1893

Tobacco growing in Louisiana: with results of experiments at Calhoun, La.

William Carter Stubbs

W. M. Sheparson.

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No. 20.

BULLETIN

OF THE

NORTH LOUISIANA EXPERIMENT STATION,

WM. C. STUBBS, Ph. D., Director.

TOBACCO GROWING IN LOUISIANA,

WITH

Results of Experiments at Calhoun, La.

BY

WM. C. STUBBS

AND

J. G. LEE.

ISSUED BY THE BUREAU OF AGRICULTURE.

H. C. NEWSOM, Commissioner.

BATON ROUGE, LA.

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LOUISIANA STATE UNIVERSITY AND A. AND M. COLLEGE.
Baton Rouge, La., Jan. 30, 1893.

Hon. H. C. Newsom, Commissioner of Agriculture, Baton Rouge, La.:

Dear Sir—I hand you herewith a treatise on Tobacco, consisting of an essay upon "Tobacco Growing in Louisiana," read by me before the State Agricultural Society, at its seventh annual session held in Mansfield, La., and the report of Major J. G. Lee, Assistant Director of North Louisiana Experiment Station, Calhoun, La., of the experiments in tobacco made at that Station. These experiments have been pre-eminently successful and emphatically show that the light lands of Louisiana can grow the finest type of yellow leaf tobacco in remunerative quantities.

Please publish as Bulletin No. 20, and oblige.

Respectfully submitted,

WM. C. STUBBS, Director.

TOBACCO GROWING IN LOUISIANA.

Among artificial stimulants, yielding powerful alkaloids, tobacco holds the first place in the estimation of the world. Not quite four centuries ago the American Indian alone enjoyed its charms. Teaching its uses to the Earlier Settlers, it soon became known to civilized Europe, and king and peasant alike became votaries at its shrine. Spreading like a contagion it has enveloped the world and to day every nation and people yield to its marvelous fascinations in one or more of its forms of use, either as smokers, chewers or snuff-takers. It is a curious fact that civilization has not multiplied its modes of use. Columbus saw on his first voyage to Cuba in 1492 the natives smoking it, and on his second visit taking it as snuff, while the Spaniards upon landing in Paraguay in 1503 were opposed by natives "beating drums, throwing water, chewing herbs and spitting the juice toward them."

Many species of the tobacco plant are known to Botanists, but only one is cultivated in this country, *Nicotiana Tabacum*, Linn. This plant has been grown from the earliest colonial times and has added greatly to the material prosperity of many States. In 1519 it was discovered growing near Tabasco. In 1559 Hernandez de Toledo, a Spaniard, introduced it into Spain and Portugal, and in the same year Jean Nicot, Envoy from the Court of France to Portugal, forwarded seeds of this plant to Queen Catharine de Medicis, and from this circumstance it was popularly called *Herba Regina*, and botanically, *Nicotiana*. In 1565 Sir John Hawkins introduced it into England from Florida. Hariot, who was in the first expedition which discovered Virginia, mentions this plant as growing wild and the uses made of it by the natives, "by sucking the smoke thereof through clay

pipes into their stomachs and heads." It was a common custom among the natives to hang up the leaves in their habitations to be dried by the heat and smoke of their fires.

Sir Richard Grenville in 1585, and Sir Ralph Lane (commissioned as the first Governor of Virginia) in 1586, both carried with them on their return to England pipes and tobacco. To these gentlemen and not to Sir Walter Raleigh as is generally supposed, belongs the honor of introduction of tobacco in England. John Rolfe, the husband of Pocahontas, the Indian Princess, is credited with the first systematic culture of this plant in 1612 at Jamestown. In 1616 its cultivation was begun by the Virginia colonists for profit and since that time it has been a leading agricultural industry of this country. Its cultivation has become so extended that only the States of Idaho, Nevada, Rhode Island and Wyoming and the territories of Oklahoma and Utah are reported by the census of 1890 as not producing it.

The State of Kentucky leads in the quantities produced, being nearly one-half of the product of the country, while Louisiana, with her farfamed Perique, far excels in the average value per pound. The total production of the United States in 1889 were 488,255,896 pounds grown upon 692,990 acres and by 205,862 farmers and worth $34,844,449. The average yield per acre was 705 pounds, ranging from 375 pounds per acre in North Carolina to 1402 pounds in Connecticut. The average area cultivated by each planter was 3.37 acres, and average production of each planter 2372 pounds. The prices ranged from 4.5 cents per pound in Missouri to 14.2 cents per pound in North Carolina and to 25.2 cents per pound in Louisiana for her peerless Perique.

These statistical figures are given to show that tobacco is grown in all latitudes, and that the value of the crop depends not upon the pounds per acre grown but upon the excellence of the product; that a few acres carefully grown and skillfully cured, may bring more clear profit than hundreds badly cultivated and improperly handled. In no crop are there greater variations in prices than in the tobacco leaf market. In the great tobacco marts it is not uncommon to find "lugs" selling

at 3 to 5 cents per pound, while handsome yellow leaf or cigar stock will command simultaneously 50 to 75 cents per pound. Before growing a crop of tobacco in any country, it should be intelligently determined what class, type or grade can be grown, and then bend every energy in the securement of the best of each. Soils and climate determine to a large extent the kind of tobacco which can be grown, but a proper selection of seed, careful culture and improved methods of curing will modify this kind as to texture, flavor, color and general structure. A knowledge of the proper fertilizer, or the proper manner of handling a curing process may enable the grower to add several hundred per cent. to the value of his product, while a deficiency of information on these points may cause the grower to destroy the very quality which gave this increased price.

The basis of a class is its adaptation to a certain purpose. Our trade recognizes to day three general classes, viz: 1st. Domestic cigar tobacco and smokers. 2d. Chewing tobacco. 3d. Export tobacco. These are again divided into *types*, which represent certain qualities or properties in the leaf, as color, strength, elasticity, body, flavor, etc., or in the methods of curing, as sun cured, air cured or flue-cured. *E. G.*, under head of first class, we have on our markets, Connecticut seed leaf, Pennsylvania seed leaf, New York seed leaf, Ohio seed leaf, Wisconsin and Illinois seed leaf, and recently Florida seed leaf, while Burley lugs, Virginia and North Carolina lugs, used for cigarettes and smoking tobacco. Under this class may also be included our Louisiana Perique type.

Under the second class we have the various types used for fine cut and plug fillers. The fine yellow wrappers made at Calhoun are included under this class among the plug wrappers.

Under third class are included the various types that are demanded of us by foreign purchasers. Each country demanding a different type for its consumers.

Grades represent the degrees of excellence in a type, as low, medium good, or fillers, binders and wrappers. In the finer types there are many grades, while the export trade demands only leaf and lugs. A district may produce but one type, and

that referred to several classes. The fine yellow type of tobacco grown last year at Calhoun, in this State, may be used for either smoking or chewing, and therefore may be placed into two classes, and if an export demand for it should be created, it would fall in all three.

Before considering the adaptability of Louisiana to tobacco growing, it would be well to premise that soils more than any other factor determine the kind of tobacco grown. It has been clearly shown that both color and type of the cured leaf, are correlative to the soil upon which it is grown. The lighter sandy soils produce the milder lemon leaf, now so fashionable, while the dark stiff soils, especially those containing much clay, produce the stronger, heavier and darker types. All varieties cure dark brown or red when grown on red clay soils with heavy dark or brown top soil, but incline to brighter and lighter hues on gray sandy lands with yellowish subsoils; hence our different colors of red, mahogany, and yellow leaf. Fresh lands produce brighter and lighter leaves than old land. So great is the effect of soils, that the purity of seeds of any variety can only be maintained by preserving seeds from the soil which produces its original and most perfect type. Again, tobacco seed introduced into a district, like other plants, becomes acclimated, and by careful selection yearly, a specially adapted variety may be obtained, which, when properly grown and cured, may find a place in our markets among the highest and best types. In this way the famous Connecticut seed leaf and Kentucky White Burley originated.

Can Louisiana grow tobacco? Yes, the tobacco plant possesses in an eminent degree the faculty of adapting itself to all soils and all climates. In this respect it rivals our Indian corn, another contribution from our savage predecessor, and excels the Irish potato, also of American origin. These three native plants thrive best upon soils rich in potash. In every section of the Union, upon well drained lands, wherever Indian corn and the Irish potato will grow, there can tobacco be produced, with this difference, however, of strongly marked diversities of qualities, superinduced by variations in soils and climatic conditions.

The best types of yellow tobacco in the Southern States are grown upon light sandy soils, deficient in vegetable matter. They are low in albuminoids, but fairly rich in nicotine. In the Northern States the best types are produced upon rich lands heavily fertilized with nitrogenous manures in order to promote rapid growth and early maturity. These too, are poor in albuminoids, burn readily without offensive odor and are also not deficient in nicotine. Such similar results from dissimilar conditions can be chargeable only to climate. Another striking feature may be noted. Suitable commercial fertilizers are largely used in the South for increasing the yield per acre, without improvement of quality, while in the North the same fertilizers are used with constant success in the amelioration of both quality and quantity. Everywhere, as far as tested, well rotted stable or lot manure has been successfully used for both increasing the quantity and quality of tobacco.

