Mississippi Agricultural Experiment Station.

BULLETIN No. 101.

Report of Work at McNeil Branch Experiment Station for 1906.

By E. B. Ferris.

132837

Figure 1.—Residence McNeil Experiment Station.

AGRICULTURAL COLLEGE, MISSISSIPPI.

JANUARY, 1907.

Tucker Printing House, Jackson, Miss.

MITCHELL MEMORIAL LIBRARY
MISSISSIPPI STATE COLLEGE
REPORT OF WORK AT McNEILL BRANCH
EXPERIMENT STATION FOR 1906.

By E. B. Ferris.

Introduction.—Work at the McNeill Station during 1906 has been conducted along the same lines as heretofore reported in our four annual reports. On the whole it has been more satisfactory than ever before; first, because the lands have been in cultivation longer and are in better shape every way for producing crops; and, second, because the seasons have been less extreme than heretofore. Good yields were made with nearly every class of crop grown here during 1906, and the year's work shows conclusively that the "Pine Belt" offers just as good natural advantages for successful agriculture as any section of Mississippi. The only trouble, just now, is the lack of sufficient labor to do any thing more than develop the timber industry which overshadows every thing else.

Season.—The seasons were less extreme than heretofore, there being no excessively heavy rains during January, February, and March, nor any severe droughts in April, May, and June. The minimum temperatures and total rainfall for each month were as follows: January, 25 degrees, and 3.46 inches; February, 29 degrees, and 4.51 inches; March, 28 degrees, 6.57 inches (one day's rainfall not obtained); April, 38 degrees, 1.96 inches; May, 45 degrees, 3.02 inches; June, 64 degrees, 5.47 inches; July, 68 degrees, 5.80 inches; August, 68 degrees, 3.83 inches; September, 65 degrees, 10.23 inches; October, 38 degrees, .78 inches; November, 27 degrees, 1.09 inches; December, 26 degrees, 2.48 inches.

As a rule the seasons here may be divided yearly into four distinct periods, the first three months usually being excessively wet, the next three entirely too dry, the following three months again too wet, and the last three rather dry. Being so, we find that by exercising care as to the time of planting crops, much can be gained in the way of better seasons and larger yields. Vegetables should be started extremely early, especially those like beets, onions, cabbage, etc., that can stand considerable cold; while such crops as corn, cowpeas, and peanuts have invariably done better when planted late, so as to have the corn still young during the dry months of May and June when moisture is so necessary to old corn, and also to have the peas and
peanuts ripen in the dry months of the fall. The Station has grown winter grains and legumes, beets, cabbage, lettuce, onions, rutabagas, and turnips here through several winters without having them injured by frost. By starting all such crops as early as possible they mature before the dry weather of the late spring hurts them seriously.

Removing Stumps.—Before the first of March, the Station will have removed, since the first of November, the stumps from about forty acres of land in the two back fields. These two fields have been cultivated up to this time with the stumps on the land and the crops have demonstrated that it is an expensive thing to do. It is impossible to use labor-saving implements on stump land; a large per cent. of the field is taken up by the stumps and the vacant space required to plow around them; much hoeing is required to keep down grass near the stumps that cultivators cannot remove; and it is difficult to control the excess of rainfall on such land so as to keep it from washing away the soil.

After trying many ways to get rid of these stumps, we have not yet found an easier nor more economical way than by blasting them with dynamite and afterwards burning them. If a machine could be perfected by which holes might be bored, otherwise than by human power, entirely through the stump from the surface of the ground on one side to well beneath the surface on the other, these holes would act as flues and greatly facilitate and hasten the burning of the stumps. A flexible shaft machine has been suggested through the agricultural press of the State as offering a solution to the boring proposition, and the Station took the matter up with the manufacturers of such machines, who reported that a flexible shaft strong enough to bore an inch and a half hole through a stump would have to be so heavy as to be unwieldy. We are still at work on a better and cheaper means of removing these stumps.

In blasting stumps we have found that by properly boring the hole for receiving the charge of dynamite, these stumps may be shattered enough to burn well with an average of $\frac{3}{8}$ of a pound of dynamite per stump. This dynamite costs $13\frac{1}{2}$ cents per pound, the caps cost 80 cents per hundred, and the fuse 60 cents per hundred feet. This makes the blasting material average $6\frac{1}{2}$ to 7 cents a stump, the holes can be bored for $\frac{3}{8}$ of a cent each, and from $2\frac{1}{2}$ to 3 cents ought to cover the cost of digging around the stump and burning the same, provided they are well dried and there is enough fuel on the ground to
assist in burning them. The average acre of cut-over land here will have one hundred stumps on it, and the average laborer will likely run the cost of removing them above the figures just given.

