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B. YOUNGBLOOD, DIRECTOR

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DIVISION OF AGRONOMY


# VARIETIES OF COTTON IN NORTHWEST TEXAS



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## SYNOPSIS

The adaptability of cotton to the Panhandle-Plains region has been gradually unfolded over a period of fifteen years and this crop has come into prominence and made a remarkable expansion in this part of the state, constituting a basic crop for the settlement of much of the new land brought into cultivation. The discovery of the unusual drouth-resistance of cotton, and the use of early-maturing varieties have been important factors in the success which has accompanied cotton-growing here.

This Bulletin presents the results of experiments with different varieties of cotton for the past fifteen years at Substation No. 8, located at Lubbock. The results are presented separately for each of the years, discussed in connection with the conditions prevailing during a particular year and the yields summarized in summary tables.

A discussion of the northwest Texas area, the growth and development of cotton production on the Plains, the relation of weather factors to cotton production here, and the development and use of the cotton harvester or sled are included in the first part of the Bulletin. This is one of the important new areas in the Cotton Belt which has shown an unusually rapid increase in production and in importance within the past five or six years. The cotton grown in the Panhandle-Plains area of Texas has increased practically one hundredfold during the past fifteen years.

A comparison of cotton and grain-sorghum yields over a twelve-year period under conditions of limited rainfall, averaging approximately 20 inches per annum, gives to cotton a place alongside the sorghums as a drouth-resistant crop.

Correlations of per cent of lint and length of lint with yield are presented for the different varieties and data in detail on the blooming and opening of cotton varieties, together with their growing-period requirements over a period of years, are given herein.

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# VARIETIES OF COTTON IN NORTHWEST TEXAS

R. E. KARPER AND D. L. JONES

Substation No. 8 of the Texas Agricultural Experiment Station is located on the High Plains three miles east of the city of Lubbock, near the center of Lubbock county. It is midway between Amarillo and Sweetwater, near the center of the South Plains region and about 75 miles east of the western border of the state.

The topography of the Plains in general is that of a nearly level plain broken by several canyons which penetrate the area and having occasional shallow basins or intermittent lakes. These depressions, known as dry lakes, vary from a few feet to twenty-five or thirty feet in depth and from a fraction of an acre to forty acres or more in size. They form a part of the natural drainage system of the region and are filled with run-off water from the surrounding areas in wet periods but are dry at other times. There is comparatively little run-off water here, the rainfall penetrating the soil readily, especially the sandier types.

The High Plains, or Llano Estacado, lies above the Caprock escarpment and approximately one thousand feet higher in elevation than the agricultural lands encountered in the Red Beds region a few miles below the escarpment. This is the southern extension of the Great Plains region of the United States and is known as the South Plains. The drainage streams of the South Plains run in a southeasterly direction and consist chiefly of the head-waters of the Brazos river. Yellowhouse Canyon and Blanco Canyon cut through the High Plains forming the beds of Double Mountain Fork and the Salt Fork of the Brazos river. Sulphur Draw, a part of the Colorado river system, drains the southwest part of the Plains; however, all of these head-water streams carry very little water except in wet periods.

The predominant soil types in the High Plains are the Amarillo and the Richfield clays, loams, and sandy loams. The greater portion of the Substation farm belongs to either the Amarillo or the Richfield sandy loam type of soil underlaid with a clay sub-soil, which reaches down to the marl or calcareous rock below and embraces the principal sandy loam soil types of the surrounding country of the South Plains region above the Caprock line. This soil is well supplied with lime and the clay sub-soil is valuable in the retention of moisture through periods of scant rainfall. The sandy loam surface takes in the rainfall readily, very little being lost as run-off, and when the moisture is sufficient to penetrate into the clay sub-soil and the marl below, the surface soil forms a natural mulch retaining the sub-soil moisture for long periods, unless removed by plant growth. The area of the Substation farm is nearly flat. The altitude is 3240 feet.

This Bulletin gives briefly the results of experiments with different varieties of cotton at this Substation for the fifteen-year period of 1912 to 1926, inclusive. Bulletin No. 299, published in 1921 and dealing with cotton varieties in northwest Texas, has been exhausted and this

Bulletin, therefore, includes the data from the earlier years, is a revision of that publication, and brings the work with cotton varieties down to the present time. During the first part of this period, the variety tests were of a preliminary nature, including a large number of different varieties, many of which were dropped from year to year, as their performance seemed to justify, and new ones added as they came into prominence. During the latter years the number of varieties carried has been reduced so as to include largely the better varieties from the standpoint of yield, staple, and adaptability and to permit of testing them out more thoroughly in larger areas.

## COTTON PRODUCTION ON THE PLAINS

Northwest Texas is one of the important new areas in the Cotton Belt which has made unprecedented strides in the increase of cotton production within the past five or six years. The production of cotton in the counties which lie wholly or partly on the High Plains has increased from approximately 5,000 bales in 1912 to 429,808 bales in 1926, or an increase of practically one hundredfold within the past fifteen years. The most rapid increase in acreage occurred from 1921 to 1924 when the total production of the American crop was low and the price relatively high.

Factors contributing to this unusual advance in cotton-growing here have been the testing out of numerous varieties and the adoption of the better ones for general cultivation, the establishment of the fact through experiments and general farm practice that cotton is well adapted as a dry-land crop and one of the most drouth-resistant crops which can be grown here, and that a large acreage of cotton per man can be cultivated because of the level character of the land and climatic conditions favorable to extensive methods and less trouble from weed and insects pests. Planting below the level in lister furrows aids in cultivation. The practice of gradually filling the furrows by throwing the dirt to the plants, kills weeds in the drill effectively and eliminates much hand labor. Hand labor is further reduced by thick-planting practices where the plants are left from three to twelve inches apart in the row and hand chopping dispensed with. Vegetative growth is suppressed and early opening is induced. These factors tend to lower cost of production, an item of especial importance in times of falling prices.

This increase has also been due to the influx of farmers from other cotton-growing states and from the eastern or cotton-growing parts of the state where they were accustomed to cotton-growing; to the freedom from the boll weevil on the Plains; and to the success attending the growing of early-maturing varieties.

There are approximately eight million acres of land suitable for cotton-growing in the eighteen to twenty counties in the South Plains. With a large part of this area available and yet to be brought into cultivation, the production of cotton here will undoubtedly continue to increase rapidly through the improvement and use of better varieties and methods, improved machinery, large-scale operations, and lowered costs of pro-

duction. Studies* in the cost of producing cotton in fifteen areas in eight cotton-producing states showed the Plains area studied, Lubbock county, to have 38.9 man labor hours requirement per acre in producing cotton, the lowest of any of the fifteen areas studied, as compared with 154 hours for the highest requirement in the North Carolina area. The net cost per pound for producing lint cotton in these fifteen areas ranged from 10 cents in the Lubbock area to as high as 54 cents for the area of highest cost. The average for all the areas studied was 25 cents per pound.

The total production in this area was almost ten times as great in 1926 as in 1921. The counties showing the largest increase in cotton production are: Crosby, Lubbock, Dawson, Hale, Floyd, Lynn and Terry. In these counties and others above the Caprock, cotton-growing was practically unknown fifteen years ago while at the present time the

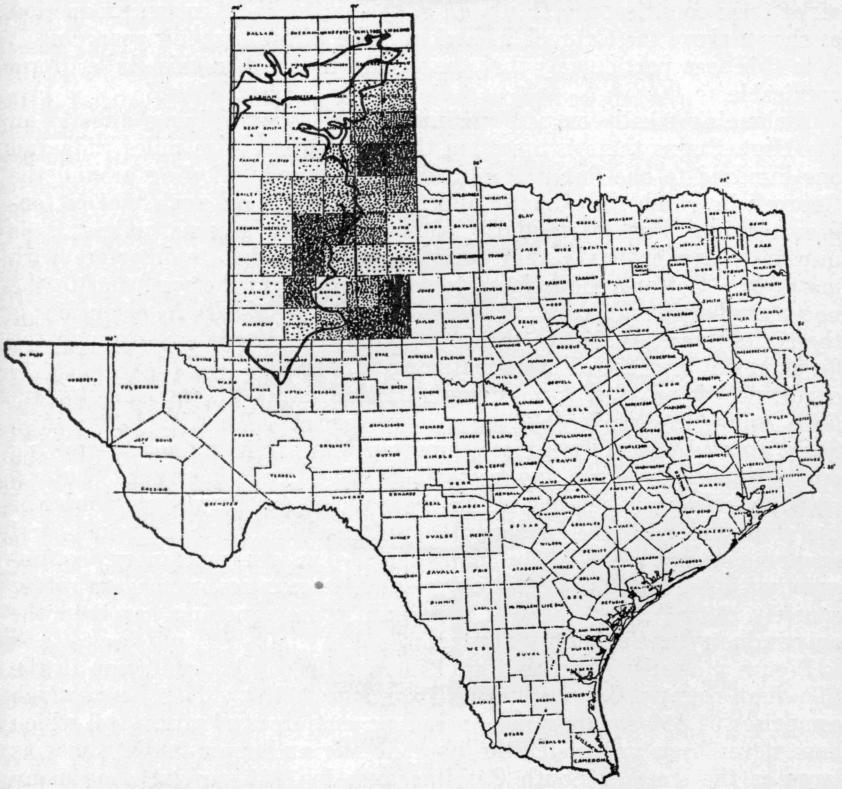

Figure 1.—The distribution and production of cotton ginned in the 54 counties in northwest Texas in 1925. The Caprock separating the High and Low Plains is indicated by the irregular line traversing the region north and south. 1 dot equals 200 bales.

*Cost of Producing Cotton in Fifteen Selected Areas, 1923, United States Department of Agriculture, Bureau of Agricultural Economics, and State Colleges of Agriculture of North Carolina, South Carolina, Georgia, Alabama, Mississippi, Arkansas, Oklahoma, and Texas.

crop of this region has reached sufficient proportions to be considered a rather important factor in the total production of the Cotton Belt. At the present time this is the principal cash crop grown in the South Plains region, the acreage exceeding that of any other crop and being approached only by the combined acreage devoted to the sorghums. The increased acreage has come about largely by bringing into cultivation new lands, but it has also been partly at the expense of or by the reduction of the acreage devoted to the sorghums or feed crops of this section.

The accompanying map, Figure 1, shows the distribution and production of cotton as of the last census report of cotton ginned for the season of 1925 in the Panhandle and South Plains counties of the state, together with the northern and western range of production at that time. The Caprock, separating the High Plains from the Low Plains, is indicated on the map. While cotton-growing has increased materially in all of these counties, practically all of the extension of cotton production as shown above the Caprock has taken place in the past few years and it is to this area particularly that the results reported in this Bulletin are applicable.

Embracing wholly or partly a number of counties lying directly on the High Plains there is a section thirty to seventy-five miles wide and one hundred to one hundred and fifty miles long following around the Caprock in which the climatic and soil conditions are such that cotton-growing has been particularly successful most seasons unless it is unusually dry or has a very early frost in the fall to interfere with maturity. Cotton production is extending both to the west and to the north of the present area. The most successful results in extension of the cotton-growing area in this direction are coming about through the development and use of early-maturing varieties particularly adapted to conditions there. Quick-maturing varieties reduce the tendency to produce bollies in unfavorable seasons and permit of earlier harvestings. Such varieties are of even more importance in extending cotton-growing appreciably to the north and west, where the altitude increases. Cotton-growing is becoming important in the counties on the western border of the state and with the tendency toward machine harvesting and hand snapping, made possible by improvements in gin machinery, cotton-growing is becoming more extensive in these counties, which are rather sparsely settled at the present time and where ranching has been the only industry until the past few years.

Figure 2 clearly shows the rapid increase in cotton production in the fifty-four counties in northwest Texas since 1912. This area, which comprises 51,850 square miles, including vast areas of virgin soil which have never been put under the plow, is one and seven-tenths times as large as the state of South Carolina and, in 1926, produced as many bales of cotton. This region comprises one-fifth of the area of the state of Texas and, in 1926, produced approximately one-fifth of the cotton grown in the state. Northwest Texas produced the past year 1,049,024 bales of cotton, whereas, ten years previously the production was normally less than one-fifth of this amount. The comparative increase in the percentage of the total production in northwest Texas which has

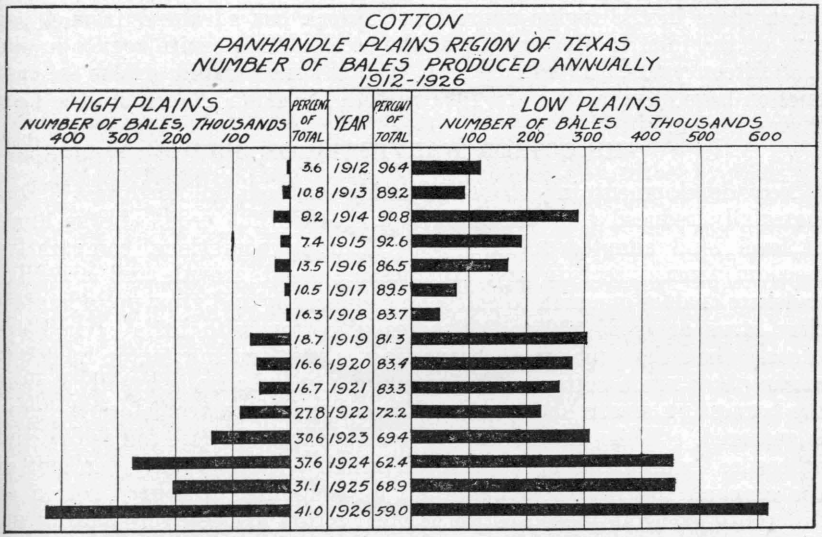


Figure 2.—Total annual production of cotton in the Panhandle and South Plains region of northwest Texas, 1912 to 1926. Note the relatively rapid increase in total production in the High Plains.

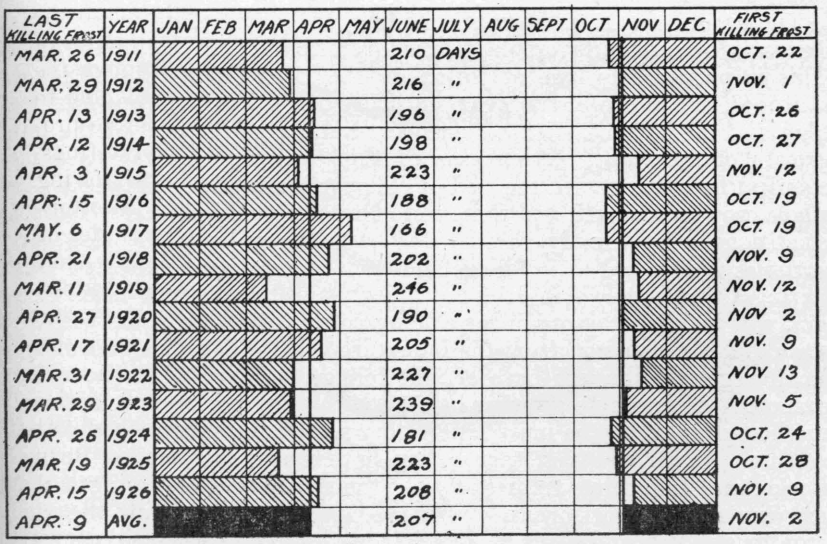


Figure 3.—Annual and average frost free period for sixteen years, 1911 to 1926, inclusive, at Texas Substation No. 8, Lubbock.

taken place in the region above the Caprock has advanced from 4 per cent of the total to 40 per cent of the total of this entire region in the past fifteen years. It will be seen that the most rapid strides in production have been made since 1921 in both the High Plains and the Low Plains region.

## THE COTTON HARVESTER OR SLED

New development in cotton-harvesting methods in northwest Texas materially reduced the cost of harvesting the 1926 crop. Large areas of level land adapted to large-scale farming operations, comparative freedom from insect injury, troublesome weed growth and excessive moisture enables one man to cultivate successfully and grow up to harvest time large areas of 150 to 200 acres of cotton with little extra help. Clearly then the problem of harvesting is the limiting factor in determining how much cotton a farmer may plant. Labor is usually scarce, the harvesting season short, and cold weather intervenes before the crop is gathered. While unfavorable to hand picking the late fall is dry and otherwise favorable to field work. Normally, ten to twenty per cent of the crop on the Plains is harvested by snapping. *Snapped* cotton as differentiated from picked cotton is open cotton harvested by pulling the whole bolls, which are run through a special cleaning equipment at the gin, separating the seed cotton from the burrs. *Bollie* cotton is ofttimes harvested and consists of the unopened or partly opened bolls, which may be immature, stained from effects of frosts, and contain "perished" staple and immature seed.

The natural small stalk-growth made by the cotton plant in northwest Texas is especially favorable to the operation of the cotton stripper. This is particularly true of cotton on the High Plains at the higher altitudes, where the plants grow normally one to two and one-half feet high and the bolls constitute a comparatively large per cent of the total growth of the plant. The season of 1926 was very favorable for mechanical harvesting with the sled or stripper inasmuch as practically the whole crop opened well and there were almost no bollies. Less favorable conditions exist usually so that for best success with the sled early varieties which shed their foliage and open promptly after the first frost, having a thin burr which dries out quickly and threshes out clean at the gin, will be advantageous in producing cotton of better grade with less stain and discoloration from the immature bolls. Varieties that make a small vegetative growth have a light foliage, and fruit heavily, with a somewhat determinate growing habit, and mature quickly and uniformly are best adapted to the most satisfactory use of the sled method of harvesting. Experiments at this station have shown the Westex, Burnett, Cooke, and Lightning Express to be promising varieties having a short growing season, short opening period, adaptable to harvesting the whole crop by sledding and likely to give fair grades of lint when so harvested.

Scarcity of labor, high charges for picking and hand snapping, low prices for cotton, weather conditions adverse to harvesting by hand, and an unusually large crop were conditions confronting the cotton farmers in northwest Texas in the fall of 1926. They were forced to adopt more

rapid and economical measures of harvesting in order to save the crop and show a profit. The cotton sled, or stripper, an implement used as early as 1914, and to a very small extent several years later, notably 1918, 1920, and 1921, was practically forced upon the growers in order to harvest the largest total crop ever produced. Probably sixty to seventy per cent of the crop was harvested either by this method or by hand snapping. The machines used were home-made or made by the local blacksmiths and showed little standardization of design. They cost ten to thirty dollars each depending upon the type of sled and the material used. Four to six acres, or two bales per day, was about the average amount of cotton harvested by one man and team at an approximate labor cost of $2.50 per bale.

The two principal types of harvesters used were the finger type and the slot or rafter type. The box of all types of harvesters is about the same and is usually 10 feet long, 4 feet wide, and 3 feet deep. One-inch material, either four or twelve inches wide, is used for the sides and bottom and the corner and cross braces are 2x4 or 2x6. This structure is mounted upon skids or runners extending the entire length of the box. It is desirable to mount on a pair of wheels so as to carry the main part of the load and thus greatly reduce the draft.

**The finger type** of sled has an opening in the center of the box in front the width of the finger assembly. Twelve to sixteen pieces of one-inch reinforcement iron about two feet long are pointed bluntly and bent upward at one end while the other end is bradded to a piece of strap iron, spacing the fingers about one-half inch apart. The whole assembly is fastened into the opening in the box, the front end of the fingers sliding on the ground and being about six inches lower than the rear end (Figure 4). As the fingers pass over the cotton plants the bolls are stripped off and raked into the box by the operator.

**A modified finger type** which proved very satisfactory was made by extending the finger assembly approximately fifty-six inches to the rear in the box. The fingers are made of T-angle iron 78 inches long and one and one-fifth inches wide. The rear end of the fingers are drilled and bolted to a solid block built up in the box to a height of about eighteen inches above the ground. The front end is pointed bluntly and turned upward slightly to permit sliding along on the ground. Having a slope of about eighteen inches, this type of finger tends to strip the cotton from the plant while it is in a normal and upright position, and prevents clogging and a consequent waste of cotton which is pulled through between the fingers. It is imperative that the front end of this sled be braced properly to prevent squeezing the fingers together when power is applied to the hitch at the corners.

**The slot or rafter type** may have a box of the same dimensions or it may be longer and deeper to accommodate taller cotton and permit of stripping from the plant in an upright position. The floor of the sled or box is in two sections being divided by a slot six inches wide at the base and extending the entire length of the box. The floor of each side of the box extends about fifteen inches in front of the box proper, is

rounded at the front forming guards which guide the plants into the slot. Two 2x4s, forming an opening or slot for the cotton stalks to pass through, extend from the rear top part of the box to the front and bottom with about a two-inch space between them. A two-inch strap iron is then fastened to these rafters and extended on to the guards in front. The opening between the 2x4s is reduced to a slot three-fourths of an inch wide by extending the strap iron over their sides.