The question asked above should therefore be changed to read: Can Louisiana successfully compete with other States in the growth of the best types of tobacco? Let us examine our environments and learn whether our State can offer soils and climatic conditions equal to those of other States, where the choicest types of tobacco are grown. In chemical properties our soils are pre eminently superior. In physical qualities some of them are defective, yet susceptible of easy amelioration.

A hasty geological review of Louisiana will aid us in reaching a conclusion. Louisiana is situated between Meridians 89° and 94° W. Longitude, and parallels 28° 56' and 33° North Latitude with an area of 45,420 square miles. The climate is much less severe than the States North of us, due to proximity of the Gulf and prevalence of winds therefrom. The average summer temperature at New Orleans is 81.6°, at Shreveport 81°. Winter average, 52.8° at New Orleans, and 45.4° at Shreveport. Occasional cold snaps, the tail end of blizzards from the Northwest, prevent the extensive culture, otherwise possible, of tropical fruits. The rainfall at New Orleans is about 70 inches, at Shreveport 47 inches. Climatically then we should grow tobacco well, particularly that type, which requires a long season to

properly develop its attractive qualities. Our climate permits of the growth of two good crops upon the same ground yearly, and our experiments have fully demonstrated its feasibility.

Only 20100 square miles of our territory are alluvial. Strictly speaking, a large portion of the flood plains of the Mississippi and Red rivers are not alluvial. These rivers "have cut their beds through strata of dark colored clays which extend from the gulf coast to Memphis and Shreveport." These clays were deposited at a time when the whole of the valley was a swamp, with its waters moving sluggishly without any definite channels. These clays frequently come to the surface and form extensive fields of buckshot soils, wholly and entirely different from the alluvial deposits made by the present rivers. They are the older strata of the Champlain epoch, whose higher strata have an extensive development in the bluff lands and cone hills of East Baton Rouge, Livingston, West Feliciana on the east, and Richland, Franklin and West Carroll on the north, a series of insular hills running down to the gulf and terminating in the five islands of Southwest Louisiana, besides forming the soils of the Attakapas prairies. North of these prairies and participating in the general southward dip of the State is the stratified drift, capping our highest hills, giving sand and gravel extending over much of Middle, Western and Northwestern Louisiana. It is seen in the bed of the Mississippi river above Port Hudson and is found overlying the salt beds of Avery's Island. North of this comes the Tertiary formation. The most southerly of these the Grand Gulf group of various kinds of clays, which rise into a series of high hills extending from Sicily Island on east through Catahoula, Grant, Natchitoches, Sabine and Vernon parishes to the Texas line. Next comes a narrow belt thirty miles wide of prairie limestone, emerging in patches of varying size, giving us examples of tertiary calcareous soils of great fertility. To the North and West comes the lower series of the Claiborne group of the Eocene period of the Tertiary age, giving us the "lower lignitic," with its immense lignite beds, the marine Claiborne with its wealth of green sand and calcareous marls, and the upper lignitic of the eastern part of North Louisiana.

Over all of these are thrown, first the "gray clays," typified so well at Arcadia in Bienville parish, and appearing at the crust of nearly every hill in North Louisiana crossed by the wagon roads and forming many of the soils of the smaller bottoms. These clays are every where superimposed by the orange sands or Lafayette group of the Quarternary, furnishing nearly everywhere in North Louisiana the surface soils of yellow sands, sandy clays and red sandy clays. At the junction of these sands and the gray clays occur petrified trees almost in perfect preservation as to outline and character. In the Western, Eastern and Southern portions of North Louisiana these yellow sandy clays are more or less mixed with the sand and gravel of the drift. Running across the State from northwest to southeast mainly at subterranean depths with only an occasional outcrop is the geological backbone of Louisiana, the cretaceous formation. It occurs 1100 feet below Shreveport, furnishes the salt wells of Bienville Winn and Grant and reappearing in South Louisiana gives us the salt of Avery's Island and the sulphur and oil of Calcasieu.

This hasty geological review shows that of the numerous formations occuring in this State, four of them only take part to a large extent in the formation of the soils of the State. With the exception of limited areas scattered here and there throughout the Northern and Western part of the State, we may say that the soils of this State are divided mainly into four distinct kinds:

1st. The alluvial (with several subdivisions) covering nearly one-half of the State, including the Mississippi bottoms, the Ouachita and Red river bottoms and their tributaries.

2d. The "bluff" or Champaign formations with three subdivisions, the black, brown and sandy loams, furnish the soils of East Baton Rouge, West Feliciana, Livingston, West Carroll, Richland and Franklin with occasional outcrops from Morehouse, through Catahoula, Grant, Rapides, Avoyelles to St. Landry, where it spreads out and forms the soils of the Attakapas prairies, covering parts or the whole of the following parishes:

St. Mary, Iberia, St. Martin, Lafayette, Acadia, St. Tammany, Calcasieu, Vermillion and Cameron.

3d. The yellow loams, or red sandy clays, of North Louisiana covered by the agricultural classification of "Good Uplands," the region of short leaf pine, mixed with oak and hickory. These soils vary from yellow sands to red sandy clays, and are easily cultivated and susceptible of the highest improvement. The parish of East Feliciana and the hill parishes of North Louisiana are mainly occupied by soils of this class.

4th. The sands and gravels of the drift. The soils of this formation, in two subdivisions, cover the Florida Parishes, save those already mentioned, and the long leaf pine region of Calcasieu, Vernon, Rapides, Natchitoches, Sabine, Grant, Winn and Catahoula.

The last two classes are denominatod light soils, the second from heavy to medium, and first heavy to stiff.

From a study of the tobacco plant we find that the last two classes are eminently suited for the growth of the finest type of yellow leaf. A similar soil in Florida is producing a most excellent quality of smoking leaf. Perhaps the long leaf region of this State would excel in the production of the Havana leaf, and experiments made at Hammond, on the Illinois Central Railroad, would seem to verify the belief. Experiments made at Calhoun the past year, an account of which will be given later, show that the yellow sandy clays of North Louisiana produce in paying profitable quantities, a most excellent type of yellow leaf, suitable for wrappers, binders, fillers and cigarette stock. On these two classes of soils we are certian of great success in tobacco raising.

The third class of soils must be restricted to growing dark cigar leaf or black plug tobaccos. The former is quite profitable, while the latter is too low in value to warrant increased cultivation. Upon the bluff lands of the Connecticut river the finest cigar stock of America is grown. Will not our bluff and prairie lands, similar in geological origin and some of them originally of superior fertility, do as well, especially when we throw in our

lengthened seasons due to climate? We have grown and had manufactured some very fine Havana cigars at Baton Rouge and believe that a profitable industry of this kind could easily be established there.

The first class of soils are restricted to the growth of dark tobaccos. In the lighter alluvial soils of North Louisiana, a fine cigar stock, or even the White Burley might be profitably grown and experiments will be made this year looking to a solution of this question both in the Red and Mississippi bottoms. In the Southern portion of the State, tobacco was once largely grown for export. To-day small areas are cultivated by the Acadians who continue to manufacture it by a peculiar process and the result known as Perique finds favor in every part of the civilized world. This industry itself could be largely increased, since the demand far exceeds the supply and unlimited acres of productive soils are available.

It may therefore be asserted in a most positive manner that the light lands of Louisiana can be most profitably cultivated in tobacco. and that the medium and heavy lands of the State can certainly grow tobacco, but whether of a desirable profitable type, remains yet to be demonstrated by experiments.

Just here I trust I may be pardoned a digression. So much has been said and written about the Perique, that a short description of its growth and manufacture may not be inappropriate. About one hundred and seventy years ago, tobacco, rice and indigo were the chief products of Louisiana. In 1752 the culture of tobacco was stimulated by the offer of $7 per cwt. by the French government for all tobacco grown in Louisiana and delivered in the public warehouse. A similar encouragement was made by the Spanish in 1776. In 1802 tobacco growing was common all along the Mississippi river as far up as Natchez, and over 2000 hogsheads were exported. This tobacco was not noted for its excellence, grown upon alluvial soils, badly cured and packed, it presented a rough appearance full of gum and nicotine. Coming in competition with that grown upon the Ohio river, it gradually lost favor in the public estimation and its production almost ceased. About this time Pierre Chenet, a

French Acadian, introduced a new method of curing tobacco among his fellow Acadians, and this process, without modification is practiced to-day. The process briefly stated is "to cure tobacco in its own juices." On the left bank of the Mississisppi river in the parish of St. James, most of this tobacco is grown and cured. Some of it is grown upon the banks of the river, while the greater half is raised upon the vacherie of Grand Pointe, three miles back from the river. It must be remembered that a vacherie is an island rising four or five feet above the surrounding swamps and was originally filled with swamp cane. To these spots the cattle of the early settlers were sent when forage elsewhere was scarce, hence the name.