General Statement.—Heretofore, the Station has conducted a large number of tests with fertilizers under a great many crops, as many as thirty-six tests being made with a single crop, varying the proportions of the several ingredients of the fertilizers in many different ways. Experience has shown that it is not possible here, in the yield of the crop, to detect very slight changes in the composition of the fertilizer used under it, so, while not reducing the actual acreage devoted to fertilizer work, we have cut down the number of tests fully fifty per cent. and are duplicating and triplicating most of these tests. All work with fertilizers under corn and cotton this year has been done in triplicate, while that with cowpeas, peaches, sugar cane, and sweet potatoes has been done in duplicate. The work of growing fruits and vegetables for market and of getting all the information possible about the profits to be expected from such work has been continued with fair results.

FRUITS AND VEGETABLES.

Strawberries.—The same plots used last year for fertilizer work with strawberries were used again in 1906, this being the fourth crop of berries from the original setting of plants. These plots were fertilized just as they had been the year before, a mixture of 200 pounds of cotton seed meal, 200 pounds of acid phosphate, and 100 pounds of kainit being used as a unit application, one-half being applied at the first cultivation after the picking season was over, and the other half at the last cultivation in the fall. Records were kept of the berries gathered between April 7th and May 10th, inclusive. When the three fertilizing materials were used in the proportions given above, berries were gathered at the rate of 2,440 quarts per acre; when the cottonseed meal and kainit were cut down one half and the acid phosphate remained the same, the yield was 1,950 quarts per acre; when the cottonseed meal and kainit were normal and the acid phosphate was doubled, the yield was 2,490 quarts per acre; when the cottonseed meal and acid phosphate were normal and the kainit left out entirely, the yield was 2,520 quarts; when the cottonseed meal and kainit were normal and the acid phosphate was left out entirely, the yield was 2,375 quarts; the blank plot yielded at the rate of 2,205 quarts per acre; double the unit application gave a yield of 2,115 quarts per
acre. A second lot of berries were set out in the fall of 1905 and seven plots of these are now being used for fertilizer work, but the yields in the spring of 1906 were so small and irregular that the results, while actually obtained, seemed to show no effects due to the different ways of fertilizing the plants. These last named plots ought to give good results during 1907.

Marketing Berries.—As stated above, the strawberries set out in the fall of 1905 yielded very little fruit in the spring following. Fifteen 24-quarts cases would probably cover all the fruit gathered from a little more than one acre of these young plants. With the exception of these fifteen crates all other berries were gathered from the original patch of two acres, set out in the fall of 1902. The records show that we sold from the entire acreage 199.5 24-quart cases, 190 of which brought shippers net returns of $426.25, the remaining 9½ cases having been consigned to parties who failed to remit for same. These berries were sold largely in Hattiesburg, Laurel, and towns along the N. O. and N. E. railroad, though a few shipments to Cincinnati, Chattanooga, and Birmingham gave remunerative returns. In addition to the 185 crates of berries sold from these two acres, there were sold during the fall and winter something more than 12,000 plants at an average price of $2.25 per thousand, while some 15,000 plants were used to set additional land here. This makes the third profitable crop of berries obtained in succession from these two acres and the prospects are good for another average crop during 1907.

Peaches.—The work with fertilizers under peaches has been continued on the original ground, but in order to do away with discrepancies apparently due to variations in the soil, the number of combinations of plant food elements have been reduced fifty per cent, so that now there are being conducted only ten tests, each of which is being duplicated. The results from these tests during the past spring were very unsatisfactory, most of the fruit having been killed by a late freeze in the spring and the fruit left was very irregular and extremely faulty. Practically none of this fruit was worth shipping, so it was canned and utilized in this way.

As reported last year, San José scale was detected on certain peach trees during the latter part of last winter, at which time every fruit tree in this orchard was sprayed with the lime-salt-sulphur wash. This was done rather late in the winter, but before the foliage had put out to any extent the few trees actually affected were gone over and a second ap-
plication of the wash put on with a paint brush. At that time all the scale had apparently been killed, but before the year was over it had revived and spread to numbers of other trees in the orchard, some of which died, while many others had entire limbs killed on them. Not thinking it advisable to try and save these trees we dug up and burned all the trees in the variety orchard and also the trees in a commercial orchard covering one acre of ground and planted to Greensboro peaches, while all other trees were thoroughly sprayed with the above mentioned wash. Up until this time peaches have not done so well here as we had hoped they would. During 1906 a number of trees in the old orchard died from other causes than the scale insect. Borers from the start have given a great deal of trouble, and insects of many kinds, attacking both the trees and the fruit, have been prevalent. Some time in February 1906, 1,000 Elberta peach trees and 500 Red June plum trees were set out in a back field some five hundred yards from the orchard affected with scale. A careful examination has not disclosed, as yet, any scale on these trees.

Asparagus.—(fertilizer tests).—The same plots used last year for tests with fertilizers under asparagus were used again this year. On six plots of land of 1-16 acres each the same fertilizers were used that had been applied the year before, except nitrate of soda was used in the place of cottonseed meal. A mixture of 250 pounds of cottonseed meal, 125 pounds of nitrate of soda, 405 pounds of acid phosphate, and 170 pounds of kainit was taken as a unit application per acre and gave a calculated yield of 1,396 pounds of merchantable asparagus; when the supply of nitrogen and potash remained the same and the phosphoric acid was reduced one half, the yield was 1,128 pounds; with phosphorus normal and the amount of nitrogen and potassium reduced one half, the yield was 1,132 pounds; when the nitrogen and phosphoric acid were normal and the kainit was left off entirely, the yield was 1,076 pounds; the blank plot gave 952 pounds; a double quantity of the unit application gave 1,312 pounds. It is thought that one row of the first plot given was affected by manure applied to rose bushes, possibly within reach of the asparagus roots on this plot.