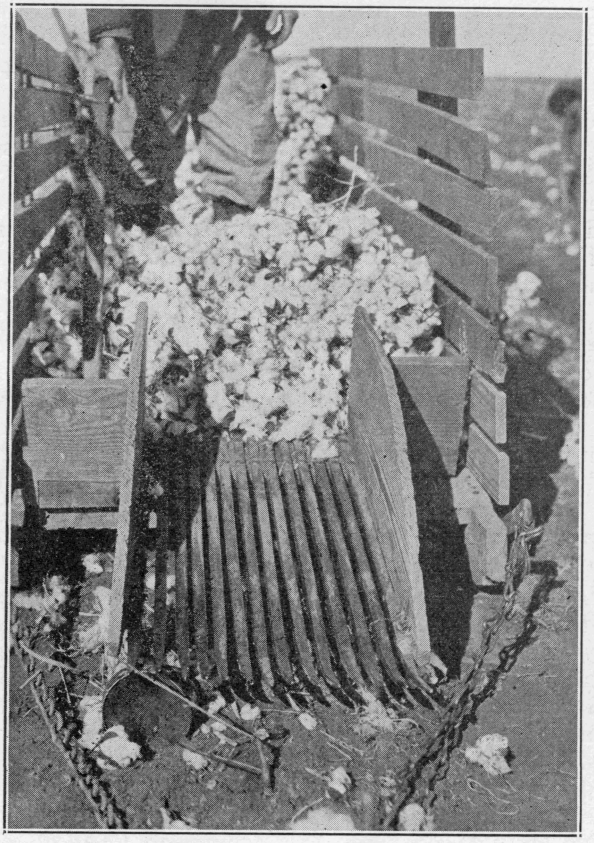

Figure 4.—The finger type of cotton harvester used extensively on the High Plains in 1926

About ninety per cent of the harvesters in use at the end of the season were of the finger type. Earlier in the season before the plants had deteriorated from excessive moisture and the cotton wasted out of the bolls the slot type worked very well. While the machines were being developed, made, and put into operation, the crop was deteriorating and wasting from the bolls so that an unusually large waste accompanied some of the harvesting by this new method. If the crop is sledded as

soon after frost as the leaves are shed it is believed a relatively small loss will be incurred. It may be found desirable to harvest before the bolls have fully dried out and place the crop in storage where it will complete drying-out and opening. In any event this rapid method of harvesting will undoubtedly call for storing the crop on the farm for a period inasmuch as it would not be profitable or economical to establish gins sufficient to handle the crop of a locality in such a short harvesting season if sledding became the universal practice.

The grade of snapped or sledded cotton is on the average one to two grades below the same cotton picked. The gins on the whole are well equipped with the most modern machinery including burr extractors

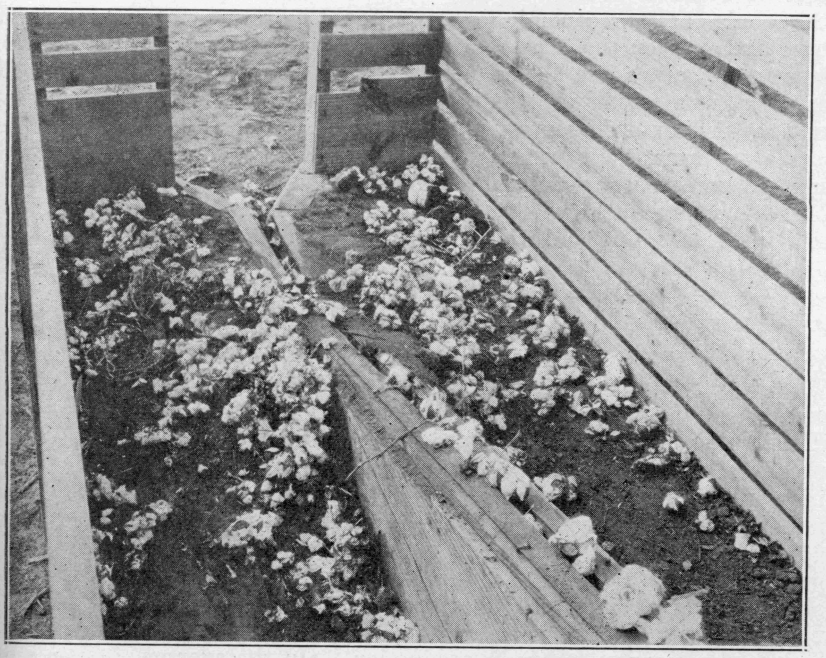

Figure 5.—The slot or rafter type of cotton sled.

and cleaning devices. Marked improvements in cleaning equipment are being made by the manufacturers of gin machinery and the grade of the snapped cotton will likely continue to be improved. Cooperation toward the realization of this end is essential to both the growers and manufacturers as a means of improving the quality of the lint and avoiding the penalty involved in marketing the lower grades due to excess dirt and trash. An understanding and recognition of the real value and merits of snapped or harvested cotton should soon establish its true value and eliminate the undue penalty and discount in classifica-

tion and selling price which at present often accompanies the marketing of this product. Spinning tests* with snapped and picked cotton have shown that the spinning qualities were practically the same; that there was about five per cent more waste in the snapped cotton but that the percentage of waste was not materially greater than in picked cotton of equal grade.

It requires approximately two thousand pounds of snapped or sledded cotton to make a bale, leaving a residue of about five hundred pounds of burrs at the gin. These burrs accumulate in great piles at the gins and become fire hazards or are burned as fuel for the operation of the plant. Analyses of the ash and slag accumulating from the burrs burned for fuel have shown as high as forty-two per cent of potash. At present these burrs are an economic loss and should be returned to the soil. A burr extractor on the farm either as a separate unit or as a part of the harvester is a possible means of retaining the burrs on the land as well as effecting a saving in ginning costs. The development and progress made with the cotton harvester, even within this one season and from the crude machines first brought into use in this emergency, was very marked and vastly greater improvements in types and efficiency of the harvesters, practices and methods of handling the crop when gathered, and in the cleaning and ginning machinery may well be expected.

## THE WEATHER AND COTTON PRODUCTION

The record of the rainfall at this Station, by months, for the fifteen-year period 1912 to 1926, inclusive, is given in the accompanying table. The average annual rainfall at this point for the period for which records are available is between twenty and twenty-one inches. The distribution is favorable to summer crops with 85 per cent of the total precipitation falling during the growing season, from April to October, inclusive, and the lowest rainfall during the winter months. The distribution of annual rainfall for the years in this period has varied from 65 per cent to as high as 95 per cent of the total falling during the growing season. The distribution on the average is extremely favorable for summer row crops; however, occasional seasons with a total annual amount ample for good crop yields may be unfavorably distributed and be the limiting factor in production. On the average, 51 per cent of the annual rainfall comes in June, July, August, and September, when the cotton crop is most in need of moisture.

The yields of cotton presented in this table for comparison with the annual rainfall represents the average of the ten highest-yielding varieties in the variety test for each year, respectively, with the exception of 1917. The variety test was a failure in that year and the yield given is the average yield of Mebane cotton produced in another test that season. Including the yields of 1917, as stated, the average yield of lint cotton for this test for the fifteen-year period has been 310 pounds.

*Spinning Tests of Picked and Snapped Cottons, Preliminary Report, Bureau of Agricultural Economics, United States Department of Agriculture.

The length of the growing season, date of the first killing frost in the fall, and mean temperatures in the early fall months are important factors in cotton production on the Plains and must be taken into consideration in choosing the variety of cotton to grow. The average number of days between the last frost in the spring and the first killing frost in the fall for this sixteen-year period, 1911 to 1926, is 207 days (Figure 3). The shortest season was 166 days in 1917, and the longest 246 days in 1919, there being a spread of 24 days between the earliest and the latest date of the killing frost in the fall and a difference of 79 days between the longest and the shortest growing season for this period of years. The average date of the last killing frost in the spring is April 9 and the average date of the first killing frost in the fall is November 2. The mean temperature for the months of June to September is quite uniform and ranges above 70 degrees. The mean temperature for October drops to 59 degrees. The cool nights at this altitude tend to retard development and prolong maturity so that with late-maturing varieties there is a tendency to produce too large a percentage of bollies in certain years. A fall with high rainfall accompanied by low night temperatures beginning in August and extending through September and October, thus prolonging the period of maturity, may be more of a limiting factor in yield than is lack of moisture. 1916, 1917, 1920, and 1925 were seasons which suffered a reduction in yield from this cause. In these years the early, adapted varieties proved a great deal more successful than the big-boll types of later maturity.

A good stand of cotton at planting time is an important factor in production and securing it demands careful and timely operations based upon the soil and climatic conditions existing at planting time. The period of favorable conditions for planting is often quite short and it is important to plant rapidly in order to take advantage of these optimum conditions. Surface soil moisture is depleted rather rapidly and may soon be insufficient for good germination. Cotton seeds covered with fuzz do not lie in close contact with the soil and if the moisture content of the soil is rather low a long time may be required for the fuzz and seed to take up sufficient moisture to grow, in which case an adequate stand will not be secured. Soaking the seed in water just before planting is often helpful. Cotton should be planted with a lister planter run shallow to medium-deep and the seed deposited on firm, moist soil either directly on the bottom of the lister furrow or in a clean, narrow trench behind an opener provided to follow the lister bottom.

Trial plantings of delinted cotton seed have been made on the Station farm a number of times with excellent results. Good germination and stands have been obtained with delinted seed under soil moisture conditions entirely inadequate for satisfactory germination of non-delinted seed. In 1924 delinted seed came up from 5 to 7 days quicker than ordinary-ginned seed and also gave a more nearly perfect stand as well as a gain in the length of growing season. Since obtaining a stand is one of the most difficult problems connected with cotton-growing in the

Table 1.—Showing the monthly, mean monthly, annual and mean annual precipitation and the annual and average date of first killing frost in the fall, together with the average yield of lint cotton to the acre for the 15-year period, 1912-1926.

| Year | Rainfall in Inches | | | | | | | | | | | | | Date First Killing Frost in Fall | Average Yield Lint Cotton |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total | | |
| 1912 | .02 | 1.28 | .61 | .50 | 1.58 | .96 | 3.35 | 2.37 | .73 | 2.81 | .01 | .38 | 14.60 | Nov. 1 | 130.44 |
| 1913 | .04 | .20 | 1.18 | 1.82 | .24 | 5.88 | .40 | .32 | 4.19 | 1.53 | 1.54 | 2.13 | 19.47 | Oct. 26 | 345.42 |
| 1914 | .15 | .10 | .29 | 1.47 | 4.04 | 3.86 | 6.17 | 5.95 | .46 | 7.12 | .35 | 1.47 | 31.43 | Oct. 27 | 663.17 |
| 1915 | .09 | 3.00 | 2.52 | 6.18 | 1.52 | 4.01 | 1.42 | 2.96 | 7.86 | 1.52 | .04 | .76 | 31.88 | Nov. 12 | 427.82 |
| 1916 | .17 | T | 1.15 | 2.63 | .39 | 1.52 | .36 | 2.45 | 2.79 | 2.91 | .55 | .11 | 15.03 | Oct. 19 | 255.86 |
| 1917 | .35 | .05 | .21 | .58 | 1.07 | .64 | 1.42 | 1.16 | 3.03 | .14 | .08 | .00 | 8.73 | Oct. 19 | 137.60 |
| 1918 | .84 | .58 | .05 | .72 | 1.67 | 2.95 | .53 | .79 | .79 | .51 | .69 | 2.03 | 12.15 | Nov. 9 | 395.16 |
| 1919 | .12 | .25 | 3.39 | 3.53 | 2.10 | 3.52 | 2.28 | 2.83 | 5.70 | 7.34 | .36 | .19 | 31.61 | Nov. 12 | 371.07 |
| 1920 | .90 | .11 | .24 | .15 | 2.91 | 3.66 | 2.19 | 2.64 | 1.63 | 1.43 | 2.21 | .09 | 18.16 | Nov. 2 | 323.32 |
| 1921 | .14 | .45 | 1.47 | .24 | .43 | 7.71 | .84 | .92 | 4.50 | .02 | T | T | 16.72 | Nov. 9 | 438.87 |
| 1922 | .34 | .20 | .55 | 3.59 | 3.50 | 2.43 | 1.36 | .28 | .17 | .60 | 1.50 | .07 | 14.59 | Nov. 13 | 199.53 |
| 1923 | .24 | .76 | 1.04 | 3.18 | 2.77 | 3.98 | 1.65 | 1.59 | 2.67 | 6.80 | .85 | .64 | 26.17 | Nov. 5 | 303.04 |
| 1924 | T | .17 | .96 | .86 | .90 | 1.79 | 1.20 | 1.76 | 1.25 | .47 | .03 | .06 | 9.45 | Oct. 24 | 251.25 |
| 1925 | .65 | .02 | T | 1.12 | 2.31 | .86 | 3.38 | 3.32 | 9.44 | 1.33 | .11 | .21 | 22.75 | Oct. 28 | 101.81 |
| 1926 | .56 | .04 | 1.64 | 1.81 | 5.14 | 1.10 | 1.03 | 2.75 | 4.15 | 8.40 | .67 | 1.77 | 29.06 | Nov. 9 | 316.38 |
| Average | .31 | .48 | 1.02 | 1.89 | 2.04 | 2.99 | 1.84 | 2.14 | 3.29 | 2.86 | .60 | .66 | 20.12 | Nov. 2 | 310.72 |

Plains region, the use of delinted seed for planting purposes will be a material aid to success. Delinted seed should be more universally used for planting here and the practice will undoubtedly increase in the future as the advantages are learned.

## COMPARATIVE DROUTH RESISTANCE OF COTTON AND GRAIN SORGHUM

A measure of the drouth-resistance of cotton is indicated when the yield of this crop is considered along with comparative yields of feterita, which is recognized as one of the most drouth-resistant grain sorghums grown. Experiments here under an average annual rainfall of around twenty inches have shown cotton to be a remarkably drouth-resistant crop. The ability of cotton to withstand hot, dry summers has been recognized but it has not been placed in the category of dry-land crops. That it can safely be so placed is evidenced by comparative yields here and that cotton can well take its place as a drouth-resistant crop alongside of the sorghums, which are recognized as being the premier drouth-resistant crops adapted to dry-land agriculture, is clearly shown.

The following table shows the comparative acre yields of lint cotton and feterita over a twelve-year period. These yields represent an average of twenty-one tenth-acre plats each of feterita and cotton, grown in direct comparison in a series of rotations, for each of the years 1915 to 1926, thus giving a reliable and parallel average for each of these two crops. The table also shows the annual rainfall, the seasonal rainfall, May to September, and the pre-season rainfall, from September to April, inclusive.

Table 2.—The annual, seasonal and pre-season rainfall and yields of cotton and feterita.

| Year | Rainfall | | | Average Acre Yield | |
|---|---|---|---|---|---|
| | Annual Rainfall | Seasonal, May to September, Inclusive | Pre-season, September to April, Inclusive | Pounds Lint Cotton | Bushels Feterita |
| 1915 | 31.88 | 17.77 | 21.19 | 418.90 | 35.81 |
| 1916 | 15.03 | 7.51 | 14.13 | 246.01 | 17.63 |
| 1917 | 8.73 | 7.32 | 7.55 | 16.45 | 10.68 |
| 1918 | 12.15 | 6.73 | 5.44 | 148.91 | 9.38 |
| 1919 | 31.61 | 16.43 | 11.31 | 477.10 | 46.17 |
| 1920 | 18.16 | 13.03 | 14.99 | 250.20 | 59.10 |
| 1921 | 16.72 | 14.40 | 7.66 | 344.59 | 35.23 |
| 1922 | 14.59 | 7.74 | 9.20 | 210.34 | 21.93 |
| 1923 | 26.17 | 12.66 | 7.56 | 339.13 | 32.78 |
| 1924 | 9.45 | 6.90 | 12.95 | 247.36 | 21.98 |
| 1925 | 22.75 | 19.31 | 3.60 | 150.30 | 20.11 |
| 1926 | 29.06 | 14.17 | 15.14 | 269.44 | 29.10 |
| Average | 19.69 | 12.00 | 10.89 | 259.89 | 28.33 |

The relation prevailing between the yields of both lint cotton and feterita with annual, seasonal and pre-season rainfall is further shown by the following correlation coefficients calculated from the data above:

| Rainfall | Correlation Coefficients Cotton | Feterita |
|---|---|---|
| Annual | .74 ± .09 | .55 ± .14 |
| Seasonal | .54 ± .14 | .55 ± .14 |
| Pre-season | .50 ± .15 | .45 ± .15 |

It will be seen from these coefficients that there is a relatively high degree of relationship between the yield of cotton and feterita and the rainfall; however, the probable errors are naturally high owing to the comparatively small number of years involved in these calculations. Cotton having a longer growing season than sorghum, it would seem reasonable to suppose that it is more dependent on the total annual rainfall than feterita. This seems to be borne out by the size of the correlation coefficients, the coefficient between yield of cotton and total rainfall being considerably higher than that between feterita and total rainfall, although the difference between these two coefficients is barely significant on account of the small size of the sample. There is little difference between these two crops in their relation to seasonal and pre-season rainfall, both showing about the same relationship but indicating the important bearing of moisture on the production of high yields. The

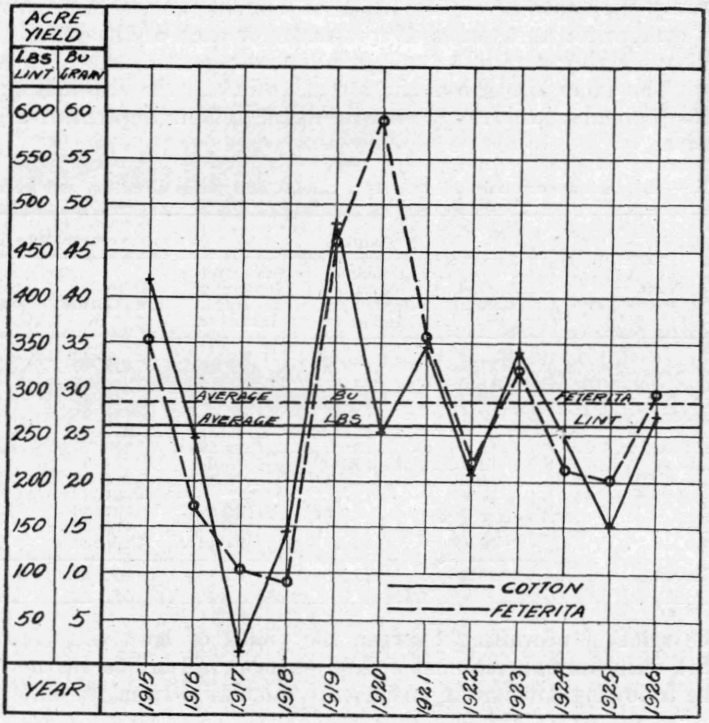


Figure 6.—Comparative yield of cotton and grain sorghum, 1915-1926.

effect of rainfall during the growing season seems to be slightly more marked than is that of the fall and winter preceding.

The average yield of cotton for this twelve-year period has been 259.89 pounds of lint as compared with an average yield of grain of 28.33 bushels. In Figure 6 is portrayed the average yield of lint cotton in pounds and grain sorghum in bushels for each of the years 1915 to 1926. The yields on the graph are based upon an ordinate value of five bushels of grain sorghum being equal to fifty pounds of lint. Actually, on the average for this period, a yield of 5.66 bushels of grain sorghum is equivalent to 51.97 pounds of lint, or approximating closely one bushel of grain to ten pounds of lint, this relationship holding so closely from year to year that the yield for either one being known, the yield of the other could be rather reliably predicted. This graph shows the manner in which the yields of cotton and grain sorghum fluctuate together. With the exception of the year 1920, a low yield of one is accompanied by a corresponding low yield of the other. The exception shown in 1920 was due largely to the fact that the season was unfavorable for maturity and opening of the cotton crop, which resulted in a rather large crop of bollies unharvested. The low yield of cotton, therefore, was not due to lack of sufficient moisture.

Comparison of the yields of cotton and feterita with the annual rainfall indicates that on the average a fair yield can be depended upon any time there is a high pre-season rainfall, regardless of whether the seasonal rainfall be favorable or not. An abundant supply of sub-soil moisture at planting time is indicative of a normal yield and an important factor in cotton production. Both a high seasonal rainfall and a high pre-season rainfall occurring together is accompanied by unusual yields. On the other hand, a low pre-season rainfall is a fairly good index that the yield of cotton or grain sorghum will be low and the yield is certain to be low if the seasonal and pre-season moisture are both below the normal. This brings out the significant value of underground season, or sub-soil moisture, which has such an important bearing on satisfactory yields in this region, and shows the certainty with which one can proceed in planting a crop of cotton with reasonable assurance of a normal yield when the pre-season rainfall has been normal or above. Under such conditions, the banks would be justified in enlarging their extension of credit and the farmer justified in seeking it or drawing more heavily upon his reserve resources for the purpose of extending and intensifying his operations. Inversely, the season preceded by low rainfall should be approached more cautiously. Thus being guided in advance by the outlook will result in greater profit from year to year, tend to reduce risks from the weather hazards, determine the best practices to follow, such as rate of planting and cultivation, and tend to stabilize the farming industry in general.

## CONDITIONS SURROUNDING VARIETY TESTS

The foregoing discussion indicates that cotton-growing in the Plains region is confronted with conditions differing in many respects from

those encountered in the older parts of the Cotton Belt. To insure maximum production and the highest returns the best-yielding varieties must be grown. Following is a record of the performance of cotton varieties here during the past fifteen years, together with a discussion of the conditions surrounding their growth and development during the season. A study of these varieties from year to year, their characteristics, growing habits, and production will be of value to the farmers growing cotton in this region.

The cotton varieties were grown in rows three feet apart and the plants spaced a uniform distance apart in the rows by measurement and count. The row space to the plant was usually eighteen inches, except in earlier years when the space was twelve inches. Up until 1920, during which time a large number of varieties were tested each year, they were planted in plats of one one-hundred-and-tenth acre in size and replicated from two to three times. Since 1920 the plats have been one-sixteenth acre in size and duplicated. In each instance the plats have been properly protected by guard rows. The yields recorded are the average for all replications of the variety.