The soil on the bank of the river is what is known as sandy alluvium, while that forming the vacherie is of a chocolate color, a calcareous loam of great fertility and easily worked. This soil is preferred to the sandy river soil. Any black soil, with sufficient sand to permit of easy tillage and to prevent baking will grow this tobacco. Seventy-five acres were grown of this tobacco last year in St. James and 17 in Assumption parish. The larger part was grown on Grand Pointe and most of it finds its way to market as the product of this vacherie, now doubly famous for its tobacco and by its story as told recently by Cable. There are 218 acres in this vacherie and twelve or fifteen proprietors. The amount raised here is about 18,000 pounds. Not over 50,000 pounds of Perique is grown in the State and yet it is known throughout the markets of America and Europe. Three fourths of the product is made into rolls, the rest is used in leaf. Kentucky, Tennessee or Virginia seed sown several years in succession assume the type of that grown from native seed. The true Perique has a fine fiber, medium leaf and small stems, is strong, rich, gummy, tough and dark, and when taken from the press has a beautiful glossy appearance. On account of its strength it is mixed with milder kinds for both smoking tobacco and cigarettes. By the natives it is also chewed. There is a material variation in the quality of leaf grown. On a sandy soil it has a delightful aroma, highly prized, which declines with the increase of clay in the soil. They divide their crop into

wrappers, fillers and smokers. At one time every leaf was brushed and cleaned before subjected to curing. This is not now generally followed. The processes of planting, cultivating and fertilizing is not unlike that performed elsewhere. They do not "prime." The seed bud is removed about the 15th of May and twelve to eighteen leaves left on a stalk. The suckers and worms are removed as elsewhere, only they claim three suckers will come from each leaf axil instead of two, as elsewhere. The tobacco will show a yellowish mottled appearance with leaves crisp and easily broken about the 1st of July, when it is cut. They claim that the heavy dews aid the secretory organs in storting up in the vesicular structure the rich juices and gum that give flavor and strength to the cured product. It is in the cuting and curing that the peculiarities of this tobacco are developed. Contrary to general practice elsewhere, they cut their plants in the hottest part of the day with a hatchet, three inches from the ground, leaving two or three leaves on the stump, which are regarded as worthless, having served their purpose of protecting the rest of the plant from sand and dirt. Sharp pointed pieces of swamp cane are stuck in the end of each stalk, making a hook, by which each plant is suspended upon a rope stretched lengthwise the shed—the plants six inches apart on the rope, and ropes one foot apart. As the plants wilt and the leaves become embrowned they are removed from the stalk and the mid ribs, still green, are removed. The first leaves are pulled from the stalk in about ten days and one to three leaves, in intervals of a few days thereafter till the stalk is stripped. The leaves, after removal of mid rib, are twisted into rolls of twenty to thirty leaves each. These rolls or twists are packed into boxes eleven inches square, capacity fifty pounds, and when nearly full are subjected to a continuous pressure of about 7000 pounds per square foot, by a lever twelve to fifteen feet long, with weights thereon. The pressure must be continuous, therefore screw presses cannot be used. After being under pressure for twenty-four hours the tobacco is taken out, opened and aired, for a few minutes, until the exuded juices, black, tarry and thick, can be reabsorbed when it is again subjected to pressure. This treatment

continues daily for ten days, every twist being opened, aired and turned so that the juices will saturate the entire mass. From a light brown, the tobacco grows darker each day until it shines in oily blackness. After ten days the manipulation becomes less frequent—say once in three or four days. In three months the tobacco is cured and emits a rich spirituous flavor, which has been imparted to it by the reabsorbtion of the oxidized juices. It will thus be seen that Perique Tobacco is cured and preserved by the resinous gums contained in the natural leaf. The wrappers are handled with great care and kept separate during process of curing. This ends the curing, but the tobacco is next put into cylindrical rolls or "carottes," containing four pounds usually. The leaves are opened, straightened and aired. Upon a cloth 24 by 15 inches, the best wrapper leaves are placed, the bottom side down, and the fibres so arranged as to point to a longitudinal median line. Leaves to the depth of half an inch are placed on these and over them a second cloth, and this mass severely tramped. The ends of mats are then doubled over about three inches and the whole tramped again. The entire mass is then rolled into a cylinder and the corner of leaves tucked down into the hollow centre. The ends of cloth are tied and a rope wound tightly around the coil from end to end by a windlass made for the purpose. At expiration of twenty-four hours the rope is taken off and rewound very tightly. After this the carrotte is ready for the market. An ordinary man with a boy can put up ten carrottes per day. The only objection to this process is the great expense attending it. It seems to me that machinery might substitute much of the present hard labor and the process be rendered equally as effective without so much expense and labor. If so, and the demand for this kind of tobacco continues much of our alluvial lands could be planted in it. The annual yield of this crop is about 300 pounds nett per acre.

Having determined upon the adaptability of our soils to tobacco growing, a rapid review of the processes involved in planting, cultivating and curing will be noted.

SELECTION OF SEEDS.

Here as elsewhere the best variety suitable to our wants and soils should be selected. In saving seed, only healthy vigorous plants, true types of the variety grown should be left to bear seed and these near together so that the flowers of each plant may certainly be pollenized. Only the flowers on the top of the plant should be left, all from side shoots and suckers should be removed.

SEED BEDS

Are usually selected with a Southern or Southeastern exposure and are used for many years, are usually thoroughly burned over to kill weed seeds and well pulverized and should be made very fertile. Don't use too many seed. They are very small, one ounce containing about 340,000 seed. One good tobacco plant will grow seed enough to plant certainly 10 acres and if each seed germinated and grew, 100 acres. Crowded plants are never strong and healthy and bear transplanting badly. A bed 10 yards square will furnish enough plants to set from 6 to 10 acres. Beds are planted according to latitude from November to April. Beds should be protected from the flea beetle, which can be done by boarding it around and covering with cotton cloth. Plants for old land and late planting should be larger than for new ground and early planting. Usually the plant is large enough to transplant when it has four well developed leaves.

TRANSPLANTING

Is usually done upon the heel of the first good shower after the plants are large enough. If no showers occur they may still be transplanted but thoroughly watered. Rows three to five feet wide, with plants eighteen inches to three feet in the row, are the limits of practice for different varieties and upon different soils.

PREPARATION AND CULTIVATION OF LAND.

Here more than perhaps with any other crop the land should be well prepared, deeply plowed, highly enriched with suitable fertilizers and finely pulverized. Cultivation similar to

that given cotton by our best planters will do for tobacco.

TOPPING AND SUCKERING.

Here there is a diversity of opinions and practices. All agree that the plant should be topped as soon as the flower buds appear generally, over a field. When these flowers will appear will depend largely upon (1) the variety, (2) fertility of soil, and (3) upon favorableness of season. From 8 to 25 leaves are left accordingly; upon rich lands 12 to 16 leaves on the ordinary plant, on the Havana seed, 20 to 25. Experience has taught that a larger proportion of good wrappers are obtained by topping low. Suckers should be removed as fast as they appear.

PRIMING AND WORMING.

Formerly priming, i. e., removing the two lower leaves was universally practiced. To-day the custom is falling into *innocuous desuetude*, and our best planters do not prime. Even our Acadian neighbors prefer leaving on the stalk when the latter is cut, rather than prime. By the new leaf curing process these are cured first, increasing the quantity per acre.

Worming, i. e., removal of the horn worm, should be performed daily, especially upon wrapper and cigar stock.

CUTTING AND CURING.

By the old process when the tobacco was ripe, the entire stalk was cut down, with hatchet, knife or saw and split from the larger end upwards and hung upon poles to cure. Later they are speared and lathed through larger end of the stalk. By the leaf curing process, the leaves are cured as they ripen, and the naked stalks left in the field to be plowed under. The latter practice is steadily growing in favor.

Tobacco is cured in many ways, sun cured, air cured, flue cured and charcoal cured. The sun cured is frequently done in the field on poles and racks, and finished in the barn. Air cured is cured in the barn without heat, frequently a little heat to be applied to finish the cure, especially during damp weather. In the older barns, the tobacco was cured by open fires, which were

superseded by charcoal fires and these in time by flues. To cure properly by fire requires skill, intelligence and experience.

ASSORTING AND PACKING.

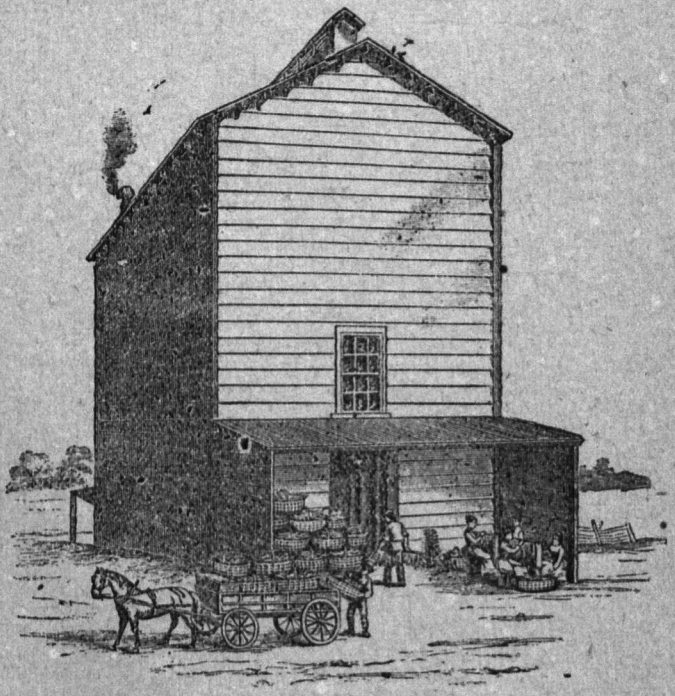
The former should be carefully done, placing the different grades and types in separate hands. After assorting properly, the tobacco is packed in boxes or prized into boxes or hogsheads and shipped to a reliable commission merchant.