Cutting was commenced on these plots and on an older patch of ½ acre, on March 13th and was discontinued on May 2d. The ½ acre first planted here has failed to do well for the past two years and decidedly our best shipments were made from the seven test plots covering a little less than ½ acre. From the entire acreage devoted to
this crop 49⅓ boxes, or 990 bunches, were sold, bringing shippers net returns of $93.35. The most of this asparagus was sold in Chicago, this city being decidedly our best market for it. About two additional acres of land have been set to asparagus during the present winter.

**CABBAGE AT MCNEILL STATION.**

Cabbage (fertilizer tests).—The Station conducted tests with fertilizers under cabbage on both parked and unparked land, but the yields were not at all satisfactory, due to the fact that a great many of the plants died and the ones that lived were affected with the cabbage root maggot, so that they were never in a healthy growing state. No blank plot was carried, since results for three years past have shown that cabbage will not head on the average soil here without some fertilizer. A mixture of 225 pounds of cottonseed meal, 121 pounds of nitrate of soda, 410 pounds of acid phosphate, and 170 pounds of kainit was taken as a unit application per acre and gave on the unparked land a calculated yield of 4,864 pounds and on the parked land 4,208 pounds of cabbage per acre; the same mixture, except for leaving out the kainit, gave 5,792 pounds on the unparked land and 5,696 pounds on the parked land. All the other tests were conducted on the unparked land where a double application of the unit gave 6,824 pounds; when the nitrogen and potash were normal and the acid phosphate was doubled the yield was 5,968 pounds per acre; when the nitrogen was increased fifty per cent. and the phosphoric acid and potash remained normal the yield was 4,656 pounds per acre. The reason attributed for the parked land having made smaller yields than the unparked land is that the cabbage plants died worse on the former than on the latter. Though these results were obtained,
the cabbage were diseased when cut and weighed and were worth practically nothing on the market, the most of them being thrown to hogs.

Commercial cabbage.—One acre of land in a back field was fertilized on February 1st with about 1,500 pounds of cotton seed, the germs of which had been killed by mixing the seed with acid phosphate and exposing them in heaps to the weather. These cotton seed were applied in the drill and listed upon when a mixture of two parts acid phosphate and one part of cottonseed meal, at the rate of 1,000 pounds per acre was applied on top of the list and harrowed into the soil. The beds were then completed and Jersey Wakefield cabbage plants set out on the 13th of February. These plants grew off nicely and were twice given a top dressing of nitrate of soda at the rate of 50 pounds per acre. The cabbage suffered some for want of rain, but made a fair yield of first class heads. All told, the Station sold ninety standard size crates of cabbage, the most of which came from this commercial patch. Sixty-four crates of these cabbage brought shippers net returns of $119.80, the remaining twenty-six crates, which were shipped later, bringing only $4.05, on account of having reached the market in a reported bad condition. A few cabbage plants set out in the fall of 1905 matured good heads early in 1906 which were sold locally at good prices. These cabbage were set out on September 28th from plants that had been grown in the cold frame. We began selling them on January 11th and sold from .22 of an acre about forty dollars worth of cabbage. Cabbage were set out again in the fall of 1906, but the seasons were unfavorable at the time and the most of the plants died. Those that lived made some good heads which were ready for market at Christmas. If well rooted, young cabbage plants seem to stand the lowest temperatures of the winters here without injury, the indications are that if planted early in December, they not only make larger yields, but sell for much better prices than when planted in February. Then, too, the soils here are so mellow that young plants can safely be covered with dirt during the severe cold spells and uncovered a few days later. This has been tried successfully here several times.

Beans (fertilizer tests).—On April 2d ten plots of 1-16 acre each on the natural soil and two plots of the same size on the parked land were fertilized in as many different ways and planted to beans, using the Valentine, a green podded variety. Picking was begun on May 29th and ended June 14th with results as follows, calculated from 1-16
to acre yields: 225 pounds of cottonseed meal and 110 pounds of nitrate of soda gave 77.3 bushels; 512 pounds of acid phosphate gave 86.9 bushels; 480 pounds of kainit gave 58.1 bushels; 512 pounds of acid phosphate and 480 pounds of kainit gave 63.5 bushels. On the other plots the following mixture was taken as a unit application per acre: 225 pounds of cottonseed meal, 112 pounds of nitrate of soda, and 456 pounds of acid phosphate, and 200 pounds of kainit. This mixture gave a calculated yield of 130.6 bushels of beans on the natural soil and 106.6 on the parked area; the same mixture except for having kainit left out, gave 124.8 bushels on the natural soil and 118.7 bushels on the parked area; with nitrogen and potash normal and phosphoric acid left out entirely the yield was 86.4 bushels; one-fourth the unit application gave a yield of 110.4 bushels, both the last results being on the natural or unparked soil.