Prior to 1919, the method of preparing the seedbed was by plowing, and intervening tillage consisted of disking and harrowing to settle and pulverize the seedbed and to keep down spring weed growth. Later, however, it was found desirable from the standpoint of soil management, particularly the prevention of soil blowing, to prepare the seedbed by the lister method, leaving the ground rough. Listing was usually done in February to a depth of six inches and the middles "busted" back or relisted again in March or early April. The crop was planted with a lister planter, bursting the beds and planting in a shallow furrow. Early cultivations were done with the harrow, knives, or go-devil and the late ones with the riding cultivator equipped with sweeps. Uniform and clean cultivation was practiced.

No commercial fertilizer or barnyard manure was used in these tests. All tests were conducted under dry-land conditions and grown on areas in established rotations; however, the land on which these variety tests were grown was ofttimes preceded by a green-manure crop or fallow prior to 1921, while since that time the test followed on land which had been in cotton or grain sorghum the preceding year. The green-manure crop consisted of sorgo plowed under when in full boot. When planted on land thus treated as well as that fallowed the previous year, the varieties in these tests as a whole were given an advantage in the way of moisture and plant food which permitted maximum production and gave yields above the average for the season.

The crop was harvested in three to five pickings until 1922, when weekly pickings of all varieties were instigated, beginning with the first bolls to open, and continued on the same day of the week throughout the harvesting period. Each variety was ginned on the small experimental gin to obtain lint percentages and the samples of lint graded and stapled by the Textile Department of the College.

A separate table is given presenting the results of cotton variety tests for each year from 1912 to 1926, except the year 1917, when the variety test of cotton was a complete failure. The results are reported for each variety in the experiment each year. The varieties are listed in the tables in order of their rank in yield.

## 1912 and 1913

Tables Nos. 3 and 3A give the yields of seed cotton for the varieties tested in 1912 and 1913 and include twenty-four and thirty-three varieties, respectively. The linting per cent and lint yield were not obtained in these two seasons.

In 1912 the upland long staple varieties were among the best producers, but No. 669 Burnett, which is a short staple and small boll variety, was outstanding in yield above all other varieties.

It will be noted that Sea Island and Yuma, two typical long staple varieties, produced very low yields this year as they did also in all future years during which they were tested.

In 1913 six varieties produced above 1000 pounds of seed cotton to the acre. No. 479 Toole produced 1511 pounds of seed cotton and was the best yielding variety. Favorable yields were made by some of the better staple varieties but the shorter staple varieties are the more prominent in yield this year.

Table 3.—Cotton Variety Test in 1912. Varieties arranged in order of yield of seed cotton.

| T. S. No. | Variety Name | Acre yield, pounds seed cotton |
|---|---|---|
| 669 | Burnett | 518.8 |
| 118 | Clarksville Long Staple | 487.1 |
| 121 | Allen's Long Staple | 425.0 |
| 2 | Bolivia | 403.1 |
| 128 | Mebane | 388.5 |
| 122 | Cook's Long Staple | 365.6 |
| 24 | Ferguson Round Nose | 350.0 |
| 74 | Allen's Long Staple | 331.3 |
| 8 | Brabham | 325.0 |
| 11 | Lone Star | 318.8 |
| 120 | Burns' Long Staple | 312.5 |
| 15 | Rowden | 290.6 |
| 1 | Cleveland Big Boll | 253.1 |
| 119 | Keenan | 240.6 |
| 3 | Columbia Long Staple | 240.6 |
| 16 | Crowder | 234.4 |
| 14 | Unknown Long Staple | 203.1 |
| 5 | Allen's Long Staple | 200.0 |
| 7 | Burns' Long Staple | 181.3 |
| 79 | Jackson | 178.1 |
| 78 | Hendricks | 171.9 |
| 77 | Rowden | 168.8 |
| 10 | Yuma | 75.0 |
| 17 | Sea Island | 25.0 |

Table 3A.—Cotton Variety Test in 1913. Varieties arranged in order of yield of seed cotton.

| T. S. No. | Variety Name | Acre yield, pounds seed cotton |
|---|---|---|
| 479 | Toole | 1511.12 |
| 472 | Peterkin | 1168.75 |
| 475 | Texas Wood | 1111.00 |
| 476 | Texas Oak | 1069.75 |
| 469 | Hawkins | 1046.30 |
| 446 | Simpkin's Prolific | 1022.60 |
| 669 | Burnett | 949.80 |
| 16 | Crowder | 860.75 |
| 443 | Half and Half | 818.60 |
| 152 | Mortgage Lifter | 804.00 |
| 700 | Long Staple | 798.87 |
| 128 | Mebane | 792.83 |
| 444 | Haaga's Ex. Long Staple | 759.90 |
| 698 | Mebane Triumph | 754.00 |
| 478 | Allen's Imp. Long Staple | 750.75 |
| 348 | Black Rattler | 724.60 |
| 135 | Union Big Boll | 720.50 |
| 415 | Huffman | 714.90 |
| 412 | Foster's Long Staple | 699.85 |
| 486 | Robert's Big Boll | 669.60 |
| 118 | Clarksville Long Staple | 662.75 |
| 129 | Edgeworth | 648.83 |
| 77 | Rowden | 643.50 |
| 170 | Hartsville | 635.25 |
| 474 | Truitt | 616.00 |
| 414 | Durango | 562.80 |
| 14 | Unknown Long Staple | 550.00 |
| 7 | Burns' Long Staple | 532.00 |
| 413 | Snowflake | 531.66 |
| 11 | Lone Star | 473.00 |
| 130 | Bank Account | 415.25 |
| 473 | Willet's Red Leaf | 378.12 |
| 10 | Yuma | 272.25 |

## 1914

The performance of the varieties in the test in 1914 is especially interesting because this season was particularly favorable to cotton production and the best yields of the fifteen-year period were made this year. The planting was made May 12 in duplicate. The plants were thinned when about six inches high to a stand of ten inches between plants. The abundant rainfall from April to August followed by a dry September enabled most varieties to mature well a heavy yield which was harvested in from three to five pickings of all varieties.

The per cent of lint, yield of seed cotton and yield of lint is given for fifty-seven varieties of cotton in the test in 1914. Thirty of these varieties yielded above a bale to the acre and thirteen yielded over 600 pounds of lint to the acre. The season of 1914 was very favorable to cotton production because of abundant rainfall well distributed and a growing season of about average length. The early spring rains permitted a rapid and early development of the young plants. In this season of favorable weather conditions and high production it is worthy of note that the varieties of superior length of staple do not in general come among the highest yielders.

Data on the number of bolls required to make a pound of seed cotton and the total number of bolls to the stalk were obtained from the dif-

ferent varieties. It is worthy of note that the highest yielding varieties were generally small bolled cottons and carried a large number of bolls to the stalk.

Table 4.—Cotton Variety Test in 1914. Arranged in order of yield of lint.

| T. S. No. | Variety | No. Bolls to the Pound | No. Bolls to the Stalk | Per Cent Lint | Acre Yield Pounds Seed Cotton | Acre Yield Pounds Lint |
|---|---|---|---|---|---|---|
| 469 | Hawkins | 85 | 19 | 34.2 | 2116.2 | 723.7 |
| 476 | Texas Oak | 81 | 18 | 34.7 | 2035.1 | 704.9 |
| 485 | Cleveland Big Boll | 63 | 16 | 32.7 | 2355.9 | 680.8 |
| 783 | King | 99 | 16 | 34.1 | 1944.3 | 663.0 |
| 446 | Simpkin's Prolific | 87 | 16 | 33.3 | 1973.9 | 656.2 |
| 480 | Culpepper's Big Boll | 61 | 14 | 30.8 | 2103.4 | 647.8 |
| 474 | Truitt | 63 | 14 | 31.5 | 2059.8 | 645.2 |
| 699 | Burnett | 78 | 16 | 30.4 | 2129.9 | 640.5 |
| 481 | Cook's Imp. Big. Boll | 62 | 14 | 30.9 | 2056.6 | 634.9 |
| 487 | Dongola Big Boll | 64 | 14 | 29.8 | 2133.3 | 634.7 |
| 700 | Long Staple | 70 | 13 | 28.9 | 2129.2 | 613.1 |
| 698 | Mebane Triumph | 54 | 10 | 34.2 | 1779.3 | 604.8 |
| 472 | Peterkin | 91 | 16 | 35.3 | 1702.3 | 601.5 |
| 443 | Half and Half | 61 | 12 | 35.4 | 1650.0 | 587.9 |
| 415 | Huffman | 54 | 13 | 30.0 | 1930.1 | 585.0 |
| 496 | Broadwell's Double Jointed | 55 | 10 | 32.9 | 1766.9 | 580.9 |
| 479 | Toole | 89 | 21 | 33.3 | 1717.4 | 571.1 |
| 482 | Bohler's Triple Jointed | 54 | 14 | 31.8 | 1632.4 | 561.1 |
| 938 | Cook | 54 | 10 | 32.8 | 1689.2 | 555.6 |
| 445 | Webber | 57 | 16 | 26.6 | 2082.1 | 553.8 |
| 941 | Triumph | 52 | 11 | 33.1 | 1664.5 | 550.9 |
| 135 | Union Big Boll | 62 | 16 | 29.9 | 1831.5 | 548.1 |
| 129 | Edgeworth | 62 | 16 | 32.9 | 1625.3 | 534.7 |
| 7 | Burns' Long Staple | 54 | 10 | 30.5 | 1755.0 | 534.1 |
| 152 | Mortgage Lifter | 54 | 12 | 29.7 | 1959.0 | 533.4 |
| 475 | Texas Wood | 97 | 17 | 32.3 | 1635.0 | 531.5 |
| 411 | Hite's Early Prolific | 70 | 22 | 31.7 | 1668.6 | 528.7 |
| 130 | Bank Account | 82 | 15 | 32.7 | 1590.5 | 519.4 |
| 16 | Crowder | 50 | 17 | 30.2 | 1845.3 | 513.7 |
| 414 | Durango | 66 | 15 | 29.8 | 1625.0 | 500.0 |
| 466 | Webber | 58 | 16 | 27.6 | 1781.4 | 491.6 |
| 504 | Durango | 67 | 15 | 30.7 | 1586.1 | 486.8 |
| 413 | Snowflake | 70 | 13 | 28.5 | 1715.6 | 484.1 |
| 486 | Roberts' Big Boll | 64 | 13 | 30.8 | 1568.9 | 482.3 |
| 483 | Columbia | 48 | 13 | 29.1 | 1667.9 | 481.6 |
| 11 | Lone Star | 47 | 11 | 33.0 | 1419.3 | 465.6 |
| 118 | Clarksville Long Staple | 73 | 14 | 28.2 | 1628.0 | 460.7 |
| 412 | Foster's Long Staple | 71 | 15 | 29.0 | 1508.4 | 437.4 |
| 939 | Floradora | 81 | 15 | 27.4 | 1571.0 | 433.5 |
| 444 | Haaga's Early Long Staple | 95 | 14 | 26.6 | 1591.9 | 430.0 |
| 495 | Hendricks | 85 | 14 | 32.5 | 1289.1 | 421.1 |
| 498 | Bolivia | 71 | 15 | 28.5 | 1465.1 | 418.6 |
| 14 | Unknown Long Staple | 56 | 11 | 27.1 | 1544.1 | 418.0 |
| 942 | Lone Star | 45 | 10 | 33.3 | 1243.0 | 413.1 |
| 77 | Rowden | 49 | 13 | 29.5 | 1482.2 | 410.3 |
| 348 | Black Rattler | 73 | 11 | 24.2 | 1509.1 | 363.7 |
| 170 | Hartsville | 55 | 12 | 29.5 | 1223.1 | 362.8 |
| 473 | Willet's Red Leaf | 93 | 19 | 34.6 | 1039.1 | 350.9 |
| 478 | Allen's Imp. Long Staple | 92 | 16 | 29.0 | 1175.7 | 340.8 |
| 494 | Cannon's World Skinner | 49 | 14 | 30.7 | 961.4 | 294.4 |
| 940 | Pemiscot | 59 | 16 | 27.1 | 1067.1 | 289.0 |
| 470 | Sunflower Long Staple | 88 | 16 | 26.6 | 1025.8 | 277.8 |
| 471 | Dillon | 71 | 25 | 33.1 | 649.7 | 214.6 |
| 477 | Webber | 55 | ..... | 26.9 | 545.2 | 147.0 |
| 484 | Keenan | 70 | 7 | 24.5 | 314.9 | 77.1 |
| 10 | Yuma | 94 | 4 | 29.2 | 49.5 | 14.5 |
| 958 | Sea Island | ..... | | 25.8 | 53.3 | 13.8 |

## 1915

The yields of forty-four varieties in 1915 are reported. This season represents one of abundant rainfall, well distributed, and a long grow-

ing season, and was in general favorable to cotton but not as favorable as the preceding year. The first killing frost in the fall occurred November 12, or ten days later than normal.

The planting was done May 11 and the plants thinned to eighteen inches apart in the row. The stand was injured somewhat by several days of high winds and drifting sand the latter part of May and the plants were set back and prevented from making a good growth early. This injury to the stand on the duplicate planting made it necessary to discard those yields and the yields given, therefore, are from only single plats.

Cleveland T. S. No. 1375 was the highest yielding variety. Burnett, Cook and Mebane were other high yielding varieties which have also yielded well in other years.

Table 5.—Cotton Variety Test in 1915. Arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint* | Acre Yield, Pounds Seed Cotton | Acre Yield, Pounds Lint |
|---|---|---|---|---|
| 1375 | Cleveland | 34.0 | 1533.13 | 521.26 |
| 1373 | Layton | 42.1 | 1179.06 | 496.38 |
| 699 | Burnett | 31.6 | 1419.69 | 448.62 |
| 1357 | Bates | 41.4 | 1031.25 | 426.93 |
| 1369 | Cook | 38.8 | 1093.13 | 424.13 |
| 700 | Long Staple | 29.9 | 1381.88 | 413.18 |
| 804 | Mebane | 34.0 | 1185.95 | 403.21 |
| 1376 | Cleveland | 34.0 | 1130.94 | 384.51 |
| 1264 | Keenan-Goodson | 28.1 | 1000.31 | 381.11 |
| 1377 | Cook | 38.8 | 976.69 | 378.95 |
| 1363 | Moneymaker | 38.4 | 962.50 | 369.60 |
| 1277 | Rublee | 42.7 | 862.81 | 368.41 |
| 1370 | Simpkins | 34.8 | 1038.13 | 361.26 |
| 1361 | Columbia | 29.1 | 1203.13 | 350.11 |
| 1364 | Bank Account | 34.4 | 979.69 | 337.01 |
| 1371 | Bostwick | 38.7 | 866.25 | 335.23 |
| 1360 | Roberts | 30.8 | 1086.25 | 334.56 |
| 1372 | Mortgage Lifter | 30.1 | 1093.13 | 329.03 |
| 1260 | Ricks | 34.0 | 924.69 | 314.39 |
| 1366 | Toole | 33.3 | 935.00 | 311.35 |
| 1362 | Cleveland | 34.0 | 904.06 | 307.38 |
| 1152 | King X Triumph | 37.7 | 800.94 | 301.95 |
| 1358 | Texas Oak | 34.7 | 859.38 | 298.20 |
| 469 | Hawkins | 33.7 | 828.44 | 279.18 |
| 1266 | Virgatus | 42.0 | 646.25 | 271.42 |
| 1359 | Roberts | 30.8 | 866.25 | 266.80 |
| 1274 | Huffman | 30.0 | 873.13 | 261.93 |
| 1367 | Truitt | 31.5 | 828.44 | 260.95 |
| 1368 | Texas Wood | 32.3 | 807.81 | 260.92 |
| 1151 | Cleveland | 34.0 | 763.13 | 259.46 |
| 698 | Mebane | 34.2 | 752.81 | 257.46 |
| 1267 | Ferguson Round Nose | 29.9 | 852.50 | 254.64 |
| 1378 | Lone Star | 35.6 | 708.13 | 252.09 |
| 1379 | Mebane | 34.0 | 739.06 | 251.28 |
| 793 | Belton | 39.8 | 598.13 | 238.05 |
| 1263 | Hartsville | 28.5 | 790.63 | 225.32 |
| 1374 | Durango | 30.2 | 718.44 | 216.96 |
| 2020 | Lone Star | 33.0 | 574.06 | 189.43 |
| 1261 | Webber | 30.0 | 625.63 | 187.68 |
| 804 | Mebane | 34.1 | 505.31 | 172.31 |
| 1262 | Webber | 27.4 | 608.44 | 166.71 |
| 1276 | Mebane | 34.1 | 443.44 | 151.21 |
| 942 | Lone Star | 33.3 | 360.94 | 120.19 |
| 1275 | Rowden | 31.3 | 364.38 | 114.05 |

*Note.—The per cent lint was obtained from the average of tests in other years.

## 1916

The season of 1916 was characterized both by light rainfall and a short growing season, which factors materially reduced the yields obtained. The yields are somewhat low in all cases.

Of the better staple varieties the Allen's Express gave the highest yield of seed cotton and matured early but gave a low per cent of lint. Cook gave the highest yield of lint and a high per cent of lint turnout. Allen's Express and Cook, while outstanding in both yield and maturity, showed poor storm resistance. Three strains of the Lone Star variety all made a yield above the average of the varieties this year and comparatively a better showing for the variety than it made either of the two previous years, which were seasons more favorable to high production. The proportionately better showing of this variety this year is due probably to the character of the season, having a tendency to promote maturity and retard vegetative growth.

Table 6.—Cotton Variety Test in 1916. Arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Acre Yield, Pounds Seed Cotton | Acre Yield, Pounds Lint |
|---|---|---|---|---|
| .... | Cook | 44.8 | 745.85 | 334.14 |
| 1861 | Ideal | 39.4 | 768.24 | 302.68 |
| 1852 | Bank Account | 36.2 | 742.44 | 268.76 |
| 1849 | Sunbeam | 37.6 | 704.66 | 264.95 |
| 1830 | Wannamaker | 35.0 | 744.20 | 260.47 |
| 1889 | Stormproof | 34.5 | 738.98 | 254.94 |
| 1815 | Allen's Express | 28.9 | 845.57 | 244.36 |
| 1933 | Lone Star | 42.0 | 512.16 | 215.10 |
| 1826 | Cleveland Big Boll | 35.3 | 594.66 | 209.91 |
| 1825 | Hawkins | 33.2 | 601.53 | 199.70 |
| 1827 | Lone Star | 33.5 | 560.28 | 187.69 |
| 2540 | Lone Star | 35.9 | 462.27 | 165.95 |
| 1818 | Rowden | 33.7 | 429.66 | 144.79 |
| 804 | Mebane | 34.0 | 424.68 | 144.39 |
| 1834 | Simpkins' Prolific | 36.4 | 393.58 | 143.26 |
| 1848 | Matchless Ex. Ey. Big Boll | 37.7 | 372.90 | 140.58 |
| 1800 | Wooten's Columbia Big Boll | 27.8 | 493.24 | 137.12 |
| 1851 | Union Big Boll | 34.2 | 395.28 | 135.18 |
| 1850 | Hastings' Upright | 33.9 | 390.11 | 132.24 |
| 1835 | Webber 82 | 32.7 | 385.00 | 125.89 |
| 1847 | Mortgage Lifter | 30.5 | 402.98 | 122.90 |
| 1823 | Early King | 34.5 | 328.24 | 113.24 |
| 699 | Burnett | 32.9 | 302.50 | 99.52 |
| 1828 | Rowden | 33.2 | 285.28 | 94.71 |
| 1837 | Keenan-Goodson | 38.1 | 247.44 | 94.27 |
| 1846 | Surecrop | 31.3 | 252.61 | 79.06 |
| 1829 | Long Staple | 30.9 | 206.20 | 63.71 |
| 1838 | Webber 49 | 27.3 | 190.74 | 52.07 |
| 1836 | Hartsville 9 | 27.6 | 108.24 | 29.87 |
| 1853 | Yuma | 29.9 | 77.33 | 23.12 |
| 1824 | Sea Island | 28.5 | 36.80 | 10.48 |

## 1917

The variety test of cotton was a complete failure in 1917 because of deficient moisture in the spring and inability to get the cotton up to a stand in time to mature. The varieties were planted May 14 in soil too dry to give a good stand and later light showers came in amounts

just sufficient to spoil the seed. Subsequently a stand was obtained from later planting of some varieties but it was too late for cotton to mature and no yields were obtained.

### 1918

The comparative yields of the different varieties in the test in 1918 are given below. Lack of stand in a number of varieties rendered them incomparable, and they are omitted from the table, which includes thirty-two of the varieties tested. The season of 1918 was one of low rainfall, preceded by a year similarly deficient. The late date of killing frost in the fall gave a long growing season for the later maturing varieties.

Improved Champion and F. G. 33 were the best short staple varieties. Of the better staple varieties Allen's Express, Acala, Trice, Express and Durango, the first mentioned was the only one which yielded as much as the average of all varieties. Allen's Express also gave a high yield in 1916.