SPECIFICATIONS

FOR

BUILDING A MODERN TOBACCO BARN,

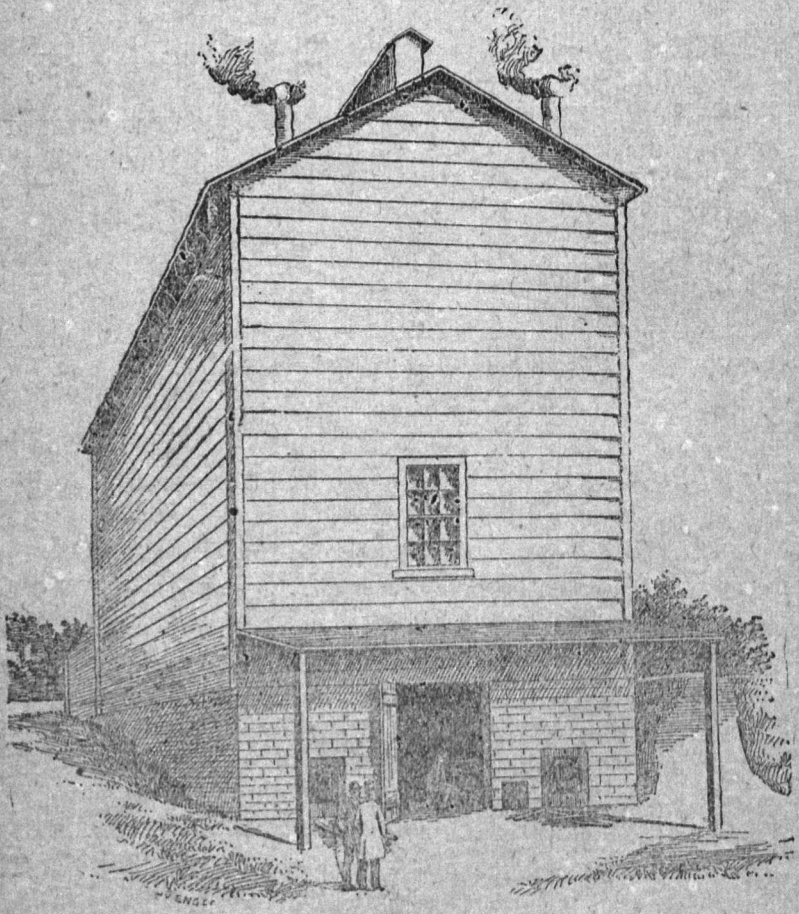
SIXTEEN BY TWENTY FEET, INSIDE MEASURE, AND TWENTY FEET HIGH, AS GIVEN BY CAPT. W. H. SNOW, THE INVENTOR.



SNOW'S MODERN TOBACCO BARN—FRONT VIEW.

Select a hillside with a slope about 2½ inches to the foot. Commencing at the lower side, dig an excavation 16 by 20 feet into the hillside. This will bring the upper side about 5½ feet

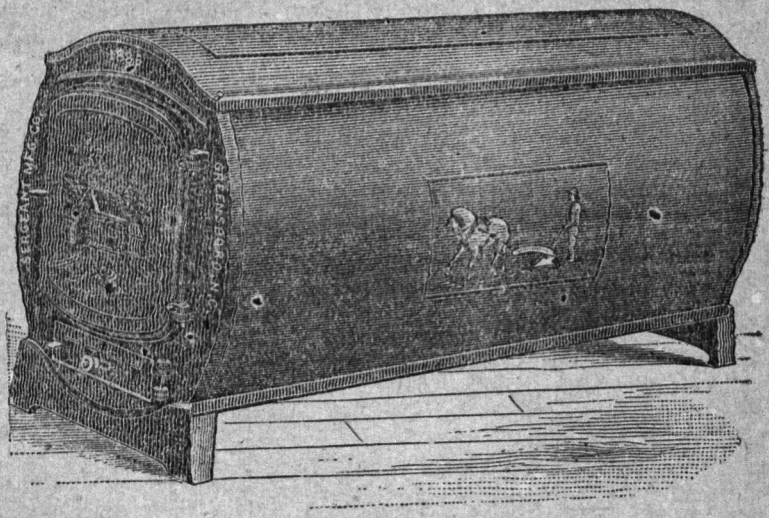
from the surface, the floor being level. Then dig a trench around the four sides of the excavation, on the inside, one foot wide, of the same depth. Fill it with small cobble stones of coarse gravel, to serve as a foundation and to act as a drain. On top of the stone or gravel, build an 8 inch wall of good brick or stone, with



REAR VIEW OF SNOW'S BARN.

strong lime mortar. The wall should be 5½ feet high on the four sides, level on top, making a basement. On the lower or exposed side of the wall leave an opening for the door, in the centre of the wall. The opening should be 5 feet high and 2½

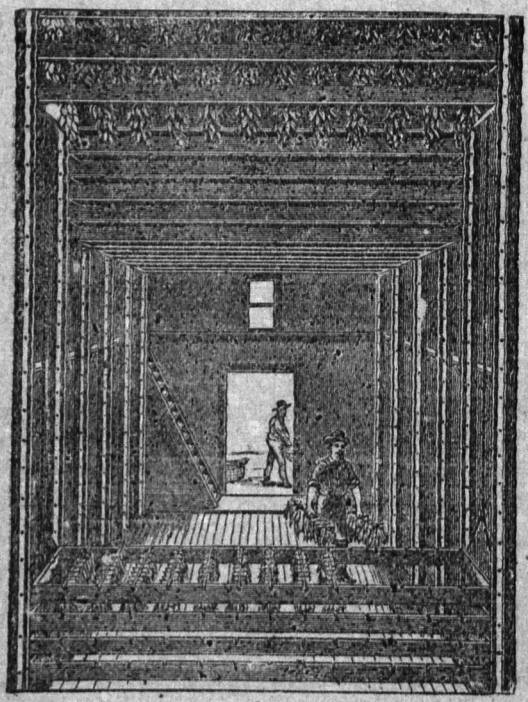
feet wide. Leave openings on each side of the door 3 inches from the ground and 22 inches from the side walls, through which the ends of the stoves may project far enough to be within



STOVE.

4 inches of the outside face of the wall. The doors of the stoves open outwards and the fuel is fed from the outside. Set the stoves three inches above the ground floor of the basement. Cover the stoves with brick arches extending 2 feet beyond the rear ends of the stoves and leaving an air space of 6 inches above and on each side of the stoves, forming jackets, the rear ends of the jackets to be left open. Directly over the stove doors, and under the line or crown of the arches, leave openings in the wall 2 x 8 inches, the longer line horizontal. These are to admit fresh air as needed around the stove and within the arch. Covers to fit them regulate the quantity of air as required. In addition to these openings, two others are left, one alongside each stove, 10 inches square, and with the tops level with the surface outside. Through these openings conduits made of 1 inch plank, 10 inches wide for the top and bottom, and 8 for the sides project and are extended inside the basement its whole length sunk even with the top of the earth floor. Provide these

conduits each four holes 10 inches long and 4 inches wide through the cover, with sliding covers. These are to allow cool air to be admitted to the basement, independent of what is let through the open arches. This completes the basement. The barn superstructure is built as follows: Sills 4 x 6 inches are framed and set on the walls, the 4-inch side resting on the walls. Set the joists and lay the floor strips 3½ x 1½ inches, leaving open space



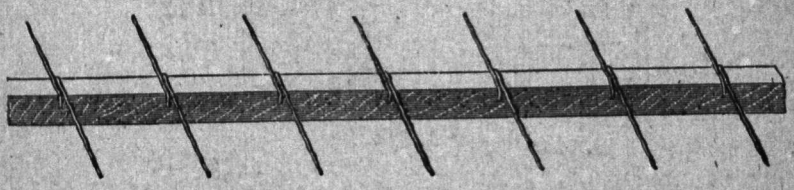
HOUSING IN SNOW'S NEW TOBACCO BARN.

1½ inches between each of them, except those within two feet of the walls on three sides. Here the floor is closely laid. The floor is open in strips at the door end of the building. Set the studding exactly 18 inches apart. Set the rafters one-third pitch. Make sheeting of good square edged planks. Shingle the roof. In the sheeting and shingles leave an opening 15 feet long and 8 inches wide at the peak of the roof for the ventilator

which is made and shipped by us. Sheating paper is nailed on the joists and the whole is ceiled and weatherboarded. Each pair of rafters must have collar or wind beams, made of plank 6 inches wide and 1¼ inch thick, fastened securely at the foot 6 inches above the plates. The first set of scaffold beams is set 7 feet from the floor on two sides and one end of the building. The next set is placed 6 feet above the first. The window frames are for 2 six light 10 x 12 glass. The frames are set, one in each end 8 feet from the floor. The stanchions will be set by us in all cases.