In addition to the test plots the Station grew two acres of wax beans on the best type of soil, well fertilized. These beans were sprayed twice with Bordeaux mixture to keep down anthracnose, or rust of the pods. However, with all this, the beans rusted so badly that they were not worth gathering and the crop proved an entire failure. Except for the first year, beans have not proven a profitable crop here—they have never been grown in large enough quantities to ship by freight and what profit there might be in them usually goes to pay express charges. The green bean is decidedly the most reliable kind to grow here for they are seldom affected seriously by anthracnose and sell almost as well on the markets as the wax bean.

Irish potatoes (fertilizer test).—Six plots of land of 1-16 acre each and six of 1-20 acre each were devoted to tests with fertilizers under Irish potatoes. This included five combinations of fertilizers and one blank plot on both parked and unparked land. The potatoes came up to a very poor stand, and notwithstanding the seasons were good, all yields were too poor and irregular to be worth reporting. Maine grown Red Triumph seed were planted on all test plots and also on one acre of land for commercial purposes. Even when the stand of potatoes was good, the yields were very poor. The acre grown for commercial purposes was first given an application of cotton seed and acid phosphate some time before planting; just before planting a mixture of cottonseed meal, nitrate of soda, and acid phosphate was applied, and later, while the potatoes were growing, nitrate of soda was used as a top dressing. These potatoes came up to a good stand
but the acre only yielded 44 bushels of first grade and 18 bushels of second grade potatoes. Four tests to show the effects on the yields of planting different size seed pieces were conducted, but resulted about as reported with the tests with varieties, the poor stand and indifferent growth of the potatoes making the tests of no value. All these potatoes were sprayed twice during the growing period with Bordeaux mixture containing enough paris green to keep down the potato beetle, and we can only attribute the poor results to indifferent seed, or to the fact that Maine grown seed were not suited to this climate.

Irish potatoes (variety test).—During the first days of February a plot of land containing twenty rows, each three feet wide and three hundred feet long was fertilized with a mixture containing 100 pounds of nitrate of soda, 200 pounds of cottonseed meal, 400 pounds of acid phosphate, and 200 pounds of kainit, applied at the rate of 20.7 pounds per row, or about 1,000 pounds per acre. Four varieties of potatoes were immediately planted in alternating rows, to do away as nearly as possible, with the effects of inequalities in the soil. The Triumph potatoes in this test did not come up to a perfect stand, while the other three varieties did. By counting an average row of each variety, we estimated that the Triumph had 84% of a stand considering the stand of the others perfect. The Triumph potatoes were dug on May 29th and the three other varieties on June 11th, giving yields as follows, calculated in bushels per acre: Triumph, 39.8 bushels of first grade and 3.5 bushels of second grade; Early Rose, 100.8 bushels of first grade and 13 bushels of second grade; Burbank, 96.8 bushels of first grade and 14.7 bushels of second grade; Peerless, 104.5 bushels of first grade and 14.6 bushels of second grade.

Remarks.—The Irish potato has never proven a profitable crop here, except for one year, and then only in a small way. Unless the land is highly developed seventy-five to one hundred bushels per acre of first grade potatoes is as good a yield as can be expected. They require a heavy fertilization, the seed are expensive, they must be sprayed at least twice to keep down the potato beetle, and unless gotten on an early market the chances are that the margin of profit between the cost of production and the selling price will be extremely close. The one redeeming feature about the crop is that it only occupies the land a short time, leaving it in good condition for corn, cowpeas, or sweet potatoes. Some of the best yields of the three crops mentioned ever obtained here, were when they followed Irish potatoes.
Tomatoes.—Three-fourths of an acre of land devoted heretofore to tillage tests with cotton and corn was prepared and fertilized at the rate of 500 pounds per acre of a fertilizer made by mixing together one part of sodium nitrate, two parts of cottonseed meal, and four parts of acid phosphate. On March 23d one half of this land was planted to tomatoes from cold frame and the other half was planted from a hotbed. Not more than two-thirds of a stand was obtained and the chief object in growing them at all was to determine whether or not it was possible to make a success of the crop here by spraying regularly to keep down black rot. These tomatoes were sprayed twice with Bordeaux mixture before they were stuck, on April 13th and 23d, using a barrel spray pump; the first application was immediately washed off by a heavy rain. They were sprayed twice after sticking, on May 19th and June 25th, using a knapsack spray pump. The vines were stuck on May 10th and picking began on June 6th and was continued until July 18th. The first tomatoes had some rot among them, but were much better than we had ever grown before, later they began rotting badly when an application of Bordeaux mixture checked the rot almost entirely. A great many tomatoes were ruined by worms, still more of them rotted, and the vines were never so thrifty as they had grown here in former years, still 170 4-basket crates were sold which brought shippers net returns of $94.67. The tomato can be grown here successfully, but only by spraying regularly to keep down the fungous which causes them to rot.

