sold in a loose condition, unsorted and not tied into hands, but the best quality of tobacco is always sorted and put into hands. In both cases, an auction sale is made in the warehouses, which are put at the disposal of the growers, and the latter are at liberty to fix a minimum price below which no sale can be effected.

Individual lots offered for sale are sometimes very small, especially at the beginning of the season. The lugs and primings are sold first, and then good tobacco is offered. Judging from the size of the lots offered, either the crops are very small, or else the tobacco is marketed by wagon loads, and small loads at that. However, it should be stated here that some of the roads which lead to Danville are sufficiently accidented to make somewhat heavy loads an impossibility.

*Prices.*—Prices vary considerably according to the quality of the products and the requirements of the market. The average price for the last few years was 10 cents to 11 cents. The lugs are sold sometimes 2 to 3 cents per pound, while some 'fancy' tobacco will fetch prices sometimes as high as 35 or 45 cents.

*Yield in weight per acre.*—The yield is very small on account of the long distances at which the plants are set, and the small size of the products; the average yield is below 700 lbs.; 800 lbs. is a very good crop.

*Money returns and net profits.*—Judging from the figures quoted above, the average money return of an acre of tobacco would be about from \$70 to \$75. This is

the return for the average grower of the district, but there are some expert growers who manage to get a much heavier yield per acre and who sell their tobacco at prices ranging from 20 to 25 cents. In this case, of course, the returns are much above the average.

The cost of production, even with coloured help, is rather high. It may go to \$30 or \$35 an acre, fertilizers included. To this must also be added the interest on the value of the land and of the special buildings required for curing, which the companies refuse to insure against fire.

However, the sum of \$30 to \$35 may be taken as a pretty close estimate of the net average value of the yield per acre.

In some years, the average price of tobacco has gone down as low as 6 cents per pound. How precarious must have been the situation of some Virginia growers in those years may readily be realized.

## NORTH CAROLINA.

Judging from what we saw at the various growers and packers which we visited in North Carolina, the tobacco grown in this part of the States is, as a rule, coarser than the South Virginia tobacco.

However, our observations were limited to the vicinity of Winston-Salem, and the warehouses of this city. While proceeding by train from Danville to Winston-Salem, we saw a number of tobacco fields, each generally covering a small area, and which were being harvested. We also noticed that the so-called 'red soils' are not so often met with in North Carolina as in the part of Virginia which we had visited.

Near Winston, we visited a grower who was curing a part of his crop, and we observed that he made the 'yellowing' phase last about 12 hours longer than the South Virginian grower on the farm of whom we had made a close study of the process of flue curing.

It would seem that this Carolina grower carries on the latter part of this operation rather slowly, as reddish leaves could be seen in a good many plants, although, judging from the condition of the rest of the crop still standing they were very ripe when harvested. The cause of this red colouration of the leaves was attributed, by a dealer who had kindly accompanied us to the grower in question, to an excess of humidity in the curing shed. Slow curing in an almost saturated atmosphere would cause it, rather than an insufficient ventilation which might have resulted in blooming.

*Ohio.—A visit at the Experimental Station of Wooster.*—Our return trip had been planned through the State of Ohio so as to give us an opportunity to visit some fields of Zimmer Spanish. We stopped at Wooster, to visit the Experimental Station, and were very courteously received by Professor Shelby, who gave us full particulars as to the work of the station. Unfortunately we learned that the experimental

plots were at a great distance from the station, and that we had passed them South. As the time at our disposal was rather short, and as the crop of these plots had been harvested, we thought we would not go back. But we were shown samples that had been prepared in view of an exhibition at Columbus, Ohio. These samples, partly composed of hybrid Zimmer-Cuban, were of an average size, with a rather fine tissue and, being well cured, they had a good flavour and a pleasant aroma. However, trial cigars proved a little strong in taste.

The same special aroma which characterizes the Quebec and Pennsylvania tobacco, and which might be termed 'the aroma of northern tobacco,' is also found, but in a still more pronounced degree in the Ohio products. These cannot be used as fillers before they have undergone a very thorough sweating.

Judging from what we learned regarding yields and methods of culture in Ohio, we are of opinion that, in size of products, yield in weight, or qualities of tissue, so far as the Zimmer-Spanish variety is concerned, the province of Ontario, or at least the counties of Essex and Kent, could easily compete with the state of Ohio.

However, the question of aroma has yet to be examined, for, although the aroma of the Zimmer-Spanish from Ohio is not one of the most delicate, yet, such as it is, it suits a certain class of smokers, and consequently a number of packers, which insures its ready sale. This question will be solved only when some Canadian dealer will undertake to carry on some experiments in sweating with the Zimmer-Spanish from Ontario.

Again, it is possible that our Zimmer-Spanish, on account of their large size and their comparatively fine tissues, would form only an intermediate type, coming halfway between fillers and binders. In this case the shortest leaves would probably make lighter tobacco for fillers than the Ohio products, but the binders might possibly be too coarse and show too high an aroma, and it is doubtful if they could compete successfully with the Comstock Spanish and the Havana seed leaf. The latter will probably have the preference.

*Practical conclusions.*—Knowing that, in an average year, varieties requiring from 95 to 100 days to reach maturity may be successfully grown in some parts of Canada, there seems to be no reason why we should not attempt to grow varieties of the Virginian type. Such is the conclusion to be drawn from the observations made in the course of our mission.

Possibly, owing to the difference in climate, the product may develop a different aroma, inferior perhaps. But, even in this case, the tobacco obtained will be utilized in certain branches of our industry, either as fillers or as wrappers. That all soils are not suitable in the same degree for the growing of these varieties is well known. Dark or heavy clay soils, or too rich in lime, should be avoided. However, judging from the results of experiments carried on in Essex, there is no doubt that suitable soils may be found in Ontario.

The growing, on a reasonable scale, in Ontario, of tobacco of the Virginia types, with a corresponding reduction in the growing of Burley, would do away with the over-production witnessed during the past two years, and thus greatly improve the

situation of the grower. Let us add that, with the protection granted to Canadian tobacco, the prospects of the Ontario grower are much brighter than those of his Southern competitor.