THE STICK PROCESS OF CURING.

In the barn 5 pieces 2 x 8 are placed upright, 3½ feet apart and extending from top to bottom of barn. In the centre of piece 2 x 8, is nailed a piece 1½ x 2, which makes a groove on each side of the original piece for the racks to slide up and down

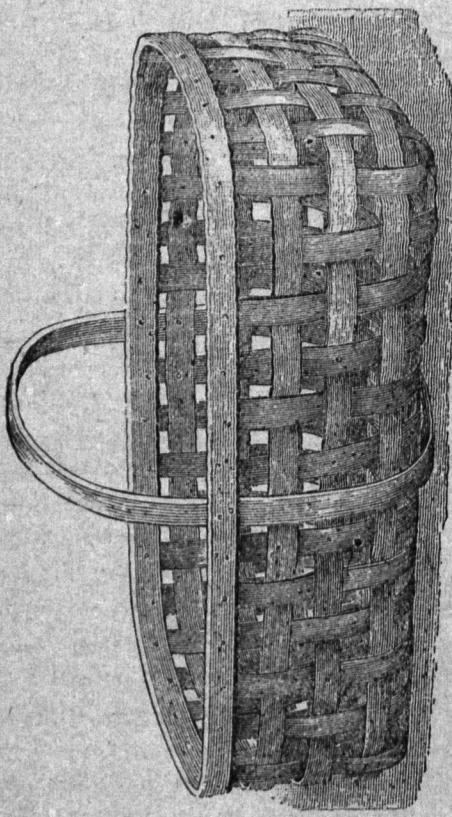


THE SNOW STICK.

in. The racks are light frames, made of 1 x 4 stuff, 3½ feet wide and 14 feet long, and taking their places in the grooves make 4 complete stanchions or rooms in the barn. Each rack has 14 notches to the side for holding 14 of the "wired" sticks. These sticks are made one inch square, holes bored through the center 6 inches apart and pointed wires 9 inches long are passed through and doubled over, at right angles to stick, making 6 wires or 12 points to the stick.

When ripe the bottom leaves of the tobacco are stripped from the stalk, carefully placed in baskets, provided for the purpose, and transported to the barn, where the filling of the sticks and barn proceeds. Small boys sitting opposite each other with a stick made stationary for the time, between them, string the leaves on the wire points, passing the wire through the butt end.

of the stem, giving from 4 to 6 leaves to each point. The sticks are carried in and placed on racks as filled. When a rack is filled, holding 14 sticks, it is elevated 20 feet to top of barn by means of a rope pulley and crank and there fastened by pegs provided in the upright piece. This manner proceeds until the room or stanchion is filled, when the pulley is transferred to the



BASKET.

next room and stanchion, etc. Each room will hold from 10 to 15 racks, according to length of tobacco leaves.

CURING.

Close all ventilators, both top and bottom, all doors and windows. The stove is fed from the outside. The heating is all done in the basement, 8 inch stove piping runs from the stoves

back to a larger drum-pipe and returns to the flue, the heat passing up through the latticed floor into the barn. The temperature is first raised to 80 degrees and remains for 24 to 36 hours, or until the leaves are a greenish yellow. This is the yellowing process. The windows will show streaks of sweat, when ventilators should be opened half way bottom and top and the heat raised 10 degrees in 30 minutes; next open both doors above and below and drop back 10 degrees in 20 minutes. This secures the color; next shut the doors and advance the heat to 100 degrees in 30 minutes, open both doors then and drop to 90 degres in 20 minutes. Now open all ventilators wide, close the doors and advance heat 2 degrees an hour until 115 degrees are reached. If the barn shows signs of sweat open doors and draw the fire from stoves until all signs of sweat have disappeared. Then rekindle the fires and advance heat at same rate until 135 degrees are reached. Watch one or two leaves, note the effect of heat on stems, if they dry dark you are running too fast. The clear, white stem is obtained by running the heat no faster than the stem will bear and cure white. Some tobacco will not bear more than 1 degree an hour. When 135 degrees is reached stop there until every stem will snap like glass. This is the limit of heat to which any vegitation can be subjected any great length of time without injury. The oils and wax are dissipated at 155 degrees, the vegetable albumen is hardened at 150 degrees and tobacco is lessened in weight equal to 15 per cent. at 180 degrees. The curing generally lasts about 3 days and nights. The above are general rules laid down by Captain Snow. Experience must guide the process.

After the curing is finished open the barn top and bottom, and all doors and windows, sprinkle the basement floor liberally with water and let the barn stand open all night. When the fibre of the leaf is soft and the stem hard remove the tobacco from the wires, put the sticks back in the racks, where they should always remain except when being used.

The tobacco should be bulked down on a tight floor in large bulks, the butts of the leaves all one way. In this condition it should remain until "handed up."

PACKING.

A damp time should be selected for grading and packing the tobacco, or the basement of barn may be sprinkled and stoves heated and tobacco transferred there, where it will soon be "in case." Grading tobacco and tying in hands demand a specialist. The large bright leaves are tied in hands of 6 or 7 leaves and are graded as long bright wrappers. The next shorter and bright are graded short bright wrappers. These are used for wrappers for plugs and command best price. The light primings are graded 10 to 12 leaves to hand and are used for cutting into cigarette and smoking tobacco, while the tops are graded 10 to 12 leaves to hand and are used as fillers for plugs. When the tobacco is graded and tied into hands and while it is yet in order it should be packed into hogsheads or very strong boxes for shipping. Tobacco should never be handled when it is not in order, and the barn may be used independent of weather as the packing and grading room, by keeping a light fire and the basement well sprinkled.

EXPERIMENTS

AT THE

NORTH LOUISIANA EXPERIMENT STATION

AT CALHOUN, LA.

Special attention is called to the following report of the carefully conducted experiments at Calhoun.

Mr. Clarke, who was introduced from North Carolina to conduct these experiments, has performed his work well. His services have been retained by the Station for the present year. The experiments in tobacco will be continued at the Station in yellow leaf, while the finer cigar types, including the white burley will be tried upon the alluvial lands of both the Red and Ouachita bottoms.

A cheap log barn of same size and capacity will be erected this year, to test its efficacy against the Snow Barn used so successfully last year. The same "stick process" will be used in both. This barn is very cheap and will be within the reach of every small farmer.

NORTH LOUISIANA EXPERIMENT STATION NO. 3,
Calhoun, La., December 22, 1892.

To W. C. Stubbs, Ph. D., Director:

Dear Sir—I hand you herewith report of the results of experiments in tobacco, conducted at this Station during the present year. For the information and benefit of the farmers of North Louisiana I have endeavored to be explicit in every detail of operation, from the seed beds, through the curing, packing and shipping rooms. The experiments have been successful

beyond most sanguine expectations. The farmers hail with delight the new enterprise in agriculture, as attested by their many visits of inspection and letters of inquiry, and because of the splendid remuneration held out to them, they will ever feel grateful to you for its inauguration in the hills of North Louisiana.

Respectfully,

J. G. LEE, B. S.,

Assistant Director.

REPORT ON TOBACCO.

On account of the depressed financial condition of the country, brought about by the "all cotton" system of farming so long followed, the Station, since its beginning, has advocated earnestly and practiced persistently a rational system of diversified farming, as the only means of relief. From one crop and truck to another it has gone and established, until now it has begun with tobacco. It has long been observed that tobacco grew well in North Louisiana about "old stumps" and in fence corners; that during the war many farmers grew and cured it in rude manner for "home use." But that any systematic method of growing and curing for market had ever been practiced, is without our knowledge. Persuaded, therefore, that the light sandy lands of North Louisiana might produce the bright types of tobacco, the Station began, with the year, formulating extensive experiments in the growing and curing of tobacco.

The best authority of Virginia and other tobacco growing States was consulted as to the types and varieties of tobacco best suited to the soil, and the most improved and advanced method of curing the same. The seed obtained and the "Snow Barn" with the "stick" process of curing selected, negotiations began for an expert tobacconist; not only expert in the planting, cultivation and growing of tobacco, but also expert in the curing, and manipulation of the Snow Barn. From one to another the letters passed, and finally, Mr. W. F. Clarke, of High Point,

N. C., who had spent his life in tobacco and who erected and manipulated the first Snow Barn, was employed.

The three main conditions complied with, viz: 1. The varieties of tobacco seed most suited to soil. 2. The Snow Barn process for curing. 3. The expert tobacconist, the work begins.

SELECTION AND PREPARATION OF SEED BED.

In order to secure early, strong and vigorous plants, too much atention cannot be directed to the proper location of seed bed. Certain surrounding conditions must be observed. There must be moisture; there must be exposure to early morning sun; there must be protection on the North from cold; there ought to be water convenient for watering bed in case of drouth, the soil must be rich, etc. Therefore, in the virgin forest alongside a running branch, select a gently sloping exposure to the South or Southeast, with timber protection on the North, for the seed bed. On the plot intended for the plants, pile logs, poles and brush and burn continuously for several hours, pulling and transferring the burning mass from one part of the bed to the other, constantly piling on new material until the entire space is effectually burned to a depth of half an inch. This destroys all weed and grass seeds in the soil, which otherwise would be destruction to young tobacco plants. After the soil has cooled well, rake off all trash and coals, leaving the ashes for fertilizer.