Other vegetables.—Such crops as beets, onions, lettuce and radishes can be grown here very successfully, but the matter of making them profitable depends a great deal on when and how they are marketed. On October 6, 1905, .17 of an acre of land was planted to Egyptian Blood Turnip Beets; these came up to only a fair stand and the missing places were filled in by transplanting the young beets. Up to April 30th, 27 bushels of beets were sold from this land for a shippers net returns of $15.15. On October 10, 1906, the same variety of beet was planted again and has done unusually well. They were ready for market on January 15th. Onions from seed and sets have been grown here through two winters and fresh onions have been sold all through the winter months. When left to mature, these onions have made fine bulbs.

STAPLE CROPS.

Cotton (fertilizer tests).—Thirty plots of 1-20 acre each, the same that have been used for this work for two years previously, were used
in conducting tests with fertilizers under cotton. Only ten different tests, however, were conducted, each being made in triplicate. This land was fertilized in the drill on April 3rd, the fertilizer mixed with a plow and listed upon. On April 16th, the beds were completed and Cook’s Improved cotton seed dropped by hand. Plots fertilized alike were so located as to give each fertilizer, as nearly as possible, equal advantage as to location, and to do away with the discrepancies that might be due to variations in the soil itself. The average yields were as follows, calculated in pounds per acre of seed cotton: no fertilizer, 480 pounds; 100 pounds of cottonseed meal, 760 pounds; 100 pounds of acid phosphate, 800 pounds; 100 pounds of kainit, 620 pounds; 100 pounds acid phosphate and 100 pounds of cottonseed meal, 1,060 pounds; 200 pounds cottonseed meal and 100 pounds of acid phosphate, 1,040 pounds; 100 pounds of cottonseed meal and 200 pounds of acid phosphate, 1,000 pounds; 100 pounds cottonseed meal and 100 pounds of raw ground phosphate rock, 840 pounds; 100 pounds of cottonseed meal and 500 pounds of New Jersey Green Sand Marl, 620 pounds; 100 pounds of acid phosphate, 100 pounds of cottonseed meal, and 100 pounds of kainit, 860 pounds. Four plots were used on the parked land and fertilized in two different ways. The work being duplicated. The main object of this particular work was to find if the addition of kainit to cottonseed meal and acid phosphate would increase the yield of cotton. The four plots used were each 1-20 of an acre in size and the average results were as follows, calculated in pounds of seed cotton per acre; 100 pounds of acid phosphate and 100 pounds of cottonseed meal gave 1,540 pounds of cotton; and 100 pounds of acid phosphate, 100 pounds of cottonseed meal and 100 pounds of kainit gave 1,485 pounds of seed cotton. These results also show that the effects of manure left by cattle in the winter of 1902-3 are still quite perceptible.

Cotton (variety tests).—During the first days of April a plot of land consisting of 76 rows each 34 feet wide and 150 feet long was prepared for varieties of cotton and fertilized at the rate of 300 pounds per acre of a mixture of two parts acid phosphate and one part cottonseed meal. On April 17th nineteen varieties of cotton were planted on this land in single rows, each variety having four rows in different parts of the field. This was done to do away with the effects of inequalities of the soil which might have interfered with the reliability of the results had all four of the rows of each variety been placed together. Each row was picked and weighed separately and the
sum of the four rows multiplied by twenty to reduce each variety to acre yields. The following are the results, calculated in pounds of seed cotton per acre: Cook's Improved, 1,385 pounds; Culpepper, 1,300 pounds; Cleveland's Big Boll, 1,265 pounds; Hunnicutt's Big Boll, 1,260 pounds; Toole's Improved, 1,245 pounds; Rogers', 1,220 pounds; Florodora, 1,210 pounds; Peterkin's Improved, 1,195 pounds; Lewis' Prize, 1,185 pounds; Russell's Big Boll, 1,180 pounds; Peterkin, 1,180 pounds; Hagerman, 1,165 pounds; Hawkins' Extra Prolific, 1,165 pounds; Texas Bur, 1,140 pounds; Pride of Georgia, 1,190 pounds; Southern Hope, 1,065 pounds; Texas Wood, 1,050 pounds; Sunflower, 1,030 pounds; Willet's Red Leaf, 975 pounds. An attempt was made to determine the percentage of seed and lint in the several varieties of cotton but the only gin available was in such condition that the tests would have been worthless.

The seed used were obtained as follows: Pride of Georgia, Sunflower, Culpepper, Texas Wood, Southern Hope, Rogers, and Hagerman, from the United States Department of Agriculture, Washington, D. C.; Cook's Improved from J. R. Cook, Ellaville, Ga.; Texas Bur, from C. E. Smith, Locust Grove, Ga.; Peterkin, Hunnicutt's Big Boll, Toole's Improved, and Florodora, from Amzi Godden Seed Co., Birmingham, Ala.; Hawkins' Extra Early Prolific, Peterkin's Improved, and Russell's Big Boll, from T. W. Wood & Sons, Richmond, Va.; Cleveland's Big Boll, from J. R. Cleveland, Decatur, Miss.; Lewis' Prize, from W. B. F. Lewis, Lewiston, La.; Willet's Red Leaf from N. L. Willet Seed Co., Augusta, Ga.