Table 7.—Cotton Variety Test in 1918. Arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre yield in pounds, Seed Cotton | Lint |
|---|---|---|---|---|---|---|
| 3056 | Improved Champion | 37.28 | 5/8 | S M | 1474.57 | 475.12 |
| 3000 | F. G. 33 | 35.95 | 15/16 | S M | 1209.99 | 434.78 |
| 3047 | Simpkins' Prolific | 35.17 | 15/16 | M | 1327.73 | 423.29 |
| 3046 | Early King | 39.34 | 7/8 | S L M | 1017.50 | 399.41 |
| 3022 | Bank Account | 39.72 | 7/8 | S L M | 1020.93 | 398.75 |
| 3028 | Cook 588 | 38.61 | 5/8 | M | 1096.56 | 393.58 |
| 3030 | Cook 931 | 43.07 | 5/8 | M | 952.18 | 385.00 |
| 3006 | Mebane | 35.31 | 7/8 | S L M | 1350.69 | 363.72 |
| 3004 | Webb | 37.38 | 1 | L M | 1125.02 | 354.89 |
| 3027 | Wannamaker | 38.21 | 7/8 | S M | 946.71 | 323.12 |
| 3045 | Allen's Express | 28.47 | 1 3/16 | M | 1129.21 | 302.50 |
| 3037 | Mebane | 40.27 | 1 | G M | 811.24 | 302.50 |
| 3002 | Mebane | 38.88 | 1 1/16 | S L M | 923.88 | 284.48 |
| 3040 | Mebane | 39.44 | 7/8 | G M | 737.34 | 269.83 |
| 3033 | Simpkins | 36.59 | 5/8 | M | 782.03 | 269.83 |
| 3036 | Lone Star | 37.82 | 1 | M | 756.25 | 268.29 |
| 3029 | King X Triumph | 37.77 | 3/4 | M | 811.24 | 262.95 |
| 3026 | Cook's Silk Long Staple | 36.15 | 3/4 | M | 783.75 | 250.03 |
| 3020 | Surecrop | 35.69 | 7/8 | S L M | 859.10 | 239.96 |
| 3044 | Cleveland Big Boll | 35.06 | 15/16 | M | 701.24 | 220.00 |
| 3025 | Acala | 36.66 | 1 1/8 | S M | 663.43 | 219.01 |
| 3057 | Rowden | 31.48 | 1 1/16 | S M | 667.05 | 209.82 |
| 3063 | Trice | 30.85 | 1 3/16 | S M | 783.54 | 199.37 |
| 3048 | Kasch | 37.72 | 1 | S M | 598.12 | 190.30 |
| 3034 | Ferguson Round Nose | 29.49 | 3/4 | G M | 785.81 | 189.03 |
| 3062 | Express | 32.37 | 1 1/8 | M | 804.37 | 178.64 |
| 3023 | Wannamaker | 38.63 | 5/8 | G M | 724.80 | 177.07 |
| 3061 | Durango | 33.08 | 1 1/8 | S M | 556.87 | 162.14 |
| 3035 | Megane | 31.62 | 15/16 | G M | 605.00 | 158.73 |
| 2995 | Union Big Boll | 35.25 | 3/4 | M | 476.95 | 139.20 |
| 2998 | Vandiver's Heavy Fruiter | 36.92 | 15/16 | S M | 358.35 | 98.16 |
| 2997 | Matchless Ex. Ey. Big. Boll | 33.33 | 7/8 | G M | 558.46 | 77.31 |

Beginning with 1918 the grade of lint and length of staple data are included in the tables. The samples were graded and stapled by specialists from the Bureau of Markets of the U. S. Department of Agriculture and the Extension Service of the Texas Agricultural and Me-

chanical College, cooperating from 1918 to 1920 and by the Division of Cotton Breeding of the Experiment Station in 1921.

The data on length of staple is of value in arriving at the acre value of different varieties where a known premium is paid for extra staple length. No attempt is made to analyze the varieties each year from this standpoint, but with the yield and staple given for each variety the necessary premium to give acre profit can be easily arrived at.

## 1919

Forty-three varieties were tested in duplicate plats in 1919. Planting was done with a lister planter May 16 and the cotton thinned to eighteen inches between plants July 2. The climatic conditions this year were very favorable. The rainfall was above normal and well distributed. The growing season was longer than normal, the late killing frost in the fall giving an ample growing season. High winds were not

Table 8.—Cotton Variety Test in 1919. Arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre yield in pounds, | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 3374 | Union Big Boll | 36.01 | 3/4 | S G O | 1567.60 | 532.11 |
| 4226 | Burnett | 38.94 | 3/4 | L M | 1333.75 | 421.75 |
| 3673 | Cleveland | 36.60 | 7/8 | S L M, T | 1192.81 | 409.87 |
| 3675 | Half and Half | 38.69 | 3/4 | L M | 1148.12 | 407.74 |
| 3676 | Mebane | 40.50 | 3/4 | S L M | 1062.18 | 393.30 |
| 3707 | Cook | 41.83 | 3/4 | S L M, T | 959.05 | 356.86 |
| 3670 | Snowflake | 35.65 | 1 1/8 | S L M | 924.68 | 316.14 |
| 3659 | Acala No. 5 | 35.16 | 1 | S L M | 924.68 | 301.99 |
| 3045 | Allen's Express | 34.29 | 1 1/8 | L M | 1024.37 | 287.08 |
| 3639 | Webb | 32.84 | 1 | S L M | 914.37 | 283.86 |
| 3654 | Lone Star | 32.43 | 3/4 | L M, T | 892.02 | 270.97 |
| 3656 | Acala | 33.92 | 1 | S L M, T | 842.18 | 269.01 |
| 3657 | Acala | 35.25 | 1 1/16 | S L M | 797.50 | 266.32 |
| 3637 | Express | 31.62 | 1 1/16 | L M | 859.37 | 264.94 |
| 3634 | Mebane | 37.97 | 3/4 | L M | 680.62 | 255.28 |
| 3655 | Ferguson Round Nose | 30.26 | 7/8 | S L M, T | 862.81 | 253.17 |
| 3635 | Mebane | 37.17 | 7/8 | L M | 701.25 | 248.07 |
| 3647 | Jackson | 32.66 | 1 | S L M | 697.81 | 237.06 |
| 3671 | Webber 82 | 32.44 | 1 | L M, T | 768.27 | 236.69 |
| 3672 | Hartsville 12 | 31.42 | 1 3/16 | L M | 752.80 | 236.54 |
| 3646 | Lone Star | 33.33 | 7/8 | L M | 670.31 | 223.41 |
| 3642 | Lone Star | 33.72 | 7/8 | L M | 653.11 | 209.17 |
| 3638 | Boykin | 36.25 | 3/4 | S L M | 598.12 | 206.56 |
| 3661 | Chisholm | 33.33 | 7/8 | S L M, T | 625.62 | 203.30 |
| 3666 | Durango | 32.60 | 1 1/8 | S L M, T | 642.31 | 201.01 |
| 3636 | Triumph (406) | 35.76 | 3/4 | S L M, T | 570.61 | 196.89 |
| 3632 | Mebane | 34.58 | 7/8 | S G O | 594.68 | 193.06 |
| 3640 | Bennett | 38.78 | 7/8 | M, T | 507.02 | 191.46 |
| 804 | Mebane | 34.58 | 7/8 | S G O | 567.18 | 183.01 |
| 3637 | Kasch | 35.59 | 7/8 | S L M, T | 512.18 | 182.28 |
| 3650 | Rowden | 34.92 | 7/8 | S L M, T | 544.84 | 180.31 |
| 3654 | Willis | 35.17 | 1 | L M | 512.18 | 178.97 |
| 3658 | Acala | 31.03 | 7/8 | M, T | 625.61 | 178.75 |
| 3660 | Truitt | 37.09 | 1 1/16 | S L M | 450.30 | 167.02 |
| 3644 | Lone Star | 33.33 | 1 | S L M | 498.43 | 166.13 |
| 3649 | Holden | 31.95 | 7/8 | S L M, T | 546.56 | 166.06 |
| 3633 | Mebane | 37.14 | 1 | L M | 429.68 | 159.58 |
| 3669 | Kekchi | 27.90 | 1 | S L M | 587.81 | 156.78 |
| 3668 | Foster | 26.08 | 1 | L M | 548.27 | 137.62 |
| 3665 | Buckelew Big Boll | 35.71 | 1 | S L M, T | 366.09 | 129.19 |
| 3664 | Gilstrap | 33.94 | 3/4 | S L M, T | 381.55 | 121.71 |
| 793 | Belton | 28.02 | 1 | L M | 372.96 | 101.93 |
| 3662 | Harvill | 33.33 | 7/8 | S L M, T | 161.56 | 51.02 |

prevalent so that little damage resulted to non-storm resistant varieties. The frequent and heavy rainfall in October, however, did materially lower the grades of lint from all varieties.

Union Big Boll, Burnett, Cleveland, Half and Half, Mebane T. S. No. 3676, and Cook were the six best yielding varieties. Of these varieties the Mebane carries desirable storm resistance and size of boll qualities which are lacking in the others.

Snowflake, Acala No. 5, and Allen's Express were the highest yielders of the longer staple varieties and stood well up toward the top of the list this season. Neither of the Acala cottons tested this year gave the expected length of staple.*

### 1920

The number of varieties was reduced to eleven in 1920. These were grown in duplicate in one-sixteenth-acre plats. The annual rainfall for the year was below normal. The distribution, however, was good. Moreover, a good supply of stored soil moisture carried over from 1919 provided conditions rather favorable to cotton. The first killing frost was only two days later than normal and a fairly large bollie crop was produced by some varieties which reduced their yield of lint.

Burnett, Mebane, and Lone Star gave the highest yields in the order named. The yield of Lone Star was reduced by the larger crop of bollies. Durango stood first among the better staple varieties.

Table 9.—Cotton Variety Test in 1920. Varieties arranged in order of lint yield.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre yield in pounds, Seed Cotton | Lint |
|---|---|---|---|---|---|---|
| 4226 | Burnett | 33.89 | 1 | S L M | 1936.0 | 582.67 |
| 4120 | Mebane | 37.38 | 3/4 | S L M | 1336.5 | 477.09 |
| 4119 | Lone Star | 34.32 | 1 | M | 1204.5 | 398.09 |
| 3150 | Lone Star | 32.01 | 1 | M | 1028.5 | 315.72 |
| 793 | Belton | 32.00 | 1 1/16 | M | 951.5 | 287.40 |
| 4116 | Rowden | 31.36 | 1 1/16 | M | 1001.0 | 281.57 |
| 4114 | Durango | 35.13 | 1 1/8 | S L M | 797.5 | 259.13 |
| 4131 | Acala | 32.47 | 1 1/8 | M | 770.0 | 230.75 |
| 4117 | Kasch | 34.74 | 5/8 | M | 654.5 | 211.00 |
| 4118 | Snowflake | 27.70 | 1 3/16 | M | 726.0 | 189.83 |
| 4115 | Bennett | 37.40 | 1 1/16 | M | 478.5 | 163.37 |

### 1921

Thirteen varieties were tested in 1921 in the same manner as the previous year. The season of 1921 was characterized by low rainfall, but this rainfall was so distributed as to make it an extremely favorable year for cotton production. The months up to June were unfavorable; but the ample rains in June, during which month almost one-half the total annual rainfall fell, started cotton off to a vigorous growth and

*For a comparison of the staple of all varieties grown at stations at different points in the State see Bulletin No. 266, The Staple of Texas Cotton.

the heavy setting of fruit. Light rainfall in the summer months prevented excessive vegetative growth and the low rainfall in October, together with the late killing frost, were very favorable for complete maturity. The negligible rain in the fall months was ideal for harvesting and production of high grade samples. Next to 1914 this was the most favorable year for cotton reported herein.

*Burnett, a small boll variety, and Lone Star, Truitt, and Rowden,* three large bolled varieties, stood at the top in yield this year. The value of the better staple and larger boll varieties is apparent in such a season favorable to maturity and free from bollies. An examination of the comparative yields of the leading varieties this year with their yields in 1920, which was less favorable for later maturing varieties, shows the advantage in earliness for consistently good yields.

Of the better staple cottons, Acala gave a higher yield than Durango but produced a shorter staple. There was a wide difference in yield between the two strains of the Mebane variety. T. S. No. 804 had a shorter staple but gave the highest yield.

Table 10.—Cotton Variety Test in 1921. Varieties arranged in order of lint yield.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre yield in pounds, | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 4226 | Burnett | 33.98 | 7/8 | S M | 1773.72 | 581.15 |
| 5995 | Lone Star | 38.48 | 1 3/16 | S M | 1377.08 | 491.24 |
| 5990 | Truitt | 37.12 | 1 1/16 | G M | 1340.44 | 478.25 |
| 5993 | Rowden | 34.62 | 1 1/8 | M | 1376.08 | 448.19 |
| 804 | Mebane | 35.64 | 1 1/32 | G M | 1354.74 | 441.08 |
| 5986 | Lone Star | 35.16 | 1 1/8 | S M | 1269.17 | 431.58 |
| 5988 | Acala | 36.56 | 1 1/16 | S M | 1279.84 | 403.58 |
| 5994 | Bennett | 37.24 | 1 5/32 | S M | 1131.30 | 399.97 |
| 5987 | Durango | 32.74 | 1 5/16 | S M | 1225.60 | 375.72 |
| 5992 | Kasch | 37.64 | 1 | S M | 948.62 | 338.03 |
| 5991 | Snowflake | 33.33 | 1 5/16 | S M | 1016.55 | 334.18 |
| 5989 | Mebane | 36.89 | 1 1/8 | G M | 921.26 | 324.50 |
| 5984 | Belton | 34.64 | 1 1/8 | S M | 830.50 | 273.18 |

## 1922

The thirteen varieties under test in 1922 were planted May 22 and came up to a stand May 30. This is slightly past the optimum date of planting, but with the climatic conditions favorable to complete maturity which followed throughout the remainder of the season, no difficulty was encountered in this respect. This season was favorable for cotton production, except for the extended dry period covering the months of July, August, and September. Abundant rains came in April, May, June, and the first few days of July, and carried the crop well into the summer in excellent condition. Continued dry weather the latter part of August and during September caused deterioration and materially reduced the prospective yields of cotton this year. The very dry late summer and fall, as well as the latest killing frost on record in the fall was especially favorable for the late-maturing varieties. Consequently, the crop opened

and was picked under ideal weather conditions several weeks ahead of the normal harvest period, producing an excellent grade of lint, but of short staple.

Burnett, Rowden, Kasch, and Improved Mebane were the four highest-yielding varieties.

Lack of moisture during the last half of the growing season was almost exclusively the limiting factor in cotton production this year. All varieties were under severe stress in this respect. Their comparative performance in yield, therefore, is a very good measure of their drouth-resistance. Of the longer staple varieties, Durango seems more drouth-resistant than either the Acala or Lightning Express, the plants of this variety showing not only a less distressed condition, but responding with a higher yield.

Table 11.—Cotton Variety Test in 1922. Varieties arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre Yield in Pounds | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 6314 | Burnett | 31.10 | 7/8 | G.M. | 707.63 | 219.34 |
| 6574 | Rowden | 34.73 | 1 1/16 | S.G.M. | 615.12 | 209.99 |
| 6573 | Kasch | 39.23 | 1 | G.M. | 540.21 | 207.90 |
| 6563 | Mebane Imp | 36.72 | 1 | G.M. | 573.76 | 207.40 |
| 5984 | Belton 793 | 34.27 | 1 | G.M. | 584.54 | 199.65 |
| 6564 | Durango | 35.61 | 1 | G.M. | 555.39 | 196.68 |
| 804 | Mebane Triumph | 32.76 | 15/16 | G.M. | 596.86 | 193.82 |
| 6572 | Bennett | 38.55 | 1 | G.M. | 501.38 | 192.17 |
| 6566 | Truitt | 35.52 | 7/8 | G.M. | 524.37 | 184.91 |
| 6565 | Lone Star | 38.91 | 15/16 | G.M. | 498.63 | 183.48 |
| 6567 | Lightning Express | 29.63 | 1 3/16 | G.M. | 587.95 | 172.81 |
| 6571 | Acala | 33.48 | 1 1/16 | G.M. | 511.06 | 170.72 |
| 6575 | Snowflake | 30.28 | 1 1/8 | G.M. | 467.83 | 139.48 |

## 1923

The same number of varieties was planted this year as in 1922. Two early plantings of the crop were made on May 9 and May 29, but were destroyed by hail and sandstorms. A good stand was secured and maintained on the final planting made June 11 and was recorded as up June 18. This date is very late for planting cotton here, especially for the late-maturing varieties, unless very favorable conditions follow throughout the remainder of the season.

The moisture condition was favorable at planting time. The season remained hot and dry throughout the summer, with only a few light rains coming in July. The stored moisture from early spring rains permitted the plants to set a good crop of fruit, and timely rains the latter part of August and the first of September fully developed this crop and produced an excellent staple. These rains, however, came too late to revive plant growth sufficient to set and mature an additional crop of fruit.

The killing frost occurred November 5, which is later than normal, and this also was in favor of increased production and maturity.

Lightning Express, Mebane, T. S. No. 804, Belton, and Durango were

the highest-yielding varieties in the order named. With the exception of Mebane, these varieties have not commonly been the high-yielding ones. All varieties produced good yields this season because of the late frost and the seasonal conditions favorable to maturity. The large-bolled varieties made a good showing and in some cases yielded better than the small-bolled varieties. Belton, Truitt, Kasch, and Rowden gave comparatively good yields. Lightning Express is a variety having long staple, low lint percentage, small bolls, fair storm-resistance, and early maturity. Its earliness and yield this year, together with its long staple, would seem to recommend it for this section when it is desirable to grow a longer staple variety.

Table 12.—Cotton Variety Test in 1923. Varieties arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre Yield in Pounds | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 6567 | Lightning Express | 30.88 | 1 1/4 | S.L.M. | 1195.51 | 365.70 |
| 804 | Mebane | 35.75 | 1 1/8 | S.L.M. | 942.20 | 334.77 |
| 5984 | Belton 793 | 33.79 | 1 1/8 | L.M. | 943.89 | 316.91 |
| 6564 | Durango | 32.00 | 1 1/4 | S.L.M. | 944.60 | 299.31 |
| 6566 | Truitt | 34.35 | 1 1/8 | M | 859.33 | 291.16 |
| 6571 | Acala | 34.24 | 1 1/8 | S.L.M. | 855.88 | 289.73 |
| 6573 | Kasch | 38.01 | 1 1/8 | M | 770.64 | 287.13 |
| 6780 | Mebane | 33.05 | 1 | M | 871.36 | 284.08 |
| 6314 | Burnett | 32.65 | 1 1/8 | L.M. | 877.19 | 282.48 |
| 6574 | Rowden | 34.42 | 1 1/16 | S.L.M. | 824.29 | 279.17 |
| 6572 | Bennett | 36.85 | 1 1/8 | L.M. | 569.88 | 208.40 |
| 5991 | Snowflake | 29.78 | 1 1/4 | M | 692.29 | 204.67 |
| 6565 | Lone Star | 34.93 | 1 1/8 | S.L.M. | 402.84 | 139.65 |

## 1924

The cotton variety test in 1924 consisted of fourteen varieties planted May 16. Conditions were not favorable for germination of the crop and considerable time was consumed by the plants in coming up. The varieties were up to a stand on May 26. Sandstorms which followed damaged the young plants somewhat, and they grew off slowly. The mean temperatures for March, April, and May were decidedly below normal, presenting a cold, late spring.

Before the seedlings developed sufficiently to become permanently established a hitherto unknown extreme period of hot winds and high temperatures followed. This period of continuous daily hot winds prevailed for eleven days, from June 9 to 19, on nine days of which the temperature registered 104 degrees or over. The maximum temperature was 108 degrees, and is the highest ever reported at this point; while the mean maximum for the month of June was ten degrees above normal. This period of extreme weather was disastrous to cotton, and many of the plants died; but where a large amount of seed had been planted, sufficient survived to furnish a stand. Otherwise, on many farms the stand was badly damaged, if not completely destroyed by the hot winds. A very timely rain of 1.02 inches fell on June 21, reviving the young cotton plants and starting them off to grow.

This year was next to the lowest in rainfall on record. The total precipitation of 9.45 inches was less than fifty per cent of the normal, but 7.76 inches, or 82 per cent of the total, fell during the growing season. The rainfall was very light throughout the year and at practically no time was it sufficient to relieve the stress on the crop except for a short time.

The moisture stored in the soil from the preceding heavy autumn rainfall played an important part in making the crop this year, enabling the production of normal yields. This is an example of the value of stored moisture, or an "underground season," following a wet fall, and the role it plays in the production of good cotton yields the following year. Such a condition is always favorable for getting a stand of cotton and for cotton production in this region.

Moisture came in fair quantities during the last of August and the middle of September, which, together with favorable temperatures, enabled the cotton crop to revive and put on additional fruit which opened late in the fall. The first killing frost came October 24 and stopped growth, but did not completely kill vegetation, except the leaves. Stalks and bolls remained green for a month longer, when they were killed by a freeze on November 24. This condition permitted development, maturity, and the opening of many bolls which put on late and which would otherwise have made only bollies or unopened bolls.