With grubbing hoes then dig and mulch the soil well to a depth of 2 or 3 inches, taking care to invert the soil as little as possible, and by no means bringing any of the subsoil to the surface. With rakes continue the mulching and pulverizing until the soil is brought to the finest tilth, care constantly given to removing all trash, roots and rootlets. In the meantime a light application of good compost of well rotted manure, in which the germs of grass seeds have been killed or a little commercial fertilizer of acid phosphate, cotton seed meal or nitrate of soda, should be scattered over and well incorporated with the soil.

SOWING THE SEED.

For every ten feet square of bed mix one tablespoonful of seed, in a cup, with three or four times as much dry sand or ashes to prevent too thick sowing, and sow once regularly over the bed, reserving enough seed to cross sow. Tobacco seed are so small, they need no covering, only pressing down the soil, which may be done by a light roller, by treading thoroughly with the feet, or by placing a plank on and standing or stamping on it. To prevent washing and ward off surface water, the bed should be trenched around. Across the bed every five or six feet surface drains may be made with grubbing hoe with slight inclination into the trench.

PROTECTION BY CANVASSING.

By all means the beds should be protected from heavy rains, frosts, and the destructive little flea bugs. This is best done by a covering of very thin cheap, cloth, cheese cloth or something similar. Set up edgewise, plank 12 x 1 inch around the bed and drive stakes down on both sides to hold the plank firmly and in place. Place strips across every two feet apart to hold up and prevent sagging of the cloth. Widths of the cloth having been sewed together to suit the bed—the covering is then spread on and tacked tightly over the bed, on the frame. This covering keeps the bed warmer and hastens the growth of plants. Several days before the plants are ready to be transplanted, the canvas may be removed, in order that the plants may toughen and become accustomed to the exposure.

Beds should be made no wider than 5 or 6 feet, so plants may be drawn from either side without getting on bed with feet; they may be as long as one desires.

To hasten the growth of young plants, an application of liquid manure may be necessary. Make a leach of well rotted fowl-house manure, by placing one half bushel of manure in a bottomless barrel, set on boards, with inclination to a trough or bucket to catch the leach, pour water on the mass, and to the collected add leach two or three times as much water and apply

by sprinkling uniformly over bed—at sundown. Never burn the bed when land is wet. Beds may be planted from January to March. The earlier plants can be grown and transplanted the better. Water beds when dry.

EXPERIMENTS IN THE FIELD

Were of three kinds, viz: 1. Land test. 2. Variety test. 3. Fertilizer test. Three plots of land, entirely different in type, and measuring exactly one acre to the plot, three acres in all, were selected for the experiments. Plot No. 1 was a mulatto, or what is commonly called in North Louisiana a red sandy soil, somewhat heavy and tenaceous, with a red sandy clay subsoil, and in cultivation for 79 years. Plot No. 2, embraced an old pine field, just recleared of saplings and was a grey, loose sandy soil with red sandy clay subsoil. Plot No. 3 was in new ground or virgin soil, and partook of both the grey clay and red sandy nature, very loose, with vegetable mold. Experiments were duplicated on each plot.

PREPARATION OF LAND AND TRANSPLANTING OF PLANTS.

Let farmers bear it well in mind that it is especially true of the tobacco crop, "*A good preparation is half cultivation,*" plow early and deep, cross plow and harrow. Land was deeply and thoroughly broken in January and February with two horse turn plow. In April it was cross plowed with "bulltongues" and well harrowed. May 3 a sufficient number of rows were prepared to accommodate the plants ready to be transplanted. The rows were marked off 3½ feet apart with a straight shovel, fertilizer uniformly distributed in the drill, two furrows thrown on same, making a flat list. Rakes passed over to make level and even a hoe following, using the back to make vigorous pats or impressions on the bed every 2½ feet apart designating the place where the tobacco plant should be dropped. This preparation should always be in advance and ready, so that in case of rain the transplanting of plants from the bed to the field, may go forward at once. The marking with the "hoe pat" is necessary, because it firms the soil, and leaves visible the place, at equal

intervals, where the plants shall be dropped, 2½ feet apart. On May 5, healthy vigorous plants only were drawn from the bed, placed carefully into large flat receiving baskets and transported to the field, where a "dropper" takes a convenient armful or small basketful is better, of plants, and going the rows, up and down, drops a single plant on the previously made "hoe pats." He is followed up by the "setter," who is provided with a peg made of hard wood, 6 inches long, 1¼ inches in diameter at big end and tapering to a point, who pushes his planting peg some 2 or 3 inches into the hill, withdraws it, inserts the plant and by a dexterous movement of the peg and knuckles of the left hand, presses the dirt gently but compactly about the roots.

If it is very dry and watering is necessary, the holes are made, the plants gently inserted, and a little water poured in, etc.

Plants should not be transplanted immediately after a soaking rain. If there should not be plenty of moisture, sprinkle the beds well before drawing the plants, otherwise, many will be bruised, broken and ruined. Draw plants from the bed one at a time. Take the plant firmly between the thumb and first finger, and with the other fingers pushing from the ground, a gentle, steady pull brings it forth uninjured. Handle plants very carefully.

Pull from the bed only strong vigorous plants, with three or four leaves and the larger ones two to three inches wide.

In transplanting, never insert the plant below the bud.

To destroy the flea bug on tobacco beds, apply land plaster, or gypsum, (sulphate of lime) ashes, or very lightly, Paris green.

CULTIVATION.

Early, rapid and thorough cultivation is necessary for a good tobacco crop, frequent stirring and mulching of the soil with hoe and plow, not deep.

Ten days after plants were transplanted, hoes passed over breaking the crust, mulching the soil thoroughly and drawing the soil gently about the young plants. Every ten or twelve days thereafter, cultivation was given with "bull tongues" and

heel-scrapes, the last in July with straight shovel and heel scrape, bursting the middles. The plows were so regulated as to completely mulch the soil two to three inches deep. After each plowing, hoes followed, taking out all grass, and more completely mulching the soil close about the plants, drawing loose dirt, making slight hills close around the stalk. If the preparation has been thorough, thrice plowing followed each time with the hoe, will suffice for the crop. Plowing should be discontinued when the leaves begin to touch in the middles, to prevent bruising and tearing. Hoeing may continue later, to remove grass and weeds and mulch the soil in case of hard rains. Short single trees should be used in plowing tobacco.

TOPPING, WORMING AND SUCKERING.

No specific rule can be laid down for the topping of tobacco, too many conditions may exist—the quality of land—the amount of fertilizer applied—the seasons, etc. The Station waited till many plants began to button for seed before commencing to top, and according to the vigor and size of plant, left from 11 to more than 20 leaves to the stalk. Experience and observation must be the guide here. If a plant is weak and small, poor land and but little fertilizer used, sometimes 7 to 9 leaves are enough to leave—according to vigor and size, thus the topper must be guided. However, it is too tedious and slow to count every leaf, and to facilitate the work one may bear in mind that counting the bottom leaf and the leaf that hangs over it in the third tier going upward, make 9 leaves, including both top and bottom leaves. Fixing this in mind, the operator has only to add to or deduct from this index leaf, marking 9, to leave any desired number of leaves on each plant with certainty without counting, that his plant may justify.

The ravages of the green horned worm is to be very much dreaded. The hawk moths, as they are commonly known, usually come in May, deposit their eggs on the tobacco leaves and in from five to seven days the larvæ or worms are hatched. They eat and grow on the plant from twenty to thirty days, burrow into the ground, where they pass into the pupa state. In about twenty

days they emerge from the ground as moths. to lay more eggs and hatch more worms. When it is considered that every moth is capable of laying about 200 eggs—and that at least two broods are certain during the season, and that 40,000 worms are possible to every moth of May, it is no wonder that the second brood sometimes appears in such countless hordes as to defy all efforts at destruction before the crop is ruined. Hence the great importance of destroying the first crop of moths and worms. To destroy the former the Station employed two methods: 1st. The burning of lamps, such as are commonly burned in cotton fields to catch the cotton boll moth. 2d. By injecting a few drops of sweetened cobalt (poison) into the tubular shaped flower of the common "Jimson" or Jamestown weed, previously transplanted in the tobacco. This latter method, brought by Mr. Clarke from Virginia and North Carolina, was decidedly most effectual. The moth loves and seeks the nectar of this flower.

The writer wishes to add, parenthetically, just here, that hereafter he trusts visitors to the Station will not pull up the Jamestown weeds found growing in the tobacco, as several worthy farmers did the present year, their purpose is *useful* rather than *ornamental*. To destroy eggs and worms the best and surest way is to hand pick and destroy. Light applications of Paris green, one half pound per acre, mixed with sand or ashes, and dusted on from a sack at the end of a stick 6 or 8 feet long while the dew is on is sure destruction. But there is a strong prejudice against the remedy. However, there is no danger to man, but unless very carefully done, there may be injury to the leaf, so the Station does not recommend the use of Paris green. The suckers, which appear after topping, in the axils of the leaves, must be pulled off persistently every week as they appear—never let them get two inches long, for if permitted to grow they abstract much that would otherwise go to perfect a rich silky leaf. Worming and suckering must be energetically and persistently pushed.