Corn (fertilizer tests).—Thirty plots of land of 1-20 acre each were devoted to this test. The land had previously grown two crops of corn and these had been followed each year by cowpeas, so that its supply of nitrogen was greater than with plots, near by, on which the work with cotton was conducted. Instead of using thirty different fertilizers here, only ten tests were made and these were triplicated. The average yields are reported in bushels of shelled corn, calculated to the acre: no fertilizer, 14.6 bushels; 100 pounds of cottonseed meal, 23.6 bushels; 100 pounds of acid phosphate, 28.3 bushels; 100 pounds of kainit, 18.6 bushels; 165 pounds of ground bone, 27.7 bushels; 90 pounds of cottonseed meal and 414 pounds of lime and acid phosphate mixture (furnishing reverted phosphoric acid), 26.4 bushels; 100 pounds of acid phosphate and 100 pounds of cottonseed meal, 26.2 bushels; 100 pounds of cottonseed meal and
200 pounds of acid phosphate, 25.1 bushels; 200 pounds of cottonseed meal and 100 pounds of acid phosphate, 27 bushels; 100 pounds of cottonseed meal, 100 pounds of acid phosphate, and 100 pounds of kainit, 28.6 bushels.

Two tests on the parked land, conducted in duplicate, gave yields as follows, calculated as above: 100 pounds of acid phosphate and 100 pounds of cottonseed meal, 36.5 bushels; 100 pounds of cottonseed meal, 100 pounds of acid phosphate, and 100 pounds of kainit gave 33.3 bushels.

**Corn (variety tests).**—The land used for this test was the same that had been used the year before for a similar test with corn, the same having been followed by a crop of cowpeas. Previous to fertilizing this land it had been broken and laid off into rows 3\(\frac{3}{4}\) feet apart. On April 4th these rows were fertilized in the drill with a mixture of equal parts of acid phosphate and cottonseed meal, at the rate of 300 pounds per acre, and on April 5th, eleven varieties of corn were planted, each variety occupying a single row and being repeated four times in the test. The rows were 300 feet long and the sum of the four allotted to each variety were calculated to acre yields by multiplying by ten. These results were as follows, calculated in bushels per acre: Cocke's Prolific, 35.3 bushels; Eureka, 35.1 bushels; Mosby's Prolific, 32.8 bushels; Early Breadfield, 32 bushels; White Majestic, 29.7 bushels; Improved Southern White Snowflake, 28.7 bushels; Improved Leming, 28.6 bushels; Holt's Strawberry, 27.3 bushels; Improved Golden Dent, 27.3 bushels; Blunt's Prolific, 24.1 bushels; Hickory King, 23.6 bushels.

**Corn (improving tests).**—The Station began in 1905 to improve a variety of corn and at that time grew one half acre of Mosby's Prolific corn, from which, in the fall, ears were selected from stalks producing at least two good ones. In 1906, the best ears from the ones selected then were taken and planted where the corn could not mix with other varieties. Just as it was ready to tassel, it was gone over and the undesirable stalks emasculated. This corn made a fine yield, nearly every stalk producing two good ears. When ripe seed were again selected only from the stalks producing two or more of the best ears. It is thought that considerable improvement has already been effected and we hope to keep up this work until a well bred corn, suited to local conditions, has been developed.
Remarks.—The Station grows practically all the corn consumed on the place by nine head of horses and mules, besides a great deal of corn which is fed to hogs. Practically all this corn, except that grown on test plots, is planted after vegetables. There were sixteen acres planted to corn in 1906 and on ten of these it followed some other crop. From these sixteen acres we weighed 439.4 bushels of corn.

Oats.—One acre of land was fertilized on September 26th with a light application of stable manure and 400 pounds of a mixture of equal parts acid phosphate and cottonseed meal, oats and vetch were immediately sown on the land in the proportion of four parts of oats to one part of vetch. In the spring these crops were given a top dressing of nitrate of soda at the rate of 100 pounds per acre and the same was worked into the land with a smoothing harrow. Both crops did well and were cut on April 30th and weighed May 7th, giving 6,090 pounds of well cured hay. After cutting, the land was immediately prepared and planted to Mosby’s Prolific corn on May 25th. Thirty bushels of corn were gathered from this acre and a fair crop of cowpeas were turned under when this same land was prepared in the fall for strawberries. The rust proof oat planted in the fall is decidedly the best variety for this section.

Vetch.—All the vetch mentioned in the last report as having been planted here in the fall of 1905 made a fine growth. Some of
this was cut for hay and other patches left to reseed itself on the land. A good quality of hay was obtained at the rate of about 1000 pounds per acre, while that allowed to form seed came up in the fall to a perfect stand.