Table 13.—Cotton Variety Test in 1924. Varieties arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre Yield in Pounds | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 7381 | Acala | 34.72 | 1 1/16 | G.M. | 887.48 | 303.31 |
| 7388 | Boykin | 37.72 | 1 | G.M. | 797.43 | 298.08 |
| 7385 | Kasch | 40.07 | 1 | G.M. | 746.55 | 296.54 |
| 3666 | Durango | 32.98 | 1 1/8 | S.G.M. | 861.40 | 279.64 |
| 7886 | Mebane 406 | 34.54 | 15/16 | G.M. | 734.17 | 252.91 |
| 7387 | Sunshine | 34.00 | 1 1/16 | S.M. | 730.76 | 243.37 |
| 8487 | Westex | 33.23 | 1 | G.M. | 687.43 | 224.75 |
| 7394 | Lightning Express | 30.75 | 1 3/16 | G.M. | 677.82 | 208.00 |
| 7408 | Mebane | 35.06 | 1 1/16 | S.M. | 596.70 | 205.92 |
| 804 | Mebane | 32.18 | 1 | S.M. | 650.29 | 200.01 |
| 6314 | Burnett | 32.07 | 1 | S.M. | 587.76 | 186.28 |
| 7386 | Lone Star | 34.42 | 1 1/8 | S.M. | 528.99 | 183.42 |
| 7411 | Belton | 34.96 | 1 1/16 | G.M. | 500.46 | 165.71 |
| 7391 | Rowden | 33.75 | 1 1/16 | G.M. | 459.88 | 153.77 |

Acala, Boykin, Kasch, Durango, and Mebane 406 were the five high-yielding varieties in the order named. Acala, Kasch, and Durango have been grown in past years and have not been the leading varieties in yield. The early-maturing varieties have, as a rule, in the past given the highest yields, but this year they were uniformly poorer in yield than those listed above, but slightly better than the varieties of the big-bolled type, such as Lone Star, Belton, and Rowden. The probable reason for the early-maturing varieties not making their usual high yields lies in their fruiting habits. They were carrying a heavy crop of fruit during

the most severe dry weather and were not revived at as early a stage in the development of the plant by the late August and mid-September rains as were the slower growing varieties. Consequently, they failed to put on late blooms, as did the other varieties, which were in this case able to mature them into bolls with the favorable fall and late frost, as is shown in the high yields of the last two weekly pickings made during the forepart of November.

### 1925

Sixteen varieties, planted in duplicate, were included in the variety test in 1925. On account of unfavorable climatic conditions it was necessary to replant this experiment several times, the final planting being made June 12, which came to a stand on the 18th. The rainfall for the year was somewhat above normal but was poorly distributed, coming largely during the latter part of the season. The rainfall for September was 9.44 inches, the largest amount ever recorded for this month. The heavy rainfall caused the cotton varieties to take on luxuriant growth and retarded maturity of the crop so that when the first killing frost occurred on October 28th, which was close to the normal date, the plant and bolls were green and full of moisture. Consequently, a large percentage of the crop was damaged by the freeze, the bolls rotting and failing to open. Notwithstanding the fact that the outlook for cotton production was very good during the early fall, yields were materially reduced, being considerably below those usually obtained in very dry years.

Table 14.—Cotton Variety Test in 1925. Varieties arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre Yield in Pounds | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 8487 | Westex (B 9-20) | 33.13 | 15/16 | M | 467.50 | 149.22 |
| 6314 | Burnett | 33.94 | 1 | S.M. | 484.00 | 144.29 |
| 7854 | Acala | 34.45 | 1 1/8 | S.M.T. | 408.03 | 134.75 |
| 7847 | Lightning Express | 31.92 | 1 1/8 | S.M. | 365.06 | 116.05 |
| 7888 | Half and Half | 43.28 | 3/4 | G.M. | 244.75 | 105.13 |
| 3666 | Durango | 32.93 | 1 1/4 | G.M. | 313.15 | 102.80 |
| 7858 | Kasch | 38.75 | 1 | S.M. | 184.25 | 70.15 |
| 7855 | Rowden | 34.90 | 1 1/16 | G.M.T. | 198.68 | 68.57 |
| 804 | Mebane | 34.13 | 1 1/16 | S.M.T. | 208.31 | 64.19 |
| 7889 | Mebane (406) | 37.86 | 1 | G.M.T. | 166.37 | 62.96 |
| 7857 | Sunshine | 34.23 | 1 1/16 | S.M.T. | 176.00 | 55.02 |
| 7852 | New Boykin | 38.09 | 15/16 | S.M.T. | 104.50 | 39.27 |
| 7851 | Lone Star | 36.58 | 1 1/16 | M | 74.25 | 26.46 |
| 7861 | Harper | 35.04 | 1 | M.T. | 59.12 | 20.35 |
| 5984–91 | Belton | 32.60 | 1 1/16 | M.T. | 61.87 | 19.31 |
| 7859 | Mebane | 35.35 | 1 1/16 | S.M.T. | 17.18 | 5.96 |

Because of the late date of planting, unfavorable growing conditions the first part of the season, and the high rainfall during August and September further retarding maturity, the early-maturing varieties proved decidedly the best this year, yielding two to five times as much

as the later-maturing varieties. Contrast this season with 1921, when cotton was planted as late in June as this year and yields considerably above normal obtained because of the dry fall and normal to high temperatures prevailing in late August, September, and October.

The grade of staple produced by these cotton varieties was poor, but the length of staple was above normal. Westex, Burnett, and Acala were the three highest-yielding varieties. Acala, Lightning Express, and Durango, all varieties of superior length of staple, gave better yields than the ordinary big boll types of cotton.

This season is a repetition of 1917 and 1920, showing that when low temperatures or high rainfall, or both, characterize the early fall, such conditions can be as serious in limiting cotton production as a dry season and, furthermore, that late planting is unsafe, but where necessitated by an unfavorable planting season, only the early-maturing varieties can be depended upon to succeed.

**1926**

Fourteen varieties or strains of cotton, with three replications of each planting, were grown in the 1926 variety test.

On account of the excessive fall rains in 1925, coupled with well distributed rainfall during the early spring, excellent moisture conditions existed at planting time, May 15th. A good stand was obtained on practically all plats. The cotton grew off well, receiving, however, a slight setback on June 3rd., when a sandstorm burned some of the tender plants. A dry period extending from the 4th. of June until August 12th. caused some shedding and undoubtedly cut down yields. On September 26th. a temperature of 36 degrees, combined with a cold rain, caused the leaves on all the plants to be shed soon thereafter. This, coupled with the dry period of the early summer, possibly influenced the hastening of maturity so that the crop as a whole was several weeks earlier than normal and also the entire cotton crop opened over a much shorter period than usual.

Table 15.—Cotton Variety Test in 1926. Varieties arranged in order of yield of lint.

| T. S. No. | Variety | Per Cent Lint | Length of Staple, Inches | Grade of Lint | Acre Yield in Pounds | |
|---|---|---|---|---|---|---|
| | | | | | Seed Cotton | Lint |
| 8708 | Half and Half | 46.74 | 3/4 | G.M. | 822.45 | 377.68 |
| 8598 | Triumph (406) | 38.58 | 7/8 | G.M. | 970.04 | 368.04 |
| 8487 | Westex | 35.87 | 5/8 | G.M. | 916.95 | 326.09 |
| 8599 | New Boykin | 38.12 | 7/8 | G.M. | 845.42 | 319.46 |
| 8606 | Acala | 36.54 | 1 | S.M. | 882.78 | 319.06 |
| 3666 | Durango | 35.68 | 1 1/8 | G.M. | 873.34 | 306.76 |
| 8590 | Lone Star | 37.82 | 7/8 | G.M. | 790.84 | 296.03 |
| 8585 | Kasch | 41.08 | 7/8 | S.M. | 719.07 | 289.79 |
| 8607 | Harper | 39.18 | 7/8 | G.M. | 732.66 | 280.48 |
| 804 | Mebane | 34.94 | 15/16 | G.M. | 809.52 | 280.41 |
| 8596 | Sunshine | 36.77 | 1 1/32 | G.M. | 777.10 | 279.18 |
| 6314 | Burnett | 34.66 | 7/8 | G.M. | 819.04 | 278.94 |
| 8605 | Lightning Express | 31.12 | 1 1/8 | M. Fair | 814.71 | 251.52 |
| 8588 | New Mebane | 41.37 | ..... | ..... | 537.59 | 222.37 |

The grade of lint was low except in the early part of the season and the staple length was only fair. The poor grade was due to the frequent showers during the early fall, sandstorms, and the inability to obtain pickers when the cotton first opened. The short staple is probably due to the relatively dry period in July and August.

Half and Half, Triumph 406, and Westex were the three highest-yielding varieties. Acala gave a higher yield than either Durango or Lightning Express.

## SUMMARY OF VARIETIES

Table 16 lists the yields of lint of some of the better varieties tested more or less continuously through this fifteen-year period. Each year is presented except 1917, when the variety test was a failure. Consideration should be given this year of failure in examining the fourteen-year average shown in the table.

The table is self-explanatory, showing the yield of lint per acre produced by each variety and the average yield of lint cotton to the acre for fourteen-, nine-, and five-year periods for the varieties presented. The four varieties tested for the fourteen-year period maintain the same relative rank in yield also for the nine- and five-year averages. The ten varieties given here were all grown consistently for each of the five years, 1919-23, and the five-year average for this period is especially significant in showing the relative performance of varieties involved. The first and last years of this period were favorable and above the average in rainfall while the other three years were comparatively dry and below normal in the moisture supply. 1922 was the most deficient in this respect, both with reference to the total and distribution of rainfall, and the yields produced in this year show the performance of the varieties under severe moisture conditions.

Table 17 presents a summary of the results of the variety tests of cotton for the entire period, 1912 to 1926. All of the varieties tested during this period are listed in the left-hand column. The order of listing the varieties is maintained with reference to the number of years the variety was grown, those tested the greater number of years appearing first and in descending order of the average relative yield per cent.

The average yield of seed cotton of all the varieties grown in a given year is obtained and this average taken as 100 per cent. The individual yield of each variety is then divided by this average, giving the comparative yields as percentages of the average. The arrangement adopted in this table lays the varieties out in such a way that their average performance can be analyzed without too great emphasis on an occasional very good or very poor yield. It affords a convenient comparison of the relative yielding ability of each variety with any other variety for a given season.

The last column, showing the average relative yield per cent, is a reliable index of comparison, especially when comparing the varieties grown for the same period of years and when grown for a sufficient number of years to obtain a reliable average and warrant conclusions.

Table 16.—Average yield of lint produced by some of the better varieties tested.

| Variety | Yield of Lint to the Acre, Pounds | | | | | | | | | | | | | | Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1912 | 1913 | 1914 | 1915 | 1916 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 14-Year | 9 Years, 1918-26 | 5 Years, 1919–23 |
| Burnett | 172.91 | 316.56 | 640.50 | 448.62 | 99.52 | ..... | 421.75 | 582.67 | 581.15 | 219.34 | 282.48 | 186.28 | 144.29 | 278.94 | *336.54 | **337.11 | 417.47 |
| Mebane | 129.48 | 264.25 | 604.80 | 403.21 | 144.39 | 363.72 | 393.30 | 477.09 | 441.08 | 193.82 | 334.77 | 200.01 | 64.19 | 280.41 | 306.75 | 305.38 | 368.01 |
| Lone Star | 106.25 | 157.65 | 465.60 | 252.09 | 187.69 | 268.29 | 270.97 | 398.09 | 491.24 | 183.48 | 139.65 | 183.42 | 26.46 | 296.03 | 244.78 | 250.84 | 296.68 |
| Rowden | 96.85 | 214.47 | 410.30 | 114.05 | 144.79 | 209.82 | 180.31 | 281.57 | 448.19 | 209.99 | 279.17 | 153.77 | 68.57 | ..... | *216.29 | **228.92 | 279.84 |
| Durango | ..... | 187.58 | 500.00 | 216.96 | ..... | 162.14 | 201.01 | 259.13 | 375.72 | 196.68 | 299.31 | 279.64 | 102.80 | 306.76 | ..... | 242.58 | 266.37 |
| Acala | ..... | ..... | ..... | ..... | ..... | 219.01 | 301.99 | 230.75 | 403.58 | 170.72 | 289.73 | 303.31 | 134.75 | 319.06 | ..... | 363.65 | 279.35 |
| Kasch | ..... | ..... | ..... | ..... | ..... | 190.30 | 182.28 | 211.00 | 338.03 | 207.90 | 287.13 | 296.54 | 70.15 | 289.79 | ..... | 230.35 | 245.26 |
| Belton | ..... | ..... | ..... | 238.05 | ..... | ..... | 101.93 | 287.40 | 273.18 | 199.65 | 316.91 | 165.71 | 19.31 | ..... | ..... | ***194.87 | 235.81 |
| Snowflake | ..... | 177.20 | ..... | ..... | ..... | ..... | 316.14 | 189.83 | 334.18 | 139.48 | 204.67 | ..... | ..... | ..... | ..... | ..... | 236.86 |
| Bennett | ..... | ..... | ..... | ..... | ..... | ..... | 191.46 | 163.37 | 399.97 | 192.17 | 208.40 | ..... | ..... | ..... | ..... | ..... | 231.07 |

*13 Year Average. **8 Year Average. ***7 Year Average.

While a single trial, or that for a short period of years, will give some indications as to the merits of a variety, the performance covering a longer period of years is necessary to establish its final merits as being a safe and profitable variety to grow.

A study of the two summary tables presented reveals the relative standing of the varieties tested each year since 1912 with the exception of 1917, when a stand was not obtained in the variety test because of dry soil conditions. Mebane has yielded consistently above the average for a long period of years. It has stood the test among the growers and held its place as a popular variety in this section. This is particularly true of the old-type Mebane and the strains of this variety which are fairly early in maturity, so that until some other variety proves to be superior or more profitable the better strains of Mebane can be recommended as a safe and reliable variety for general planting.

If yield alone was the only factor to consider, the Burnett variety could be recommended unreservedly. It lacks in size of boll and storm-resistance, which are objectionable to its use as a variety for general and exclusive planting. On account of its good yielding qualities and its consistent early maturity in this section, however, it can be used very profitably when late planting is forced for any reason or when replanting is necessary at a date too late to be safe with the later-maturing varieties. Westex, a new variety developed at this Station, has given good yields, is even earlier than the Burnett, and these two varieties are of particular value for growing further to the north and west in the cotton area in this section where maturity is of first importance.

Lone Star, Belton, Bennett, and Rowden have desirable storm-resistance, size of boll, and qualities of lint, and do well in this section in favorable years. They are not consistently good producers, however, because of the tendency to produce too large a per cent of bollie cotton in certain seasons. Cook, Toole, and Allen's Express have produced satisfactory yields considerably above the average during the time they have been tested.

Varieties having superior length of staple which have produced well during the past five years are Acala, Lightning Express, and Durango. In point of yield, Acala and Lightning Express have been on a par during this five-year period and both of these varieties have yielded better than Durango. The length of staple produced by Durango and Lightning Express has, on the average, been about the same and somewhat longer than that produced by the Acala variety. The Lightning Express is early and yields well, but lacks somewhat in storm resistance. Snowflake has produced longer staple than either of the above varieties but has yielded low and can not be recommended as a staple variety to grow in this region.

Table 17.—Comparative yields of seed cotton of varieties grown, 1912-1926.

| Variety | Year | | | | | | | | | | | | | | No. Years Tested | Average Relative Yield % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1912 | 1913 | 1914 | 1915 | 1916 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | | |
| | Average Yield, Pounds of Seed Cotton, Taken as 100 Per Cent | | | | | | | | | | | | | | | |
| | 279 =100 % | 748 =100 % | 1559 =100 % | 880 =100 % | 443 =100 % | 855 =100 % | 718 =100 % | 989 =100 % | 1219 =100 % | 558 =100 % | 826 =100 % | 674 =100 % | 220 =100 % | 808 =100 % | | |
| Mebane | 139 | 103 | 114 | 82 | 95 | 103 | 92 | 135 | 93 | 105 | 110 | 98 | 59 | 96 | 14 | 102 |
| Lone Star | 114 | 63 | 85 | 62 | 115 | 88 | 94 | 112 | 108 | 89 | 49 | 78 | 34 | 98 | 14 | 85 |
| Burnett | 186 | 127 | 136 | 161 | 68 | ..... | 185 | 195 | 145 | 127 | 106 | 87 | 220 | 101 | 13 | 142 |
| Rowden | 82 | 86 | 95 | 41 | 80 | 77 | 75 | 101 | 112 | 110 | 100 | 68 | 90 | ..... | 13 | 86 |
| Durango | ..... | 75 | 102 | 81 | ..... | 65 | 89 | 80 | 100 | 100 | 114 | 128 | 142 | 108 | 12 | 99 |
| Acala | ..... | ..... | ..... | ..... | ..... | 77 | 110 | 77 | 105 | 92 | 104 | 132 | 185 | 109 | 9 | 110 |
| Kasch | ..... | ..... | ..... | ..... | ..... | 69 | 71 | 66 | 77 | 97 | 93 | 111 | 84 | 89 | 9 | 84 |
| Belton | ..... | ..... | ..... | 67 | ..... | ..... | 51 | 96 | 68 | 105 | 114 | 74 | 28 | ..... | 8 | 75 |
| Truitt | ..... | 82 | 132 | 94 | ..... | ..... | 62 | ..... | 109 | 94 | 104 | ..... | ..... | ..... | 7 | 97 |
| Snowflake | ..... | 71 | 110 | ..... | ..... | ..... | 128 | 73 | 83 | 84 | 84 | ..... | ..... | ..... | 7 | 90 |
| Cook | ..... | ..... | 120 | 117 | 168 | 120 | 133 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 132 |
| Lightning Express | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 105 | 145 | 101 | 166 | 101 | 5 | 124 |
| Simpkins Prolific | ..... | 136 | 126 | 118 | 88 | 123 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 118 |
| Union Big Boll | ..... | 96 | 117 | ..... | 89 | 55 | 218 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 115 |
| Bank Account | 55 | 102 | 111 | 167 | 119 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 111 |
| Bennett | ..... | ..... | ..... | ..... | ..... | ..... | 70 | 48 | 92 | 90 | 69 | ..... | ..... | ..... | 5 | 74 |
| Hawkins | ..... | 139 | 135 | 94 | 135 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 126 |
| Texas Oak | ..... | 143 | 130 | 97 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 111 | ..... | 4 | 120 |
| Half and Half | ..... | 109 | 105 | ..... | ..... | ..... | 159 | ..... | ..... | ..... | ..... | ..... | ..... | 102 | 4 | 119 |
| Cleveland Big Boll | 90 | ..... | 151 | ..... | 134 | 81 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 114 |
| Mortgage Lifter | ..... | 107 | 125 | 124 | 90 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 112 |
| Long Staple | ..... | 106 | 136 | 157 | 46 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 111 |
| Ferguson Round Nose | 125 | ..... | ..... | 96 | ..... | 91 | 120 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 108 |
| Boykin | ..... | ..... | ..... | ..... | ..... | ..... | 83 | ..... | ..... | ..... | ..... | 118 | 48 | 105 | 4 | 89 |
| Yuma | 26 | 36 | 3 | ..... | 17 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 20 |
| Allen's Express | ..... | ..... | ..... | ..... | 190 | 131 | 142 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 154 |
| Westex | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 102 | 212 | 113 | 3 | 142 |
| Toole | ..... | 202 | 110 | 106 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 139 |
| Clarksville Long Staple | 174 | 88 | 104 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 122 |
| Texas Wood | ..... | 148 | 104 | 91 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 114 |
| Crowder | 84 | 115 | 118 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 106 |
| Huffman | ..... | 95 | 123 | 99 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 106 |
| King | ..... | ..... | 124 | ..... | 74 | 118 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 105 |
| Roberts | ..... | 89 | 100 | 110 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 100 |
| Allen's Long Staple | 113 | 100 | 75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 96 |
| Sunshine | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 108 | 80 | 96 | 3 | 95 |
| Burn's Long Staple | 88 | 71 | 112 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 90 |

Table 17.—Comparative yields of seed cotton of varieties grown, 1912-1926—Continued.

| Variety | Year | | | | | | | | | | | | | | No. Years Tested | Average Relative Yield % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1912 | 1913 | 1914 | 1915 | 1916 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | | |
| | Average Yield, Pounds of Seed Cotton, Taken as 100 Per Cent | | | | | | | | | | | | | | | |
| | 279 =100 % | 748 =100 % | 1559 =100 % | 880 =100 % | 443 =100 % | 855 =100 % | 718 =100 % | 989 =100 % | 1219 =100 % | 558 =100 % | 826 =100 % | 674 =100 % | 220 =100 % | 808 =100 % | | |
| Foster's | | 93 | 96 | | | | 76 | | | | | | | | 3 | 88 |
| Hartsville | | 84 | 78 | 89 | | | | | | | | | | | 3 | 84 |
| Unknown Long Staple | 72 | 73 | 99 | | | | | | | | | | | | 3 | 81 |
| Sea Island | 8 | | 3 | | 8 | | | | | | | | | | 3 | 6 |
| Cleveland | | | | 123 | | | 166 | | | | | | | | 2 | 144 |
| Peterkin | | 156 | 109 | | | | | | | | | | | | 2 | 132 |
| Wannamaker | | | | | 167 | 97 | | | | | | | | | 2 | 132 |
| Webb | | | | | | 131 | 127 | | | | | | | | 2 | 129 |
| Columbia | | | 106 | 136 | | | | | | | | | | | 2 | 121 |
| Bolivia | 144 | | 93 | | | | | | | | | | | | 2 | 118 |
| Express | | | | | | 93 | 119 | | | | | | | | 2 | 106 |
| Haaga's Extra Long Staple | | 101 | 102 | | | | | | | | | | | | 2 | 101 |
| Black Rattler | | 96 | 96 | | | | | | | | | | | | 2 | 96 |
| Webber No. 82 | | | | | 86 | | 107 | | | | | | | | 2 | 96 |
| Edgeworth | | 86 | 104 | | | | | | | | | | | | 2 | 95 |
| King X Triumph | | | | 91 | | 94 | | | | | | | | | 2 | 92 |
| Triumph | | | 106 | | | | 79 | | | | | | | | 2 | 92 |
| Keenan-Goodson | | | | 113 | 55 | | | | | | | | | | 2 | 84 |
| Webber | | | 94 | 70 | | | | | | | | | | | 2 | 82 |
| Jackson | 63 | | | | | | 97 | | | | | | | | 2 | 80 |
| Surecrop | | | | | 56 | 100 | | | | | | | | | 2 | 78 |
| Matchless Big Boll | | | | | 84 | 65 | | | | | | | | | 2 | 74 |
| Hendrick's | 61 | | 82 | | | | | | | | | | | | 2 | 71 |
| Harper | | | | | | | | | | | | | 27 | 91 | 2 | 59 |
| Red Leaf | | 50 | 66 | | | | | | | | | | | | 2 | 58 |
| Keenan | 86 | | 20 | | | | | | | | | | | | 2 | 53 |
| Ideal | | | | | 173 | | | | | | | | | | 1 | 173 |
| Improved Champion | | | | | | 172 | | | | | | | | | 1 | 172 |
| Stormproof | | | | | 166 | | | | | | | | | | 1 | 166 |
| Sunbeam | | | | | 158 | | | | | | | | | | 1 | 158 |
| F. G. 33 | | | | | | 141 | | | | | | | | | 1 | 141 |
| Douglass Big Boll | | | 136 | | | | | | | | | | | | 1 | 136 |
| Culpepper's Big Boll | | | 134 | | | | | | | | | | | | 1 | 134 |
| Layton | | | | 134 | | | | | | | | | | | 1 | 134 |
| Cooks Long Staple | 131 | | | | | | | | | | | | | | 1 | 131 |
| Bates | | | | 117 | | | | | | | | | | | 1 | 117 |