RIPENING.

On ripening, the leaves change from green to a greenish yellow, and assume a "pea green" color, the clammy mass of little

hairs disappear and thickens, so that pressing the underside of the leaf between the thumb and finger it cracks open.

Curing began August 1, in the Snow Barn, (see description of barn and process of curing on pages 581–88), and continued a curing per week until the crop was all cured. Below are the results of experiments on the three plots previously described. The season was all that could be desired, except on new land.

PLOT NO. 1—RED SANDY.

The questions sought of this plot are, 1. Variety test, with and without fertilizers. 2. The fertilizer best suited to tobacco. 3. The quantity to use per acre.

There are ten different varieties tested. The first six named below are bright leaf tobaccos, the last four are for cigars. The latter are used for cigars and smoking tobacco, the former are used for cigarettes, smoking and chewing, the bottom leaves are known as cutters and smokers, for cigarettes and pipe, the top leaves as fillers for plugs, and the middle leaves for long and short bright wrappers for plugs; they command good prices always, and constitute about one-half of the crop.

The same fertilizer was used on the varieties consisting of a mixture of nitrate soda, sulphate ammonia, dried blood, cotton seed meal, acid phosphate and sulphate potash, at rate of 360 pounds per acre. The quantity test in the general crop received the same fertilizer as follows :

Experiment No. 1, received 240 pounds per acre.

Experiment No. 2, received 360 pounds per acre.

Experiment No. 3, received 480 pounds per acre.

Following are the results of Plot No. 1 .

PLAT NO 1.—VARIETY TEST—FERTILIZED—RED SANDY.

No. of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre	Pounds cured tobacco, per acre.	Percentage of loss on curing.	Remarks.
1	Conqueror	7710	1440	81.4	Bright Leaf.
2	Hester	6180	1530	76.	Bright Leaf.
3	Long Leaf Gooch	7560	1470	82.	Bright Leaf.
4	Ragland's Improved	7290	1530	79.1	Bright Leaf.
5	Sweet Orinoco	6630	1320	80.1	Bright Leaf.
6	White Burley	4200	1020	75.8	Bright Leaf.
7	Comstock Spanish	7140	1020	85.3	Cigar Leaf.
8	Persian Rose	4860	900	81.5	Cigar Leaf.
9	Improved Havana	4860	1230	74.7	Cigar Leaf.
10	Brazillian American	7260	1350	81.5	Cigar Leaf.

The brights all cured a lemon yellow, except Burley, which was rather dark. The soil was suitable to all. The cigar types cured too bright—soil possibly not adapted. Hester and Ragland's Improved gave best yields.

PLOT NO. 1—VARIETY TEST—UNFERTILIZED—RED SANDY.

No. of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre	Pounds cured tobacco, per acre.	Percentage of loss in curing.	Remarks.
1	Conqueror	5790	1050	81.9	Bright Leaf.
2	Hester	4770	1020	78.7	Bright Leaf.
3	Long Leaf Gooch	3150	630	80.0	Bright Leaf.
4	Ragland's Improved	4505	1200	73.4	Bright Leaf.
5	Sweet Orinoco	3753	720	80.9	Bright Leaf.
6	White Burley	2313	546	76.9	Bright Leaf.
7	Comstock Spanish	2420	513	78.9	Cigar Leaf.
8	Persian Rose	3480	546	84.3	Cigar Leaf.
9	Improved Havana	3240	600	81.5	Cigar Leaf.
10	Brazillian American	1833	399	78.3	Cigar Leaf.

Both quality and quantity largely improved by fertilizers. Ragsland's Improved and Conqueror lead in quantity.

PLOT NO. 1.—FERTILIZER TEST—RED SANDY.

No. of Experiment.	Kind and quantity of fertilizer used, per acre.	Pounds green tobacco cut, per acre	Pounds cured tobacco, per acre.	Percentage of loss in curing.
1	160 pounds Nitrate Soda	4880	1010	79.3
2	160 pounds Nitrate Soda 160 pounds Acid Phosphate	5940	1010	83.
3	160 pounds Nitrate Soda 160 pounds Acid Phosphate 60 pounds Muriate Potash	4880	1100 (2)	77.5
4	160 pounds Nitrate Soda 160 pounds Acid Phosphate 240 pounds Kainite	5800	1150 (1)	80.2
5	160 pounds Nitrate Soda 160 pounds Acid Phosphate 140 pounds Ashes Cotton Seed Hull	5400	1030 (3)	81.
6	No manure	3420	700	79.6
7	160 pounds Nitrate Soda 160 pounds Acid Phosphate 60 pounds Sulphate Potash	5310	1010 (2)	81.
8	120 pounds Sulphate Ammonia 160 pounds Acid Phosphate 60 pounds Sulphate Potash	5020	1020 (1)	79.7
9	190 pounds Dried Blood 160 pounds Acid Phosphate 60 pounds Sulphate Potash	4460	950 (4)	78.7
10	340 pounds Cotton Seed Meal 160 pounds Acid Phosphate 60 pounds Sulphate Potash	4740	980 (3)	79.4

Plot No. 1—Quantity test—same mixture applied as on varieties.

No. 1—240 pounds per acre, gave, green tobacco, 4160 pounds, cured 850 pounds, percentage loss, 79.6.

No. 2—360 pounds per acre, gave, green tobacco, 5195 pounds, cured 1010 pounds, percentage loss, 80.4.

No. 3—480 pounds per acre, gave, green tobacco, 550½ pounds, cured 1040 pounds, percentage loss, 81.2.

Results indicate 360 pounds to be most economical.

Following are the results of Plot No. 2—Gray, sandy soil, old pine field recleared. Experiments duplicate of Plot 1.

PLOT NO. 2—VARIETY TEST—FERTILIZED—GRAY SANDY SOIL.

No. of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre.	Pounds cured tobacco, per acre.	Percentage of loss in curing.	Remarks.
1	Conqueror	7980	1380	82.8	Bright Leaf.
2	Hester	8060	1500	81.4	Bright Leaf.
3	Long Leaf Gooch	8130	1440	82.3	Bright Leaf.
4	Ragland's Improved	8220	1380	84.2	Bright Leaf.
5	Sweet Orinoco	8850	1680	81.	Bright Leaf.
6	White Burley	6840	1350	80.3	Bright Leaf.
7	Comstock's Spanish	8220	1260	84.7	Cigar Leaf.
8	Persian Rose	5010	1050	78.7	Cigar Leaf.
9	Improved Havana	4160	1080	74.1	Cigar Leaf.
10	Brazillian American	7350	1320	82.1	Cigar Leaf.

PLAT NO. 2—VARIETY TEST—UNFERTILIZED—GRAY SANDY SOIL.

No. of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre.	Pounds cured tobacco, per acre.	Percentage of loss in curing	Remarks.
1	Conqueror	4770	870	82.	Bright Leaf.
2	Hester	4800	870	81.9	Bright Leaf.
3	Long Leaf Gooch	6300	960	84.8	Bright Leaf.
4	Ragland's Improved	6240	1170	81.3	Bright Leaf.
5	Sweet Orinoco	5760	990	82.9	Bright Leaf.
6	White Burley	3810	900	76.4	Bright Leaf
7	Comstock's Spanish	6510	1080	83.5	Cigar Leaf.
8	Persian Rose	3540	810	77.2	Cigar Leaf.
9	Improved Havana	3540	780	78.	Cigar Leaf.
10	Brazillian American	3900	960	75.	Cigar Leaf.

PLOT NO. 2—FERTILIZER TEST—GRAY SANDY SOIL.

No. of Experiment.	Kind and quantity of fertilizers used, per acre.	Pounds green tobacco cut, per acre.	Pounds cured tobacco, per acre.	Percentage of loss in curing.
1	160 pounds Nitrate Soda	6490	1140 (5)	82.5
2	160 pounds Nitrate Soda 160 pounds Acid Phosphate	7540	1440 (1)	81.
3	160 pounds Nitrate Soda 160 pounds Acid Phosphate 60 pounds Muriate Potash	6570	1270 (4)	80.7
4	160 pounds Nitrate Soda 160 pounds Acid Phosphate 240 pounds Kainite	8010	1380 (3)	82.8
5	160 pounds Nitrate Soda 160 pounds Acid Phosphate 140 pounds Ashes Cotton Seed	7950	1510 (2)	81.1
6	No Manure	3120	690	78.
7	160 pounds Nitrate Soda 160 pounds Acid Phosphate 60 pounds Sulphate Potash	6910	1380 (2)	80.1
8	120 pounds Sulphate Ammonia 160 pounds Acid Phosphate 60 pounds Sulphate Potash	6680	1390 (1)	79.2
9	190 pounds Dried Blood 160 pounds Acid Phosphate 60 pounds Sulphate Potash	5990	1120 (4)	81.3
10	340 pounds Cotton Seed Meal 160 pounds Acid Phosphate 60 pounds Sulphate Potash	7720	1130 (3)	85.4

Plot No. 2—Gray sandy soil. Quantity test.