Other legumes.—Further work has been done with alfalfa and the conclusion reached that it will not be a profitable crop for this section. That grown from seed sown in the fall of 1905 was choked out by crab grass during the past summer, and another lot sown in the fall of 1906 failed to come up to a stand and the land was afterwards planted to cabbage. The burr clover sown in 1905 made a few seed in the spring and these were turned under when the land was prepared for other crops. This same land was sown to oats in the fall of 1906 and a fair stand of burr clover came up with the oats. This, however, lacked vitality and unless the land is inoculated it is hardly worth while to attempt to grow this crop. Some burr clover planted around the house has done nicely and is spreading each year.

Sugar cane (fertilizer tests).—Two different tests, showing the effects of fertilizers on the yield of sugar cane, were conducted, one with stubble cane and the other with plant cane. The work with fertilizers under plant cane was conducted on 1.25 acre plots and there were two of these plots to each test. The following is the average yield of cane, calculated in pounds per acre: no fertilizer, 31,425 pounds; 200 pounds of cottonseed meal and 200 pounds of acid phosphate, 36,325 pounds; 200 pounds of cottonseed meal, 200 pounds of acid phosphate, and 100 pounds of kainit, 35,800 pounds; 400 pounds of cottonseed meal, and 200 pounds of acid phosphate, 39,950 pounds; 200 pounds of cottonseed meal and 400 pounds of acid phosphate, 36,950 pounds; 400 pounds of cottonseed meal and 400 pounds of acid phosphate, 36,325 pounds.

The work with fertilizers under stubble cane was conducted on the same plots used the year before for fertilizer tests with plant cane, and is merely a repetition of that work. A mixture containing 210 pounds of cottonseed meal, 210 pounds of acid phosphate, and 90 pounds of kainit was taken as a unit application and gave a calculated yield per acre of 33,856 pounds of cane; when the acid phosphate in the above mixture was doubled the yield was 41,536 pounds; double the unit application, one half applied on May 16th and the other half on July 10th, gave 41,984 pounds; double the unit application, all applied May 16th, gave 40,896 pounds; when the cottonseed meal and acid phosphate were normal and the kainit left out entirely, the
yield was 33,920 pounds; one half the unit application gave 33,856 pounds; four times the unit application gave 45,312 pounds; no fertilizer gave 31,744 pounds; doubling the nitrogen and leaving the phosphorus and potassium normal, gave 36,032 pounds. The results obtained with the stubble cane will average fifty per cent. less than the yield obtained last year on the same plots with plant cane.

Remarks.—The Station made between 1,100 and 1,200 gallons of syrup last year and put up 1,000 gallons in ten pound screw-top cans. This syrup in cans kept perfectly and a few gallons on hand at this time is just as good molasses as when first made, while other syrup put up in jugs soured and was unfit for use by the middle of last summer. Practically all of the syrup in the cans was sold at from fifty to fifty-five cents per can, while a great deal of that in the jugs had to be boiled over in the fall of 1906. Practically all of the cane grown in 1906, except about one acre which was injured by frost, was used for seed and some ten acres of additional cane was planted in the fall. The acre mentioned was ground and the syrup put up in three-pound cans with soldered tops. This three pound can is a more popular package than the ten pound can, but a good deal more effort is required to handle them.

Peanuts and chufas.—No particular tests were conducted with these crops, but several acres of each were grown, a good many of each were saved for seed, and a large part of the peanut vines cured and saved for hay. The peanut is not regarded so highly here as the chufa; in the first place they do not yield so well, and in the second, the drop will not wait when ripe for a convenient season, and unless planted in a field to themselves where they can be grazed off by hogs when mature, the nuts sprout in the ground and are seriously injured. Chufas grow here to perfection and will lie in the ground all the fall and winter without rotting or sprouting. Artichokes have never done well here and three trials with them have convinced us that it is not a profitable crop for this section.

Sweet potatoes (fertilizer tests).—Ten tests with fertilizers under sweet potatoes were conducted. The work was done on 1-20 acre plots and every experiment was duplicated, the duplicate plots being so located as to avoid errors, as far as possible, which might be due to differences in the soil. The following is the average of each test, calculated in pounds of potatoes per acre: no fertilizer, 13,550; 200 pounds of cottonseed meal, 14,320; 200 pounds of acid phosphate,
16,000; 200 pounds of kainit, 14,490; 150 pounds of cottonseed meal and 150 pounds of acid phosphate, 14,820; 150 pounds of cottonseed meal and 300 pounds of acid phosphate, 15,550; 300 pounds of cottonseed meal and 150 pounds of acid phosphate, 14,830; 150 pounds of cottonseed meal and 150 pounds of kainit, 14,300; 150 pounds of acid phosphate and 150 pounds of kainit, 14,910; 150 pounds of cottonseed meal, 150 pounds of acid phosphate and 150 pounds of kainit, 15,910.

Remarks.—The potatoes from this one acre of land above mentioned, were put in sacks as they were dug and were shipped at once to Birmingham without re-handling, where they were sold at 54 cents per bushel, f. o. b. McNeill. The acre yielded 247 bushels of marketable potatoes and 23 bushels of seed potatoes. Several acres of land in the young peach orchard were planted to sweet potatoes, but did not yield so well, largely because, with stumps and peach trees both to contend with, the potatoes were poorly worked and not more than half the land was actually devoted to them. We shipped all told 720 bushels of sweet potatoes which brought shippers net returns of 355.79, only a few white and a few cut potatoes selling for less than 50 cents per bushel, f. o. b. our station. Hogs were allowed to graze over practically all of this potato land, and except on the test plots, no special effort was made to get all of the potatoes.