Table 17.—Comparative yields of seed cotton of varieties grown, 1912-1926—Continued.

| Variety | Year | | | | | | | | | | | | | | No. Years Tested | Average Relative Yield % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1912 | 1913 | 1914 | 1915 | 1916 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | | |
| | Average Yield, Pounds of Seed Cotton, Taken as 100 Per Cent | | | | | | | | | | | | | | | |
| | 279 =100 % | 748 =100 % | 1559 =100 % | 880 =100 % | 443 =100 % | 855 =100 % | 718 =100 % | 989 =100 % | 1219 =100 % | 558 =100 % | 826 =100 % | 674 =100 % | 220 =100 % | 808 =100 % | | |
| Brabham | 116 | | | | | | | | | | | | | | 1 | 116 |
| Broadwell Double Jointed | | | 113 | | | | | | | | | | | | 1 | 113 |
| Wooten's Columbia Big Boll | | | | | 111 | | | | | | | | | | 1 | 111 |
| Moneymaker | | | | 109 | | | | | | | | | | | 1 | 109 |
| Hites Prolific | | | 107 | | | | | | | | | | | | 1 | 107 |
| Ricks | | | | 105 | | | | | | | | | | | 1 | 105 |
| Bohler's Triple Jointed | | | 104 | | | | | | | | | | | | 1 | 104 |
| Hartsville, No. 12 | | | | | | | 104 | | | | | | | | 1 | 104 |
| Floradora | | | 100 | | | | | | | | | | | | 1 | 100 |
| Rublee | | | | 98 | | | | | | | | | | | 1 | 98 |
| Bostwick | | | | 98 | | | | | | | | | | | 1 | 98 |
| Cook's Silk Long Staple | | | | | | 91 | | | | | | | | | 1 | 91 |
| Trice | | | | | | 91 | | | | | | | | | 1 | 91 |
| Hasting's Upright | | | | | 87 | | | | | | | | | | 1 | 87 |
| Chisholm | | | | | | | 87 | | | | | | | | 1 | 87 |
| Columbia Long Staple | 86 | | | | | | | | | | | | | | 1 | 86 |
| Kekchi | | | | | | | 81 | | | | | | | | 1 | 81 |
| Holden | | | | | | | 76 | | | | | | | | 1 | 76 |
| Virgatus | | | | 73 | | | | | | | | | | | 1 | 73 |
| Willis | | | | | | | 71 | | | | | | | | 1 | 71 |
| Pemiscott | | | 68 | | | | | | | | | | | | 1 | 68 |
| Sunflower Long Staple | | | 65 | | | | | | | | | | | | 1 | 65 |
| Cannon's World Skinner | | | 61 | | | | | | | | | | | | 1 | 61 |
| Gilstrap | | | | | | | 53 | | | | | | | | 1 | 53 |
| Buckelew | | | | | | | 50 | | | | | | | | 1 | 50 |
| Webber, No. 49 | | | | | 43 | | | | | | | | | | 1 | 43 |
| Dillon | | | 41 | | | | | | | | | | | | 1 | 41 |
| Vandiver's Heavy Fruiter | | | | | | 41 | | | | | | | | | 1 | 41 |
| Hartsville No. 9 | | | | | 24 | | | | | | | | | | 1 | 24 |
| Harvill | | | | | | | 22 | | | | | | | | 1 | 22 |

## BLOOMING AND OPENING OF VARIETIES

Fruiting habits of cotton varieties as judged by their rate and time of blooming and rate and time of opening are reported in considerable detail in the pages which follow. The bloom counts were obtained for each variety by counting the number of white blooms appearing on one hundred plants at weekly intervals and on the same day of each week, beginning with the first bloom to appear and extending throughout the blooming period. In 1922 the blooms were recorded in periods of five-day intervals instead of seven-day intervals.

Weekly pickings of all the open bolls on duplicate plantings of all the varieties were made on the same day of each week beginning with the first open boll to appear and continuing throughout the season. Both the blooming record and the picking record for all varieties in the test are complete for the three years 1922 to 1924, inclusive, and were made without interruption except that occurring in the picking record for October 25 and November 1 in 1923. Wet weather prevented harvesting at this period.

Tables 18 and 19 are a record of the blooms and pickings for the weekly periods each of the three years 1922-24. The figures are reported in percentage of the total number of white blooms existing on the one hundred plants on each date of the period and calculated to the nearest whole number. The picking record is reported in percentage of the total seed cotton harvested on the respective dates. These data are represented on a cumulative percentage basis by the graphs in Figures 7 and 8.

A tabulation of the blooming and opening of varieties at regular intervals permits of laying their fruiting habits out to be judged on a comparative basis as to the variation characteristic of the variety in these respects. The rapidity, time, and duration of blooming and opening and the relation between the time of blooming and maturity and between the number of blooms set and the total yield of seed cotton produced are apparent.

The blooming habits of the cotton plant and the opening of the matured bolls when plotted approaches the normal or frequency curve. It is evident that the curves obtained in plotting the weekly pickings may be bi-modal for most varieties because of certain disturbing climatic conditions. For instance, in 1924 the normal picking peak occurred at the fifth week of harvesting while a second peak at the tenth week occurred because of the intervention of a killing frost October 24 stopping growth and causing the rapid opening of the remaining bolls. In all except the very early varieties there is usually a pronounced increase shown at the first or second picking after frost. This is a clear index of the earliness of the varieties. The percentage of the total crop picked before frost can be easily seen by referring to the tables and curves and the frost data given in Figure 3. A similar, though less marked, bi-modal tendency may be found in the blooming of the plants due to the suppression of fruiting by periods of dry weather and the

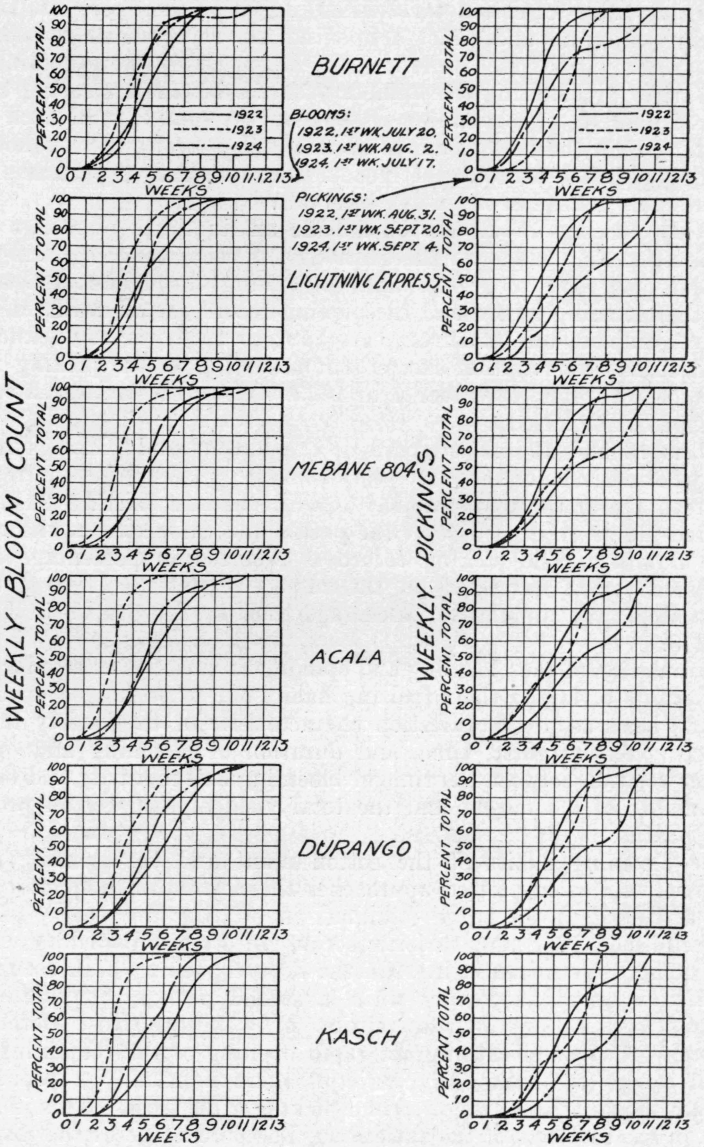


Figure 7.—Cumulative curves showing the per cent of the total number of blooms, (left) appearing by weeks, and the per cent of the total seed cotton picked, (right) by weeks. Cotton Varieties, 1922-24.

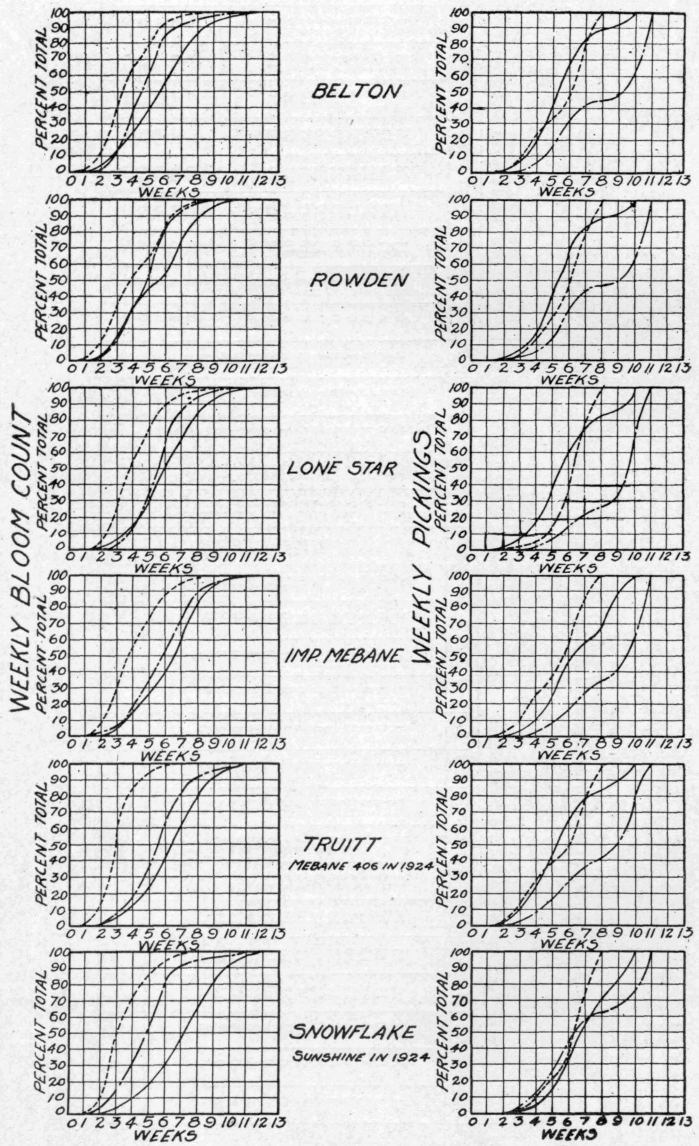


Figure 8.—Continuation of Figure 7, cumulative curves for cotton varieties.

Table 18.—Per cent of total blooms recorded at 5-day periods in 1922 and weekly in 1923 and 1924 in Cotton Variety Tests.

| T. S. No. | Variety | 1922 Per cent of Total Blooms Every 5 days Ending: | | | | | | | | | | | | 1923 Per Cent of Total Blooms Each Week Ending: | | | | | | | | | 1924 Per Cent of Total Blooms Each Week Wnding | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7–20 | 7–25 | 7–31 | 8–5 | 8–10 | 8–15 | 8–20 | 8–25 | 8–30 | 9–4 | 9–9 | 9–14 | 8–2 | 8–9 | 8–16 | 8–23 | 8–29 | 9–6 | 9–13 | 9–20 | 9–28 | 7–17 | 7–24 | 7–31 | 8–7 | 8–14 | 8–21 | 8–28 | 9–4 | 9–11 | 9–18 | 9–25 |
| 6567 | Lghtning Express | 1 | 8 | 12 | 23 | 15 | 12 | 11 | 10 | 7 | 1 | 1 | 0 | 0 | 9 | 33 | 29 | 13 | 13 | 3 | 0 | 0 | 0 | 2 | 11 | 24 | 26 | 23 | 9 | 5 | 1 | 0 | 0 |
| 6314 | Burnett | 1 | 8 | 10 | 17 | 22 | 16 | 19 | 5 | 1 | 1 | 0 | 0 | 1 | 9 | 26 | 24 | 17 | 13 | 6 | 3 | 0 | 0 | 4 | 11 | 33 | 30 | 16 | 1 | 1 | 0 | 0 | 5 |
| 804 | Mebane | 1 | 4 | 8 | 22 | 16 | 17 | 17 | 7 | 5 | 2 | 1 | 0 | 4 | 15 | 36 | 29 | 8 | 6 | 2 | 0 | 0 | 0 | 2 | 10 | 20 | 22 | 28 | 6 | 7 | 0 | 0 | 3 |
| 6564 | Durango | 0 | 2 | 5 | 14 | 16 | 14 | 17 | 17 | 10 | 3 | 2 | 1 | 1 | 10 | 23 | 27 | 17 | 17 | 4 | 2 | 1 | 0 | 2 | 9 | 17 | 23 | 23 | 8 | 8 | 5 | 1 | 3 |
| 6571 | Acala | 1 | 3 | 8 | 17 | 19 | 16 | 15 | 10 | 6 | 3 | 1 | 0 | 3 | 18 | 39 | 31 | 6 | 2 | 0 | 0 | 0 | 0 | 1 | 10 | 22 | 23 | 27 | 5 | 7 | 1 | 0 | 4 |
| 5984 | Belton | 0 | 4 | 10 | 14 | 13 | 12 | 20 | 13 | 9 | 4 | 1 | 0 | 1 | 13 | 28 | 25 | 11 | 16 | 3 | 1 | 1 | 0 | 1 | 12 | 27 | 22 | 25 | 7 | 3 | 1 | 3 | 1 |
| 6574 | Rowden | 0 | 3 | 12 | 17 | 13 | 10 | 19 | 16 | 9 | 2 | 0 | 0 | 1 | 11 | 25 | 17 | 14 | 17 | 10 | 5 | 0 | 0 | 1 | 10 | 22 | 21 | 31 | 10 | 5 | 1 | 0 | 0 |
| 6573 | Kasch | 0 | 0 | 4 | 13 | 12 | 18 | 18 | 17 | 14 | 3 | 1 | 0 | 1 | 10 | 44 | 34 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 10 | 24 | 17 | 17 | 22 | 9 | 1 | 0 | 1 |
| 6565 | Lone Star | 0 | 0 | 6 | 10 | 14 | 21 | 17 | 17 | 9 | 3 | 2 | 0 | 0 | 5 | 22 | 28 | 17 | 18 | 5 | 2 | 3 | 0 | 0 | 2 | 12 | 20 | 32 | 21 | 10 | 1 | 1 | 0 |
| 6566 | Truitt | 0 | 1 | 4 | 10 | 10 | 17 | 19 | 19 | 12 | 5 | 3 | 0 | 1 | 13 | 43 | 31 | 8 | 2 | 1 | 1 | 1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 6563 | Imp. Mebane | 0 | 0 | 4 | 12 | 12 | 12 | 23 | 19 | 13 | 5 | 1 | 0 | 0 | 9 | 21 | 25 | 16 | 17 | 7 | 3 | 2 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 6572 | Bennett | 0 | 0 | 6 | 13 | 11 | 14 | 27 | 15 | 8 | 4 | 1 | 0 | 0 | 8 | 20 | 24 | 15 | 26 | 5 | 1 | 0 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 5991 | Snowflake | 0 | 0 | 2 | 7 | 11 | 10 | 17 | 18 | 17 | 11 | 5 | 2 | 0 | 10 | 39 | 24 | 15 | 7 | 2 | 2 | 1 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 8487 | Westex | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 2 | 14 | 26 | 30 | 20 | 5 | 2 | 0 | 0 | 2 |
| 7387 | Sunshine | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 3 | 15 | 13 | 23 | 28 | 9 | 5 | 2 | 0 | 2 |
| 7388 | Boykin | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 9 | 21 | 16 | 20 | 12 | 14 | 5 | 3 | 0 |
| 406 | Mebane | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 8 | 12 | 16 | 28 | 17 | 13 | 2 | 1 | 2 |
| 7408 | Mebane | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 6 | 13 | 16 | 18 | 18 | 20 | 6 | 3 | 1 |

Table 19—Per cent of total crop picked each week throughout the picking season for varieties of cotton in 1922-1924.

| T. S. No | Variety | 1922 Per Cent of Total Pickings Each Week Ending: | | | | | | | | | | 1923 Per Cent of Total Pickings Each Week Ending: | | | | | | | | 1924 Per Cent of Total Pickings Each Week Ending | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 8–31 | 9–7 | 9–14 | 9–21 | 9–28 | 10–5 | 10–13 | 10–19 | 10–26 | 11–2 | 9–20 | 9–27 | 10–5 | 10–11 | 10–18 | 11–8 | 11–15 | 11–22 | 9–4 | 9–11 | 9–18 | 9–25 | 10–2 | 10–9 | 10–16 | 10–23 | 10–30 | 11–6 | 11–13 |
| 6567 | Lightning Express | 2 | 15 | 16 | 20 | 19 | 15 | 8 | 2 | 0 | 2 | 0 | 6 | 15 | 18 | 12 | 21 | 21 | 7 | 0 | 0 | 11 | 9 | 16 | 12 | 8 | 5 | 11 | 18 | 12 |
| 6314 | Burnett | 1 | 15 | 20 | 26 | 22 | 11 | 2 | 0 | 0 | 3 | 0 | 1 | 7 | 15 | 14 | 25 | 30 | 8 | 0 | 8 | 21 | 15 | 18 | 10 | 5 | 2 | 3 | 11 | 8 |
| 804 | Mebane | 0 | 8 | 14 | 21 | 19 | 21 | 9 | 3 | 0 | 5 | 0 | 5 | 14 | 15 | 10 | 13 | 28 | 16 | 0 | 4 | 9 | 11 | 16 | 12 | 6 | 3 | 7 | 19 | 14 |
| 6564 | Durango | 0 | 4 | 13 | 17 | 21 | 23 | 12 | 4 | 2 | 5 | 1 | 3 | 12 | 17 | 9 | 16 | 25 | 17 | 0 | 0 | 8 | 7 | 13 | 12 | 9 | 4 | 9 | 27 | 12 |
| 6571 | Acala | 1 | 9 | 12 | 14 | 17 | 19 | 12 | 4 | 5 | 8 | 1 | 8 | 15 | 13 | 7 | 12 | 26 | 19 | 0 | 1 | 6 | 9 | 15 | 13 | 10 | 4 | 9 | 22 | 12 |
| 5984 | Belton | 0 | 1 | 5 | 15 | 22 | 24 | 15 | 6 | 4 | 8 | 0 | 1 | 8 | 15 | 12 | 13 | 31 | 21 | 0 | 0 | 1 | 4 | 11 | 17 | 10 | 2 | 2 | 14 | 38 |
| 6574 | Rowden | 0 | 2 | 3 | 12 | 25 | 25 | 16 | 6 | 4 | 8 | 0 | 0 | 3 | 11 | 13 | 16 | 35 | 22 | 0 | 0 | 1 | 4 | 12 | 16 | 12 | 2 | 2 | 15 | 37 |
| 6573 | Kasch | 0 | 2 | 6 | 14 | 19 | 23 | 13 | 4 | 5 | 15 | 0 | 1 | 13 | 16 | 7 | 11 | 19 | 33 | 0 | 0 | 2 | 6 | 11 | 13 | 7 | 4 | 10 | 25 | 22 |
| 6565 | Lone Star | 0 | 1 | 7 | 9 | 21 | 22 | 15 | 7 | 3 | 14 | 0 | 0 | 1 | 4 | 8 | 23 | 41 | 23 | 0 | 0 | 0 | 2 | 4 | 9 | 8 | 4 | 7 | 35 | 31 |
| 6566 | Truitt | 0 | 1 | 9 | 14 | 19 | 23 | 14 | 4 | 6 | 10 | 0 | 1 | 13 | 15 | 9 | 10 | 30 | 21 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 6563 | Imp. Mebane | 0 | 0 | 3 | 8 | 14 | 21 | 14 | 5 | 23 | 12 | 0 | 2 | 8 | 15 | 12 | 21 | 29 | 14 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 6572 | Bennett | 0 | 0 | 2 | 9 | 15 | 28 | 18 | 8 | 4 | 17 | 0 | 0 | 3 | 9 | 9 | 22 | 33 | 23 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 5991 | Snowflake | 0 | 0 | 1 | 4 | 11 | 21 | 22 | 14 | 10 | 19 | 0 | 0 | 0 | 10 | 12 | 14 | 35 | 29 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 8487 | Westex | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 7 | 20 | 13 | 18 | 11 | 5 | 2 | 3 | 14 | 7 |
| 7387 | Sunshine | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 3 | 8 | 14 | 17 | 16 | 4 | 3 | 14 | 21 |
| 7388 | Boykin | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 4 | 8 | 15 | 14 | 11 | 4 | 7 | 21 | 17 |
| 406 | Mebane | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 2 | 4 | 11 | 11 | 9 | 4 | 8 | 32 | 18 |
| 7408 | Mebane | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 | 0 | 0 | 1 | 7 | 9 | 11 | 5 | 7 | 26 | 33 |

later recurrence of favorable moisture conditions. This is then reflected again in the picking records later.