No. 1—240 pounds per acre, gave, green tobacco, 6296 pounds, cured 1196, percentage loss 81.1.

No. 2—360 pounds per acre, gave, green tobacco, 6964 pounds, cured, 1282, percentage loss, 81.6.

No. 3—480 pounds per acre, gave, green tobacco, 8034 pounds, cured, 1427, percentage loss, 82.3.

In the next plot, No. 3, new land, only the variety tests, with and without fertilizers, and the quantity tests were duplicated.

Experiments were at great disadvantage—set out late in June, and excessive rains and low land occupied by varieties, completely drowned them out.

PLOT NO. 3—VARIETY TEST—ON NEW LAND—FERTILIZED.

No. of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre.	Pounds cured tobacco, per acre.	Percentage of loss in curing.	Remarks.
1	Conquerer	4140	600	85.6	Bright Leaf.
2	Hester	4080	600	85.4	Bright Leaf.
3	Long Leaf Gooch	2940	540	81.7	Bright Leaf.
4	Ragland's Improved	2820	480	83.	Bright Leaf.
5	Sweet Orinoco	3020	540	82.2	Bright Leaf.
6	White Burley	1440	240	83.4	Bright Leaf.
7	Comstock's Spanish	2700	390	85.6	Cigar Leaf.
8	Persian Rose	780	120	84.7	Cigar Leaf.
9	Improved Havana	720	120	83.4	Cigar Leaf.
10	Brazillian American	724	120	83.4	Cigar Leaf.

PLOT NO 3—VARIETY TEST—ON NEW LAND—UNFERTILIZED.

No of Experiment.	Name of Variety.	Pounds green tobacco cut, per acre.	Pounds tobacco cured, per acre.	Percentage of loss in curing.	Remarks.
1	Conqueror	3020	420	86.2	Bright Leaf.
2	Hester	2800	420	85.5	Bright Leaf.
3	Long Leaf Gooch	2400	360	85.	Bright Leaf.
4	Ragland's Improved	2520	420	83.4	Bright Leaf.
5	Sweet Orinoco	2490	390	83.4	Bright Leaf.
6	White Burley	1020	180	82.4	Bright Leaf.
7	Comstock's Spanish	2400	360	85.	Cigar Leaf.
8	Persian Rose	780	120	64.7	Cigar Leaf.
9	Improved Havana	480	90	81.3	Cigar Leaf.
10	Brazillian American	360	60	83.4	Cigar Leaf.

Plot No. 3—New land. Quantity test.

No. 1—240 pounds per acre, gave, green tobacco, per acre, 2500 pounds, cured, 474 pounds, percentage loss, 81.2.

No. 2—360 pounds per acre, gave, green tobacco, 4404 pounds, cured, 840 pounds, percentage loss, 80.4.

No. 3—480 pounds per acre, gave, green tobacco, 3690 pounds, cured, 620 pounds, percentage loss, 83.3.

Twenty rows, without fertilizer, gave, green tobacco, 3308 pounds, cured, 495 pounds, percentage loss, 85.1 per acre.

CONCLUSIONS FROM EXPERIMENTS.

In Plot No. 1 the average of all the fertilized experiments in varieties was 1280 pounds per acre, with the highest 1530 pounds and lowest 900 pounds. Omitting the last five, which are cigar tobaccos and counting only the yellow leaf varieties, we have a mean of 1458 pounds per acre.

The average of the unfertilized experiments in the same varieties was for all of the experiments 712 pounds per acre, with highest 1200 pounds and lowest 399. Omitting the cigar varieties we have a mean of 904 pounds.

In Plot 2 we find on the fertilized experiments a mean of all, equal to 1340 pounds, with highest and lowest of 1680 and 1050 pounds. Of the bright varieties alone the average was 1476 pounds per acre.

On same plot, the unfertilized, we have a mean of 949, with highest and lowest of 1170 and 780 pounds. Neglecting the cigar types, we have an average of 972 pounds. The increments due to fertilizer have therefore been as follows: Plot 1—On all experiments 572 pounds, on bright types only 554 pounds. In Plot 2, 391 pounds, and 504 pounds respectively.

A close examination of the effect of the different ingredients of the fertilizer used, upon the increase of crop, will show that potash has had little or no effect, while nitrogen in every form used, has been very beneficial. No form of the latter was decidedly preferable—all causing a marked increase in the quantity produced.

In quality, the effects of the different forms of fertilizer, were thought to have been apparent. The mixture of cotton seed meal, acid phosphate and sulphate of potash produced uniformly

a grade of tobacco more suitable to the eye and taste of the expert (Mr. Smith) in charge of the curing.

The profits of the above crops may be easily figured by applying the prices given in the subjoined extracts from letters received from leading merchants in our principal tobacco marts. These letters were received in response to inquiry made by the Station as to ruling price of such tobacco in their market as the sample sent, taken from our lot. The following are the extracts:

Carr & Richardson, manufacturers, of Richmond, Virginia, write:

"We pronounce it as fine in quality and texture as the *best* average of the best section and among the best and most skilled planters in North Carolina. In short, we think its quality could hardly be excelled. * * You have as clear color for the ripeness and quality as we have ever seen. We have seen cutters and light press wrappers of a fraction better color than this, but the white yellow was at the expense of its chewing and smoking qualities. The samples you sent are what we pronounce the ideal cigarette stock, excepting the heavier bundles, which is a light press wrapper. * * Our advice to you, if you continue to make tobacco, is to make the *very best*, like the samples sent, getting as much off an acre as possible, and then secure a second crop if possible."

These gentlemen write further that it is their opinion that no other country could successfully compete with Louisiana in raising tobacco, owing to our long summer, which insures a ripe crop, which is not always the case in Virginia and North Carolina.

From P. Lorrillard & Co., New Jersey, the following was received:

"We beg to acknowlede receipt of your favor of the 14th ult., also type samples referred to therein, which we have carefully examined and note with pleasure the success attained in the growing and curing of bright tobacco. As indicated by these types the soil is evidently well adapted to the growth o bright tobaccco, and with a proper knowledge of curing and

handling the same we believe the farmers of your State will find tobacco raising a profitable industry."

This firm offered 20 cents for cutters and smokers, 35 cents for large wrappers and 30 cents for small wrappers.

Pemberton & Penn, of Henderson, N. C., wrote: "It cannot fail to bring a good price."

G. W. Smith & Co., manufacturers, Lynchburg, Va., write:

"We were quite interested in examining your samples and surprised to see such tobacco from Louisiana. It is a valuable crop, and if exhibited in any market in Virginia and North Carolina in proper condition would command prices that would probably be very satisfactory to you."

Messrs. J. P. Taylor & Co., Danville, Va., write: "We are sure it will bring you a good price."

Mr. E. J. Parrish, of Durham, N. C., says: "Samples received. They show to be very good stock and worth from 15 to 30 cents per pound"

The Addison Tinsley Tobacco Co., of Louisiana, Mo., write: "We find on examination, your samples to be a very good quality of wrappers. We cannot make an intelligent bid without knowing proportion of long and short wrappers, but lumping the lot, we make you an offer of $20 per 100 pounds on the entire lot."

Several gratifying results are brought out by these experiments.

1st. That our old worn lands of North Louisiana can produce large and profitable crops of an excellent type of yellow wrappers—with or without fertilizers.

2d. That our pine thickets can be utilized profitably in growing this crop, yielding 1476 with fertilizers and 972 pounds without, a gain of 504 pounds.

3d. That no form of potash has given very much increase on these soils, while of the nitrogenous manures our own cotton seed meal has given results almost the equal of any other form.

4th. That the yellow varieties are pre-eminently adapted

to these soils, the Hester and Ragland's Improved leading, with the Conqueror, Long Leaf Gooch and Sweet Orinoco closely following.

The cigar varieties have usually fallen behind the others in quantity and quality.

And now, in conclusion, shall the Station recommend our farmers to plant tobacco? Yes, but with a positive qualification. Go slowly. Learn the business thoroughly before largely embarking in it. Anybody on any soil can grow tobacco, but only the best types of the best classes are profitable. Grow only these and you will be prosperous. Grow the ordinary kinds and you will find the industry more unprofitable than cotton at 8 cents per pound. Tobacco, more than any other crop, requires "high farming"—heavy manuring and excellent tillage. Soils largely control the types to be grown—while curing determines the grades of the type. Strive to select the right seed adaptable to your soil—fertilize properly and liberally—cultivate well, and cure in the most careful manner by the latest approved methods and you will be assured of handsome profits for your crop. North, western and extreme eastern parts of the State have been assured by the experiments at Calhoun of their ability to grow superb grades of the best yellow wrapper type, and careful obedience to the instructions given in this bulletin, will enable every farmer in these sections to become a successful tobacco planter.

One serious drawback to the successful growth on a large scale of the yellow wrapper type in this State, is our great distance from market. No plug tobacco manufactories exist in this State and our leaf must be shipped to other States for manufacture. This involves too great an expenditure in freight and must be stopped. Local factories must start in every town, village and hamlet, simultaneous with the agricultural development. It is gratifying to report that the progressive town of Arcadia is preparing to grow 2000 acres of tobacco, and to manufacture it in its own limits. Other cities and towns will soon imitate this progressive example.