Cowpeas (fertilizer tests).—Three tests were conducted on duplicate plots to show the effect of fertilizers under cowpeas. The six plots used were each 1-20 of an acre in size and were fertilized on May 16th and immediately planted to the Unknown cowpea. All the peas were first picked from the vines before these were cut and cured for hay. Practically all leaves had fallen from the vines before the last peas ripened. The average results, calculated in pounds per acre, were as follows: 200 pounds of acid phosphate gave 1200 pounds of peas in hull and 840 pounds of hay; 200 pounds of kainit gave 1,220 pounds of peas in hull and 840 pounds of hay; a mixture of 200 pounds of acid phosphate and 200 pounds of kainit gave 1,330 pounds of peas in hull and 820 pounds of hay. No blank plot was carried.

Cowpeas (variety tests).—Ten varieties of cowpeas were planted June 13th on a uniform piece of land that had just been fertilized with acid phosphate at the rate of 200 pounds per acre. The rows were each three feet wide and 148 feet long and there were six rows planted to each variety. Instead of having all these rows together in one plot they were distributed regularly over the entire piece of land devoted to
The vines were cut on August 30th and weighed September 3d, moisture was determined in each variety as weighed, the results here reported being given in pounds per acre of air dried hay. The following were the yields: Wonderful, or Unknown, 4,200 pounds; Red Ripper, 3,504 pounds; Iron, 3,329 pounds; Clay, 3,043 pounds; New Era, 2,902 pounds; Whippoorwill, 2,822 pounds; Red Caroline, 2,783 pounds; Black, 2,715 pounds; Taylor, 2,595 pounds; Large Black Eye, 2,464 pounds.

Remarks.—Cowpeas are made to follow all corn grown here and also any other crops that it is possible to plant them after and the vines are usually saved for hay. Tests have shown that they have a wonderful effect here, especially in connection with phosphate, in building up the soils and in supplying nitrogen necessary to other crops. The hay saved from the vines furnishes practically all of the roughness used by the Station's live stock and frequently this hay is made to take the place of corn in the feed for horses and mules. If more cowpeas were grown it is confidently believed that the problem of fertilizing these pine soils would be reduced to a simple proposition of furnishing them phosphorus from acid phosphate and perhaps from the raw ground phosphate rock.

HOME-RAISED MULE COLTS.

Live stock.—The Station has continued to raise mule colts, though only in a very small way, as only two mares have been kept and one of these has failed to breed from the start. The other one has raised a mule colt every year for the past three years and is due to foal again.
in the early spring. The two oldest colts (one from a mare that died) have been trained to work, and are now, at a little less than three years old, of good size and able to do as good farm work as any team on the place. The accompanying illustration shows these two young mules just after we began working them as two-year olds. During the year the jack served 26 mares, including the two belonging to the Station. This jack has been recently exchanged with the Holly Springs Branch Experiment Station for a thoroughbred stallion, and horse, instead of mule colts, will be raised in future.

**Rotations.**—There are four plots in this experiment, each \( \frac{1}{2} \) acre in size. One half of each plot is fertilized every year and the other half has been left unfertilized (except the cowpeas following oats have been fertilized with acid phosphate beginning in 1905). This work began in 1903, and the rotation, being a 3 year-5 crop system, each plot grew in 1906 the same crop that had been grown in 1903. The fertilized halves of these plots yielded as follows, calculated in pounds per acre: plot 1, 2,568 pounds of oat hay in 1903 and 2,800 pounds in 1906; plot 2, 1,520 pounds of corn in ear in 1903 and 1,940 pounds in 1906; plot 3, 1,118 pounds of seed cotton in 1903 and 1,312 pounds in 1906; plot 4 (growing cotton continuously), 1,120 pounds of seed cotton in 1903 and 936 pounds in 1906. The unfertilized halves of the plots (except that cowpeas following oats received acid phosphate at the rate of 200 pounds per acre in 1905-06) yielded as follows, calculated in pounds per acre; plot 1, 1,560 pounds of oat hay in 1903, and 1,840 pounds in 1906; plot 2, 800 pounds of corn in ear in 1903, and 560 pounds in 1906; plot 3, 500 pounds of seed cotton in 1903 and 710 pounds in 1906; plot 4 (growing cotton continuously), 558 pounds of seed cotton in 1903 and 360 pounds in 1906. The significant fact is developed that by rotating our crops and fertilizing same, the productive capacity of the soil may be increased seventeen per cent. in three years, while by growing cotton continuously on the land its productive capacity is reduced sixteen per cent in the same length of time. A further fact is brought out that unless some fertilizer is used on these soils the cowpeas in the rotation will not thrive and cannot be made to increase the crop producing power of the soil.