Table 20 shows the total number of white blooms appearing on one hundred plants in each variety for the combined periods of blooming during the years 1922-26, inclusive, and the total amount of seed cotton per plat produced by each of the varieties. It will be seen that there is a tendency for the free-blooming varieties to also turn out a higher yield of cotton and while this tendency is less marked in some years than in others, on the average for the five years there is a marked relation between the number of blooms produced and the final yield. Lightning Express, Acala, and Durango produced the largest number of blooms and in general the small-bolled early varieties were heavier bloomers than the large-boll varieties.

Table 20.—Total number of blooms recorded and yield of seed cotton per plat for varieties of cotton, 1922–26.

| Variety | Total Blooms Counted Per 100 Plants | | | | | Ave. | Total Pounds Seed Cotton Picked Per Plat | | | | | Ave. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1922 | 1923 | 1924 | 1925 | 1926 | | 1922 | 1923 | 1924 | 1925 | 1926 | |
| Burnett | 372 | 278 | 187 | 231 | 217 | 257 | 32.17 | 39.82 | 22.37 | 22.00 | 15.04 | 26.28 |
| Durango | 338 | 302 | 213 | 231 | 198 | 256 | 25.25 | 42.92 | 39.15 | 14.23 | 18.17 | 27.95 |
| Mebane 804 | 293 | 233 | 210 | 237 | 258 | 246 | 27.13 | 42.83 | 25.40 | 9.47 | 15.17 | 24.00 |
| Lightning Express | 290 | 224 | 180 | 213 | 154 | 212 | 26.73 | 54.34 | 30.15 | 16.59 | 16.59 | 28.88 |
| Acala | 295 | 216 | 192 | 236 | 115 | 211 | 23.22 | 38.85 | 40.34 | 18.55 | 15.90 | 27.37 |
| Improved Mebane | 243 | 255 | 159 | 198 | 165 | 204 | 32.83 | 39.61 | 27.12 | .78 | 12.76 | 22.62 |
| Kasch | 320 | 178 | 160 | 184 | 108 | 190 | 25.06 | 34.53 | 33.93 | 8.38 | 13.32 | 23.04 |
| Lone Star | 216 | 197 | 166 | 199 | 128 | 181 | 22.67 | 18.31 | 21.25 | 3.38 | 14.79 | 16.08 |
| Belton | 282 | 183 | 152 | 259 | ..... | 219 | 26.57 | 42.90 | 22.75 | 2.81 | ..... | 23.76 |
| Rowden | 268 | 166 | 183 | 189 | ..... | 202 | 27.96 | 37.47 | 20.90 | 9.03 | ..... | 23.84 |
| Westex | ..... | ..... | 194 | 258 | 193 | 215 | ..... | ..... | 31.25 | 21.25 | 16.79 | 23.10 |
| Sunshine | ..... | ..... | 183 | 243 | 118 | 181 | ..... | ..... | 33.18 | 8.00 | 15.54 | 18.91 |
| Mebane (406) | ..... | ..... | 128 | 231 | 155 | 171 | ..... | ..... | 28.78 | 7.56 | 17.15 | 17.83 |
| Snowflake | 346 | 301 | ..... | ..... | ..... | 324 | 21.28 | 31.47 | ..... | ..... | ..... | 26.38 |
| Truitt | 285 | 181 | ..... | ..... | ..... | 233 | 23.84 | 39.06 | ..... | ..... | ..... | 31.45 |
| Bennett | 248 | 144 | ..... | ..... | ..... | 196 | 22.79 | 25.90 | ..... | ..... | ..... | 24.35 |
| Half and Half | ..... | ..... | ..... | 230 | 130 | 180 | ..... | ..... | ..... | 11.13 | 15.10 | 13.12 |
| Harper | ..... | ..... | ..... | 212 | 133 | 173 | ..... | ..... | ..... | 2.69 | 14.79 | 8.74 |
| New Boykin | ..... | ..... | ..... | 151 | 118 | 135 | ..... | ..... | ..... | 4.75 | 14.93 | 9.69 |
| Boykin | ..... | ..... | 150 | ..... | ..... | 150 | ..... | ..... | 36.05 | ..... | ..... | 36.05 |

## PER CENT OF CROP PICKED BY PERIODS

Table 21 gives the per cent of the total crop of each variety picked at the end of each of four chosen periods in 1922 to 1924. These data were obtained from the weekly pickings and calculated to the nearest whole number on a percentage basis. The number of days from the date of the coming up of the crop to the picking periods used varies slightly from year to year but approximates 115, 135, 150, and 165 days from date up. A great deal of variation in the time required for the beginning and completion of opening will be noted among the different varieties and for the three different years. In 1922, for instance, a short season was required, one-half of the crop of most varieties being picked 135 days after the crop came up, whereas, in 1924 a period of about thirty days longer was required before the same proportion of the crop opened.

Table 21.—Per cent of total crop picked at each of four periods in 1922-24 for cotton varieties.

| T. S. No. | Variety | 1922 | | | | 1923 | | | | 1924 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Days from Date Up | | | | Days from Date Up | | | | Days from Date Up | | | |
| | | 114 | 135 | 149 | 163 | 117 | 130 | 151 | 165 | 122 | 143 | 164 | 178 |
| | | % | % | % | % | % | % | % | % | % | % | % | % |
| 6567 | Lightning Express | 33 | 54 | 10 | 2 | 21 | 30 | 21 | 28 | 11 | 36 | 23 | 30 |
| 6314 | Burnett | 36 | 59 | 2 | 3 | 8 | 29 | 25 | 38 | 29 | 43 | 9 | 19 |
| 804 | Mebane | 22 | 61 | 12 | 5 | 19 | 24 | 13 | 44 | 12 | 38 | 16 | 33 |
| 6564 | Durango | 17 | 61 | 33 | 7 | 16 | 26 | 16 | 42 | 8 | 32 | 21 | 39 |
| 6571 | Acala | 22 | 50 | 16 | 12 | 24 | 19 | 12 | 44 | 7 | 38 | 22 | 33 |
| 5984 | Belton | 6 | 61 | 21 | 11 | 9 | 27 | 13 | 52 | 1 | 32 | 14 | 52 |
| 6574 | Rowden | 5 | 62 | 22 | 11 | 3 | 24 | 16 | 56 | 1 | 31 | 16 | 51 |
| 6573 | Kasch | 8 | 55 | 7 | 20 | 13 | 23 | 11 | 53 | 2 | 30 | 20 | 47 |
| 6565 | Lone Star | 8 | 53 | 22 | 17 | 1 | 12 | 23 | 64 | 0 | 15 | 19 | 66 |
| 6563 | Improved Mebane | 3 | 42 | 19 | 35 | 10 | 26 | 21 | 42 | 0 | 17 | 23 | 60 |
| 6566 | Truitt | 11 | 55 | 19 | 16 | 14 | 24 | 10 | 51 | ..... | ..... | ..... | ..... |
| 6572 | Bennett | 2 | 52 | 26 | 21 | 3 | 19 | 22 | 57 | ..... | ..... | ..... | ..... |
| 5991 | Snowflake | 1 | 35 | 35 | 29 | 0 | 22 | 14 | 64 | ..... | ..... | ..... | ..... |
| 8487 | Westex | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 28 | 42 | 10 | 20 |
| 7387 | Sunshine | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | 39 | 23 | 35 |
| 7388 | Boykin | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 36 | 21 | 39 |
| 7889 | Mebane (406) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 | 26 | 21 | 50 |

Table 22.—Average per cent of total crop of varieties picked at a selected number of days after planting date.

| T. S. No. | Variety | 5 Year Average 1922-1926, incl. | | 3 Year Average 1924-1926, incl. | | 2 Year Average 1925-1926, incl. | |
|---|---|---|---|---|---|---|---|
| | | Per cent picked in | | Per cent picked in | | Per cent picked in | |
| | | 126 days | 140 days | 131 days | 143 days | 135 days | 145 days |
| 6314 | Burnett | 28 | 62 | 27 | 61 | 26 | 61 |
| 804 | Mebane | 15 | 46 | 14 | 47 | 15 | 51 |
| 6571 | Acala | 21 | 37 | 15 | 31 | 19 | 31 |
| 6564 | Durango | 19 | 41 | 14 | 38 | 18 | 44 |
| 6567 | Lightning Express | 28 | 57 | 23 | 54 | 29 | 63 |
| 6573 | Kasch | 10 | 24 | 5 | 17 | 5 | 15 |
| 6565 | Lone Star | 6 | 19 | 5 | 14 | 8 | 18 |
| 8588 | New Mebane | 8 | 20 | 2 | 9 | 3 | 8 |
| 8487 | Westex | ..... | ..... | 25 | 48 | 24 | 42 |
| 7387 | Sunshine | ..... | ..... | 10 | 24 | 14 | 23 |
| 7889 | Triumph (406) | ..... | ..... | 8 | 35 | 10 | 43 |
| 8599 | New Boykin | ..... | ..... | 7 | 21 | 9 | 19 |
| 8708 | Half and Half | ..... | ..... | ..... | ..... | 19 | 49 |
| 8607 | Harper | ..... | ..... | ..... | ..... | 7 | 17 |

The per cent of the total crop harvested on the average for the five years is presented in Table 22 for the various varieties, 126 and 140 days after the planting date. From this and the previous table it can be determined approximately what per cent of the crop one may expect to be ready to pick at a given time in the fall. Fifty to sixty per cent of the total crop has been harvested on the average from the very early varieties one hundred and forty days after they were planted while with the large-boll varieties only twenty to twenty-five per cent of the crop was harvested in this same period. The grower should consider the date of planting and the average date of the first killing frost in the fall in arriving at the growing period available for the variety of cotton he

chooses to grow. It is obvious that a late-maturing variety of cotton planted as late as June 1 may have a relatively large per cent of its crop immature when the first frost stops growth in the fall. A study of the above tables will aid the farmer in choosing the variety best suited to fit the conditions with which he is confronted and give him a better understanding of the fruiting habits and requirements of the different varieties.

## GROWING SEASON REQUIREMENT FOR BLOOMING AND OPENING OF COTTON VARIETIES

The number of days required annually and on the average for the blooming and opening process of the different varieties of cotton grown are tabulated below. These data are calculated from the date of planting. The variation in the number of days from planting to first bloom from year to year is not marked and averages about sixty days for most varieties. The time required for the first bolls to open, however, was materially prolonged in 1925 and a considerable variation is noted for the different varieties. The environment and climatic conditions are of course intimately associated with the time required for these developmental processes of the cotton blooms and bolls and the effects of these factors can be clearly seen from this table and those preceding. The opening and maturing of the bolls appear to be more variable from year to year and the varietal differences in time required for the crop to open are more pronounced than they are in the flowering of the plants. In seasons conducive to early opening the early varieties produce their first open bolls in one hundred to one hundred and ten days and reach the height of their picking season about thirty days later. The picking peak for later-maturing varieties usually follows some ten to twenty days later than this. From this table the grower can determine rather closely when the bulk of his crop should be ready to harvest.

Table 23.—Yearly and average days growing period requirement for fruiting and opening of cotton varieties.

| Variety | Year | Number of Days from Planting to: | | | | Number of Days from: | |
|---|---|---|---|---|---|---|---|
| | | First Bloom | First Open Boll | Bloom Peak | Picking Peak | First Bloom to First Open Boll | Bloom Peak to Picking Peak |
| Burnett | 1922 | 59 | 101 | 80 | 122 | 42 | 42 |
| | 1923 | 52 | 108 | 66 | 157 | 56 | 91 |
| | 1924 | 69 | 111 | 83 | 125 | 42 | 42 |
| | 1925 | 62 | 139 | 90 | 146 | 77 | 56 |
| Average | | 61 | 115 | 80 | 138 | 54 | 58 |
| Durango | 1922 | 59 | 108 | 90 | 136 | 49 | 46 |
| | 1923 | 52 | 101 | 73 | 157 | 49 | 84 |
| | 1924 | 69 | 125 | 90 | 174 | 56 | 84 |
| | 1925 | 62 | 132 | 90 | 146 | 70 | 56 |
| Average | | 61 | 117 | 86 | 153 | 56 | 67 |
| Mebane 804 | 1922 | 59 | 101 | 75 | 129 | 42 | 54 |
| | 1923 | 52 | 101 | 66 | 157 | 49 | 91 |
| | 1924 | 62 | 118 | 97 | 174 | 56 | 77 |
| | 1925 | 62 | 139 | 90 | 146 | 77 | 56 |
| Average | | 59 | 115 | 82 | 152 | 56 | 70 |

Table 23.—Yearly and average days growing period requirement for fruiting and opening of cotton varieties—Continued.

| Variety | Year | Number of Days from Planting to: | | | | Number of Days from: | |
|---|---|---|---|---|---|---|---|
| | | First Bloom | First Open Boll | Bloom Peak | Picking Peak | First Bloom to First Open Boll | Bloom Peak to Picking Peak |
| Lightning Express.. | 1922 | 59 | 101 | 75 | 122 | 42 | 47 |
| | 1923 | 59 | 101 | 66 | 150 | 42 | 84 |
| | 1924 | 69 | 125 | 90 | 174 | 56 | 84 |
| | 1925 | 62 | 132 | 97 | 146 | 70 | 49 |
| Average..... | ..... | 62 | 115 | 82 | 148 | 53 | 66 |
| Acala..... | 1922 | 59 | 101 | 80 | 136 | 42 | 56 |
| | 1923 | 52 | 101 | 66 | 157 | 49 | 91 |
| | 1924 | 69 | 118 | 97 | 174 | 49 | 77 |
| | 1925 | 62 | 132 | 90 | 153 | 70 | 63 |
| Average.... | ..... | 61 | 113 | 83 | 155 | 52 | 72 |
| Kasch..... | 1922 | 64 | 108 | 90 | 136 | 44 | 46 |
| | 1923 | 52 | 108 | 66 | 164 | 56 | 98 |
| | 1924 | 76 | 125 | 83 | 174 | 49 | 91 |
| | 1925 | 69 | 153 | 97 | 153 | 84 | 56 |
| Average.... | ..... | 65 | 124 | 84 | 157 | 59 | 73 |
| Lone Star..... | 1922 | 64 | 108 | 85 | 136 | 44 | 51 |
| | 1923 | 59 | 108 | 73 | 157 | 49 | 84 |
| | 1924 | 76 | 132 | 97 | 174 | 56 | 77 |
| | 1925 | 69 | 160 | 90 | 160 | 91 | 70 |
| Average..... | ..... | 67 | 127 | 86 | 157 | 60 | 71 |
| Belton..... | 1922 | 59 | 108 | 90 | 136 | 49 | 46 |
| | 1923 | 52 | 101 | 66 | 157 | 49 | 91 |
| | 1924 | 69 | 125 | 83 | 181 | 56 | 98 |
| | 1925 | 62 | 153 | 97 | 153 | 91 | 56 |
| Average..... | ..... | 61 | 122 | 84 | 157 | 61 | 73 |
| Rowden..... | 1922 | 64 | 108 | 90 | 129 | 44 | 39 |
| | 1923 | 52 | 108 | 66 | 157 | 56 | 91 |
| | 1924 | 69 | 125 | 97 | 181 | 56 | 84 |
| | 1925 | 62 | 146 | 90 | 146 | 84 | 56 |
| Average..... | ..... | 62 | 122 | 86 | 153 | 60 | 67 |
| Improved Mebane. | 1922 | 70 | 108 | 90 | 136 | 38 | 46 |
| | 1923 | 52 | 101 | 73 | 157 | 49 | 84 |
| | 1924 | 76 | 132 | 111 | 181 | 56 | 70 |
| | 1925 | 69 | 160 | 97 | 160 | 91 | 63 |
| Average.... | ..... | 67 | 125 | 93 | 159 | 58 | 66 |
| Westex..... | 1924 | 69 | 111 | 90 | 125 | 42 | 35 |
| | 1925 | 62 | 132 | 90 | 153 | 70 | 63 |
| Average.... | ..... | 66 | 122 | 90 | 139 | 56 | 49 |
| Sunshine..... | 1924 | 69 | 125 | 97 | 181 | 56 | 84 |
| | 1925 | 62 | 139 | 90 | 153 | 77 | 63 |
| Average.... | ..... | 66 | 132 | 94 | 167 | 66 | 73 |
| Mebane (406)..... | 1924 | 76 | 125 | 97 | 174 | 49 | 77 |
| | 1925 | 69 | 139 | 97 | 160 | 70 | 63 |
| Average.... | ..... | 73 | 132 | 97 | 167 | 59 | 70 |
| Snowflake..... | 1922 | 70 | 115 | 95 | 144 | 45 | 49 |
| | 1923 | 59 | 122 | 66 | 157 | 63 | 91 |
| Average..... | ..... | 65 | 119 | 81 | 151 | 54 | 70 |
| Truitt..... | 1922 | 64 | 108 | 95 | 136 | 44 | 41 |
| | 1923 | 52 | 108 | 66 | 157 | 56 | 91 |
| Average.... | ..... | 58 | 108 | 81 | 147 | 50 | 66 |
| Bennett..... | 1922 | 64 | 115 | 90 | 136 | 51 | 46 |
| | 1923 | 59 | 108 | 87 | 157 | 49 | 70 |
| Average.... | ..... | 62 | 112 | 89 | 147 | 50 | 58 |
| New Boykin..... | 1924 | 76 | 125 | 83 | 174 | 49 | 91 |
| | 1925 | 69 | 160 | 97 | 160 | 91 | 63 |
| Average..... | ..... | 73 | 143 | 90 | 167 | 70 | 77 |

## VARIATION IN PER CENT OF LINT AND LENGTH OF LINT

Comparative data for eight of the standard varieties of cotton covering a seven-year period and showing the varietal and seasonal variation in both length of lint and per cent of lint are given in the accompanying tables.

The significant points brought out in these tables are: first, that the percentage of lint from year to year is quite constant and shows only slight seasonal fluctuations, and, secondly, that the length of staple exhibits a rather wide fluctuation for the different seasons. Variations for the average staple length show as much as one-eighth to three-sixteenths of an inch in different years. The varieties are arranged in order of their length of staple, which shows their inherent varietal characteristic in this respect. The variation for the different seasons seems to be highly associated with climatic conditions, principally rainfall. A study of the daily and monthly precipitation records in connection with these staple lengths indicates a high degree of relationship between the amount of moisture falling at the time the bolls are fairly well developed and the length of staple produced. The seasons which had good moisture conditions in September when the major crop of bolls were developing into maturity show superior length of staple. Four years out of the seven produced staple above the average in length. These were seasons having favorable rainfall in September. The season of 1923, which was one of a very dry summer, but with favorable moisture in September, produced an excellent length of staple universally in the Plains Region for all varieties of cotton.

These data further show that the length of staple produced on the Plains by these commonly grown varieties is acceptable and adequate to meet the market demands. The first three varieties, of recognized short staple, come well within the minimum staple for tenderable cotton, while the staple produced by the other varieties is comparable to that produced by them in other sections under normal conditions of fertility and moisture.

Table 24.—Per cent of lint for different varieties of cotton, 1919 to 1925.

| Variety | Per Cent of Lint | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | Average |
| Kasch | 35.59 | 34.74 | 37.64 | 39.23 | 38.01 | 40.07 | 38.75 | 37.71 |
| Lone Star | 33.72 | 34.32 | 38.48 | 38.91 | 34.93 | 34.42 | 36.58 | 35.90 |
| Mebane 804 | 34.58 | 37.38 | 35.64 | 32.76 | 35.75 | 32.18 | 34.13 | 34.63 |
| Rowden | 34.92 | 31.36 | 34.62 | 34.73 | 34.42 | 33.75 | 34.90 | 34.10 |
| Acala | 31.03 | 32.47 | 36.56 | 33.48 | 34.24 | 34.72 | 34.45 | 33.85 |
| Burnett | 38.94 | 33.89 | 33.98 | 31.10 | 32.65 | 32.07 | 33.94 | 33.79 |
| Durango | 32.60 | 35.13 | 32.74 | 35.61 | 32.00 | 32.98 | 32.93 | 33.42 |
| Belton | 28.02 | 32.00 | 34.64 | 34.27 | 33.79 | 34.96 | 32.60 | 32.89 |
| Average | 33.67 | 33.91 | 35.53 | 35.01 | 34.47 | 34.39 | 34.78 | 34.53 |

Table 25.—Annual and average length of staple for different varieties, 1919 to 1925.

| Variety | Length of Staple in Sixteenths of an Inch | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | Average |
| Burnett | 12 | 16 | 14 | 14 | 18 | 16 | 16 | 15.1 |
| Mebane 804 | 14 | 12 | 16 | 15 | 18 | 16 | 17 | 15.4 |
| Kasch | 14 | 12 | 16 | 16 | 18 | 16 | 16 | 15.4 |
| Rowden | 14 | 17 | 18 | 17 | 17 | 17 | 17 | 16.7 |
| Lone Star | 15 | 16 | 19 | 15 | 18 | 18 | 17 | 16.8 |
| Belton | 16 | 17 | 18 | 16 | 18 | 17 | 17 | 17.0 |
| Acala | 16 | 18 | 17 | 17 | 18 | 17 | 18 | 17.2 |
| Durango | 18 | 18 | 20 | 16 | 20 | 18 | 20 | 18.5 |
| Average | 14.8 | 15.7 | 17.2 | 15.7 | 18.1 | 16.8 | 17.2 | 16.5 |

## THE RELATION OF PERCENTAGE OF LINT TO YIELD

The percentage of lint was obtained for all varieties grown in the eleven-year period, 1914-25. Linting percentage is an inherent quality characteristic of the variety and is a character which is given considerable weight by the farmer when it comes to choosing the variety of cotton he will grow. It is of value, therefore, to analyze as far as possible the relationship between the percentage of lint and the yield of lint produced and to determine the direction and extent of such association if it exists.

Correlation coefficients have been calculated for percentage and yield of lint for each of the individual years 1914-25, including all the varieties grown each year as shown in Table 26. The varieties grown for any year, therefore, constitute the sample and all are subject to the same environmental influences due to climatic conditions.

While there may be certain objections to throwing the varieties, with all their inherent differences for producing a characteristic percentage of lint, into a single sample, and it is not possible to analyze the causes of the relation between percentage of lint and yield, this procedure does afford a measure of the tendency for high or low yields to be associated with high or low percentages of lint among the particular varieties which are being compared with each other.

Table 26.—Correlation between percentage of lint and yield of lint.

| Year | No. of Varieties | Extremes of Lint Per Cent | | Correlation Coefficient |
|---|---|---|---|---|
| | | Lower | Upper | |
| 1914 | 57 | 24.2 | 35.4 | .55 ± .06 |
| 1915 | 44 | 27.4 | 42.7 | .34 ± .09 |
| 1916 | 31 | 27.3 | 44.8 | .66 ± .07 |
| 1918 | 32 | 28.4 | 43.0 | .38 ± .10 |
| 1919 | 43 | 26.0 | 41.8 | .44 ± .08 |
| 1920 | 11 | 27.7 | 37.4 | .22 ± .19 |
| 1921 | 13 | 32.7 | 38.4 | .06 ± .19 |
| 1922 | 13 | 29.6 | 39.2 | .37 ± .16 |
| 1923 | 13 | 29.7 | 38.0 | —.11 ± .18 |
| 1924 | 14 | 30.7 | 40.0 | .45 ± .14 |
| 1925 | 16 | 31.9 | 43.2 | —.07 ± .17 |

In nine years out of the eleven, as shown in Table 25, the correlation has been in the positive direction. During the first five years the number of varieties in the sample was reasonably large and the correlation coefficients are fairly high and significant with a low probable error.

Since 1920 the number involved has been low and the probable errors correspondingly high, showing a fairly significant correlation only in 1924. Grouping the 283 varieties grown during this period, dividing the values of percentage of lint and yield of lint at the median and assuming the distribution to be a normal one the correlation is .28 ± .04. Calculated on the basis of Yule's Coefficient of Association, which takes a higher value than the correlation coefficient, the relation between these two characters, when all varieties grown are considered, is expressed by the coefficient .44 ± .03.

There seems to be, therefore, some tendency for the varieties having low percentages of lint to produce low yields and vice versa. This may not, and probably does not, mean that the varieties with extremely high linting percentages are the highest yielders but those varieties carrying a percentage of lint which falls above the average on the scale also have a tendency to produce an acre yield above the average.

## RELATION BETWEEN PERCENTAGE OF LINT AND LENGTH OF LINT

The relation between the percentage of lint and length of lint for the varieties grown in the variety test each year from 1918 to 1925 is shown by the correlation coefficients in the following table:

Table 27.—Correlation between Percentage and length of lint.

| Year | Number of Varieties | Correlation Coefficient |
|---|---|---|
| 1918 | 32 | —.45 ± .09 |
| 1919 | 44 | —.44 ± .08 |
| 1920 | 11 | —.55 ± .14 |
| 1921 | 13 | —.37 ± .16 |
| 1922 | 13 | —.52 ± .14 |
| 1923 | 13 | —.50 ± .14 |
| 1924 | 14 | —.40 ± .15 |
| 1925 | 16 | —.74 ± .08 |

The number of varieties involved in calculating these coefficients was rather small with the exception of the first two years and, consequently, the probable errors are rather high. The relation between percentage of lint and length of lint, however, is shown to be in a negative direction in each of the years involved and the size of the correlation coefficient is significant in most cases. It seems that with the varieties which were included in this test there is a strong tendency for the varieties which have a longer staple to have a correspondingly low ginning percentage.

## COMPARISON OF LENGTH OF STAPLE AND YIELD

The correlation between the length of lint and yield of lint for the varieties grown in the experiment each year since 1918 is shown in Table 28. With the exception of the first two years, the number of varieties involved has been inadequate and the coefficients for the most part do not show a significant relation and have high probable errors. The table is given, however, to show the trend or tendency on the whole for long staple to be accompanied by lower yield. In all except one year the correlation was in the negative direction and this tendency is more significant than the degree of correlation shown.

Table 28.—Correlation between length of staple and yield of lint.

| Year | No. of Varieties | Extremes of Length of Staple in 16th Inches | | Correlation Coefficien |
|---|---|---|---|---|
| | | Lower | Upper | |
| 1918 | 32 | 10 | 19 | —.19 ± .12 |
| 1919 | 43 | 12 | 18 | —.27 ± .09 |
| 1920 | 11 | 10 | 19 | —.26 ± .16 |
| 1921 | 13 | 14 | 21 | —.22 ± .18 |
| 1922 | 13 | 14 | 19 | —.42 ± .15 |
| 1923 | 13 | 16 | 20 | .04 ± .18 |
| 1924 | 14 | 15 | 19 | —.06 ± .18 |
| 1925 | 16 | 12 | 20 | —.02 ± .17 |

The table appearing below is presented for the purpose of showing the comparison between the length of staple and yield of some of the varieties chosen to represent the various staple lengths. Varieties considered representative, and the best in their class, of the various staple lengths from $\frac{7}{8}$ to 1 3/16 inches are given and their actual yields of lint to the acre recorded for the past eight years.

Taking the 1-inch staple, represented by the Mebane variety, as 100 per cent, it will be noted that there is a gradual decline in yield directly as the length of staple increases. The $\frac{7}{8}$-inch, or shortest staple, gave an increased yield of 13 per cent over the inch staple and an increase of 34 per cent over that produced by the longest staple. The average per cent gain or loss in yield is given for each class of staple.

The best varieties, having a length of staple from 1 1/16 to 1 3/16 inches yielded 79 per cent as much lint to the acre as the best variety having a staple of $\frac{7}{8}$ to 1 inch. It will be seen from the table that a decided inverse correlation exists in these varieties between length of staple and acre yield of lint. This relation holds true in six out of the eight years under consideration.

This may be considered as an exhibition of varietal excellence rather than a portrayal of the difference between the yielding power of long- and short-staple cotton on the whole. These are admittedly somewhat arbitrarily chosen varieties, representing as they do a range in staple from the minimum tenderable length to the staple lengths. Even so, however, they are consistent in a marked decrease in yield accompanying an increase in the staple length.

Table 29.—The relation between yield and length of lint for representative varieties of cotton, 1919-26.

| Variety | Length of Lint, Inches | Acre Yield Pounds of Lint | | | | | | | | | Per Cent Average Yield of 1-inch Staple =100% | Per Cent Gain or Loss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | Average | | |
| Burnett | 7/8 | 421.75 | 582.67 | 581.15 | 219.34 | 282.48 | 186.28 | 144.29 | 278.94 | 337.11 | 113.09 | +13.09 |
| Mebane | 1 | 393.30 | 477.09 | 441.08 | 193.82 | 334.77 | 200.01 | 64.19 | 280.41 | 298.08 | 100.00 | 0 |
| Lone Star | 1 1/16 | 270.97 | 398.09 | 491.24 | 183.48 | 139.65 | 183.42 | 26.46 | 296.03 | 248.67 | 83.42 | —16.58 |
| Acala | 1 1/8 | 301.99 | 230.79 | 403.58 | 170.72 | 289.73 | 303.31 | 134.75 | 319.06 | 269.24 | 90.32 | — 9.68 |
| Snowflake* | 1 3/16 | 316.14 | 189.83 | 334.18 | 139.48 | 204.67 | 279.64 | 102.80 | 306.76 | 234.19 | 78.57 | —21.43 |

*Durango variety in years 1924-26.

This is not an argument in favor of planting short-staple cottons, below $\frac{7}{8}$ to 1 inch, which are the typical tenderable grades of commercial cotton. It is rather intended to point out the need for an adequate premium for the longer staple and for permitting the normal premium paid for additional length of staple to reach the producer. Furthermore, the farmer has no incentive to grow a long-staple variety here unless he does receive the premium due him for the product of higher quality.

Until the past two or three years, there has been very little of the so-called "Half and Half" cotton, producing staple under $\frac{7}{8}$ of an inch in length, grown in this region. Recently, however, there has been a tendency on the part of some growers to plant this shorter-staple cotton. This quality of cotton is not acceptable to the trade, is penalized on the market, can only result in a loss to the region as a whole, and should not be grown. Experiments here show that varieties producing around an inch staple are satisfactory in yield and in general are the ones which should be grown in this region.

Northwest Texas is not without good producing varieties of superior length of staple, and the Acala, Lightning Express, and Durango are early, staple varieties which can be planted with profit where a corresponding premium is passed on to the grower.

## SIZE OF THE BOLL

The size of the boll in cotton has a bearing on the cost and ease of picking and is of importance in determining the merits of a variety. The number of bolls required to weigh one pound was recorded for cotton varieties grown the past six years and are shown in the following table. The size of boll characteristic of the varieties and the variation from year to year due to environmental influences are shown.

Table 30.—Size of boll of cotton varieties, 1921-1926.

| Variety | Number of Bolls Required to Weigh One Pound | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Years | | | | | | Average | | |
| | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | Six Years | Three Years | Years Grown |
| Burnett | 80 | 98 | 72 | 95 | 63 | 78 | 81 | 79 | 81 |
| Durango | 83 | 89 | 71 | 86 | 63 | 81 | 79 | 77 | 79 |
| Acala | 74 | 91 | 71 | 74 | 60 | 75 | 74 | 70 | 74 |
| Mebane 804 | 73 | 81 | 48 | 87 | 87 | 82 | 76 | 85 | 76 |
| New Mebane | 75 | 62 | 68 | 65 | 63 | 50 | 64 | 59 | 64 |
| Kasch | 53 | 74 | 51 | 64 | 64 | 53 | 60 | 60 | 60 |
| Lone Star | 56 | 65 | 47 | 69 | 48 | 76 | 60 | 64 | 60 |
| Belton | 70 | 71 | 54 | 64 | 54 | ..... | ..... | ..... | 63 |
| Rowden | 65 | 59 | 49 | 69 | 51 | ..... | ..... | ..... | 59 |
| Lightning Express | ..... | 99 | 76 | 90 | 73 | 89 | ..... | 84 | 85 |
| Snowflake | 91 | 89 | 68 | ..... | ..... | ..... | ..... | ..... | 83 |
| Truitt | 73 | 63 | 56 | ..... | ..... | ..... | ..... | ..... | 64 |
| Westex | ..... | ..... | ..... | 84 | 72 | 83 | ..... | 80 | 80 |
| New Boykin | ..... | ..... | ..... | 76 | 67 | 72 | ..... | 72 | 72 |
| Triumph 406 | ..... | ..... | ..... | 73 | 56 | 65 | ..... | 65 | 65 |
| Sunshine | ..... | ..... | ..... | 67 | 61 | 60 | ..... | 63 | 63 |
| Bennett | 58 | ..... | 49 | ..... | ..... | ..... | ..... | ..... | 53 |
| Half and Half | ..... | ..... | ..... | ..... | 54 | 84 | ..... | ..... | 69 |
| Harper | ..... | ..... | ..... | ..... | 70 | 58 | ..... | ..... | 64 |

## BREEDING NEW VARIETIES

The conditions under which cotton is grown in the South Plains and Northwest Texas are vastly different from those in the older cotton-growing regions. Cotton breeding and the development of the varieties now in general use in Texas have been with the conditions and requirements of the central and eastern part of the State in view. These varieties, for the most part, form the bulk of the cotton grown here and some of them have done well while others are wholly unsuited. Peculiar climatic conditions not found in another part of the Cotton Belt, particularly rainfall and temperature, together with the altitude, are factors which must have consideration in developing a variety of cotton best suited to this region. There is, at this time, no variety especially adapted to the needs and conditions here. Breeding and selection work were started at this Substation several years ago with the view of developing varieties or strains of cotton better suited to the region. The plant-row method is being used almost exclusively, the major selections being from the old Mebane stock and also from Durango and Burnett. Some promising selections are being increased for comparison and further test and it is hoped to find some better adapted than those now used.

Westex is the name given a new variety developed at this Substation through single-plant selection, the original selection being made in a field of Burnett cotton in 1921. This variety has been increased and seed distributed, particularly to the counties north and northwest of the Station, where there has been, in very recent years, much interest in cotton-growing for the first time and where an early variety is essential to success. It is believed that the particular value of this variety will be that it will make possible the profitable growing of cotton fifty to one hundred miles to the north and northwest, where other varieties are now uncertain.

Westex is a very early-maturing variety, comparatively heavy-fruiting, and yields satisfactorily under less favorable conditions of drouth or low temperatures. It has a linting percentage of 34 and a staple of $\frac{7}{8}$ to 1 inch in length. It is lacking in size of boll and storm resistance. This variety possesses seedling vigor and ability to grow off under low temperatures, which is of value when planted under unfavorable spring conditions such as often exist on the Plains, and for growing toward the northern margin of the cotton area. The adaptability of this variety for an extension of the cotton area farther north into the Panhandle is shown by the fact that it produced 235 pounds of lint to the acre at the Fort Hays Experiment Station, Hays, Kansas, in a cooperative test grown there in 1926. Another companion selection, even slightly earlier than the Westex, yielded 249 pounds at Hays this year.

This variety makes a small vegetative growth, has small leaves, and with its early and quick habits of growth, approaches the nature of a determinate growing habit. The burrs are thin, and dry out rather

quickly, and with the first frost the whole crop remaining opens rapidly. It, therefore, has advantages as a variety adapted to the requirements for more successful harvesting with the cotton sled or stripper, which was so universally practiced in the Plains region in 1926. The size of boll is objectionable for hand picking, but if machine harvesting becomes a more universal practice the size and shape of boll will be factors of relatively smaller importance.

## SUMMARY AND CONCLUSIONS

1. Cotton-growing has increased almost one hundredfold in the High Plains region in the past fifteen years and has proven to be a dependable crop here at an altitude of 3200 feet with an average growing season of 207 days.

2. The distribution of the rainfall on the Plains, with 85 per cent of the total falling during the growing season, is favorable to cotton-growing. Length of season, first killing frosts in the fall, and occasional subnormal mean temperatures in the early fall months must be considered in choosing the variety to grow.

3. Cotton compares favorably with the sorghums as a drouth-resistant crop adapted to dry-land farming, producing on the average ten pounds of lint to one bushel of grain sorghum.

4. A high pre-season rainfall is in general indicative of an average yield of cotton and has almost as effective an influence on yield as does seasonal rainfall.

5. Conditions on the Plains favor cultivation of large areas per man and harvesting the crop with cotton harvesters or sleds.

6. The early-maturing varieties have consistently given the highest yields. The Burnett has given the best yield and while it has a small boll and lacks storm-resistance it is a profitable cotton to grow under extreme conditions because of its earliness. The medium to early strains of Mebane have given satisfactory yields, possess fair staple around one inch, and storm-resistance. Under ordinary conditions a good strain of Mebane cotton should be grown here.

7. Lightning Express, Acala, and Durango are early varieties of longer-staple cotton, which produce well and can be profitably grown when a corresponding premium for the extra staple length is passed on to the producer.

8. Weekly bloom counts and weekly pickings show considerable variation in the fruiting habits of the different varieties. The varieties producing the most blooms also gave the largest yields of cotton. A five-year average shows the early varieties to have 40 to 60 per cent of their total crop open 140 days after planting as compared with 20 to 25 per cent for the large-boll varieties in the same period.

9. The percentage of lint outturn of the varieties tested was quite constant from year to year while the length of lint showed a rather wide fluctuation for the different seasons. The length of lint produced here is adequate to meet the market demands.

10. Correlations between the percentage of lint and yield of lint would seem to indicate that those varieties with a linting percentage above the average also have a tendency to produce an acre yield above the average.

11. A rather consistent, high and negative correlation, ranging from —.37±.16 to —.74±.08, exists between the percentage of lint and length of lint for the varieties grown the past eight years.

12. Among the varieties grown, a correlation in the negative direction but not highly significant is shown between long staple and yield of lint in seven out of the eight years. The best varieties, having a staple of 1 1/16 to 1 3/16 inches, yielded, on the average for eight years, 79 per cent as much lint as those having a staple of $\frac{7}{8}$ and 1 inch.

Table 31.—Source of seed of cotton varieties grown, 1920-1926, inclusive.

| T. S. No. | Variety | Source |
|---|---|---|
| 4131 | Acala | F. D. Watson, Italy, Texas. |
| 5988 | Acala | Watson Seed Farms, Waxahachie, Texas. |
| 6571 | Acala | Jno. D. Rogers, Allenfarm, Texas. |
| 7381 | Acala | |
| 7854 | Acala | |
| 8609 | Acala | |
| 793 | Belton | Texas Substation No. 5, Temple, Texas. |
| 5984–91 | Belton | |
| 7411 | Belton | |
| 4115 | Bennett | R. L. Bennett & Sons, Paris, Texas. |
| 5994 | Bennett | |
| 6572 | Bennett | |
| 7388 | Boykin | Ferguson Seed Farms, Sherman, Texas. |
| 7852 | Boykin, New | |
| 8599 | Boykin, New | |
| 4226 | Burnett | Bert Raithel, Ralls, Texas. |
| 6314 | Burnett | M. H. Wooley, Ralls, Texas. |
| 3666 | Durango | F. C. Tracy, Carlsbad, New Mexico. |
| 4114 | Durango | Texas Substation No. 8, Lubbock, Texas. |
| 5987 | Durango | |
| 6564 | Durango | |
| 7888 | Half and Half | U. P. Pace, Lubbock, Texas. |
| 8708 | Half and Half | Jeff. Summerour, Duluth, Georgia. |
| 7861 | Harper | R. M. Harper, Martindale, Texas. |
| 8607 | Harper | Wharton Mercantile Company, Wharton, Texas. |
| 4117 | Kasch | Ed. Kasch, San Marcos, Texas. |
| 5992 | Kasch | |
| 6573 | Kasch | |
| 7385 | Kasch | |
| 7858 | Kasch | |
| 8585 | Kasch | Geo. W. Baker & Son, Lockhart, Texas. |
| 6567 | Lightning Express | Pedigree Seed Company, Hartsville, S. C. |
| 7394 | Lightning Express | |
| 7847 | Lightning Express | |
| 8605 | Lightning Express | |
| 4119 | Lone Star | D. A. Saunders Seed Co., Greenville, Texas. |
| 5995 | Lone Star | |
| 6565 | Lone Star | |
| 7386 | Lone Star | |
| 7851 | Lone Star | |
| 8590 | Lone Star | |
| 3150 | Lone Star | R. H. Hiesch, Clarksville, Texas. |
| 5986 | Lone Star | Main Station Farm, College Station, Texas. |
| 804 | Mebane Triumph | H. A. Brewer, Dale, Texas. |
| 4120 | Mebane | J. P. Horner, Lockhart, Texas. |
| 5989 | Mebane | A. D. Mebane, Lockhart, Texas. |
| 6780 | Mebane | A. D. Mebane Sales Agency, Lockhart, Texas. |
| 7408 | Mebane | |
| 7859 | Mebane | |
| 8588 | Mebane | |
| 6563 | Mebane Improved | A. D. Mebane, Lockhart, Texas. |
| 7886 | Mebane 406 | Ferguson Seed Farms, Sherman, Texas. |
| 7889 | Mebane 406 | |
| 4116 | Rowden | Rowden Brothern, Wills Point, Texas. |
| 5993 | Rowden | |
| 6574 | Rowden | |
| 7391 | Rowden | |
| 7855 | Rowden | |
| 8613 | Rowden | |
| 4118 | Snowflake | John McLernon, Clarksville, Texas. |
| 5991 | Snowflake | |
| 6575 | Snowflake | |
| 7387 | Sunshine | J. W. Davidson, McKinney, Texas. |
| 7857 | Sunshine | |
| 8596 | Sunshine | |
| 8598 | Triumph (406 | Ferguson Seed Farms, Inc., Sherman, Texas. |
| 5990 | Truitt | T. B. Truitt & Son, Waxahachie, Texas. |
| 6566 | Truitt | |
| 8592 | Wacona | Lankart-Bred Seed Farms, Waco, Texas. |
| 8487 | Westex | Texas Substation No. 8, Lubbock, Texas. |