Cotton and its products

William Carter Stubbs
Dear Sir:

I hand you herewith a Bulletin on Cotton, covering the essay read before Louisiana State Agricultural Society at its late meeting in Shreveport, together with results of experiments and some suggestions as to the use of Paris Green in destroying the cotton worm. I also include a receipt for making the compost, so frequently called for. The issue of this Bulletin as you know, has been unavoidably delayed.

Respectfully submitted,

WM. C. STUBBS.
COTTON.

Cotton belongs to a large class of plants, known to the botanists as Malvaceae. Of this class, beside cotton, we have in cultivation the okra and the hollyhock. There are said to be many species of cotton—two of which only are cultivated in the south—the one upland or common cotton; “Gossypium Herbaceum,” the other “Sea Island cotton,” “Gossypium Barbadense.” The latter is cultivated only on the coast or neighboring islands, while the former constitutes the chief staple of the Southern States. The bloom of upland cotton is white or cream colored the first day, turning red on the next and falling on the third, leaving a small boll enveloped in the calyx. This boll continues to develop until it reaches the size and shape of an egg, when on maturity it splits into three to five cells, containing the seed, wrapped in a tomentose wool. This wool constitutes the lint or fibre which clothes the world.

HABITUDES.

Cotton is emphatically a child of the sun and flourishes only in warm latitudes. Its heliotropic tendencies are even more marked than the poetical sunflower. Its leaves receive the first glow of morning light and following the king of day, dismiss it at eve in the west with dewy regrets. With us it is an annual herb. Further south it appears to be a shrub, while under the tropics it is a small tree, enduring many years. It is an exogenous plant, with two seed leaves and a long tap root. Among our field crops it stands without a fellow—alone—and peculiar in its habits and characteristics. Its nearest relation among our cultivated plants, as before mentioned, is the okra, with which it crosses, to form some of the many evanescent varieties of okra-cotton, now on the market. By its long, deep tap
root, it is enabled to withstand droughts and to pump up from
the lower layers of the soil, plant food, unavailable to fibrous
rooted plants, which is quickly assimilated by its large leaf sur-
face. Hence it thrives better on poor land than any other land
than any other field crop.

Formerly cotton was not grown north of the isothermal line
36 degrees, but under the influence of phosphatic manures, its
cultivation in late years has been extended several degrees be-
yond this line. The region best adapted to successful culture is
included between the 30th and 35th degrees of north latitude.
North of this belt the seasons are too precarious, while south of
it, excessive rains and depredations of the caterpillar greatly
interfere with large production.

PLANTING AND CULTIVATION.

The soil best adapted to cotton is yet not fully decided. Clay
loams, well drained and sandy loams, resting upon clay
subsoils are both highly recommended. Both should contain a
fair amount of vegetable matter.

The width of the rows and the distance apart of the stalks
in the row, must depend upon the fertility of the soil and the
rain supply. In poor lands or on soils subject to drought during
fructing season, thin planting must be practiced to obtain the
largest results. Mr. David Dickson, the great cotton planter of
Georgia, now no more, always contended that cotton needed
distance only one way. If, therefore, the rows were wide, it
could be crowded in the drill and vice versa.

Deep and thorough preparation of soil, followed by pulv-
erization should always precede planting. The planting should
be done by some of the excellent and cheap cotton planters now
to be everywhere found, since only the machine will give that
uniform and straight stand, which so facilitates the subsequent
chopping. It furthermore economizes the seed, a point of great
importance, when the true value of this article as a manure and
feed stuff is appreciated. The first plowing of cotton may be as
deep and thorough as possible, but all subsequent workings
ought to be as shallow as the character of the land will permit,
since root-breaking to this plant is almost a disaster. After every heavy rain the soil should be stirred and during drought a shallow implement run just deep enough to break the continuity of the pores of the soil and to form an upper layer, which shall act as a mulch to conserve the moisture in the soil, has often been found highly beneficial.

**GRASS**

is an enemy of the cotton planter and should never be permitted (if possible to prevent) to obtain possession of his fields. In cotton as in all other crops the hoe should be used as little as possible. It is an element of cost excessive to bear and with this plant often causes the disease known as “sore shin” by breaking or removing the epidermis of the tender stalk in the effort of the hoemen to remove the last spire of grass.

When to plant must be decided by the climate and by the character of the soil. When the ground is warm enough to promptly germinate the seed and give a vigorous healthy plant, then the seed can be wisely trusted in the earth. This is usually the case in this latitude in April.

Planting in May is often hazardous, on account of the delay in germination, due to the prevalence of drouths at this period. When May planting is practiced, the seed should be covered rather deeply and firmed with a light roller.

A practice prevails among some of our progressive planters to plant late and highly fertilize. By this means they claim a crop of grass, which so frequently infests an early planting, is destroyed, the costly hoe labor avoided and the plant pushed quickly into vigor by the underlying fertilizer, soon occupies the ground and renders the after culture both simple and inexpensive. As a rule, it is best to plant poor unfertilized lands early and rich or highly fertilized lands late.

The manures for cotton. The composition of cotton is nearly constant for all latitudes. If the same were true of soils nothing would be easier than to prescribe definitely a manure for cotton adapted to all soils in every latitude. But nature has designed differently. There were many dynamical.
agencies in the geological evolutions of mother earth, and we find evidence of their work in our great variety of soils (sometimes in the same field.) This variation in the composition of soils is a source of great perplexity to every agricultural chemist, especially when he is almost daily called upon to give formulas for manures for all crops upon all kinds of soils, many of which he has, perhaps, never seen. Let it be understood once for all that only by direct experiments upon each kind of soil can its wants be told, and to make these experiments is a part of the business of an experiment station.

On the worn lands of the archaean formation of the Atlantic slope, east of the Appalachian range and on the tertiary soils immediately on the coast, extending from Virginia to Mobile, Ala., excluding the cretaceous or prairie belt of Alabama, it has been found by numerous experiments that a fertilizer containing three per cent. of ammonia, ten per cent. of available phosphoric acid, and two per cent. of potash is specially adapted to cotton. These ingredients in the above proportions are furnished in the best form by a mixture of 100 bushels of cotton seed meal, 100 bushels of stable manure, one ton of acid phosphate, composted in the proper manner. In fact, the intelligent and progressive farmers of Georgia and Alabama prefer this to any other fertilizer.

It not only supplies the above ingredients in most available forms, but restores to the land a considerable amount of humus so essential to large production.

Compost, compost, is the word. The modern olympus is a compost heap and the God enthroned on it is called Jupiter Ammoniac.

In the absence of cotton seed and stable manure, the above ingredients may be furnished in the mixture of 700 pounds of cotton seed meal, 1,100 pounds of acid phosphate, 200 pounds of kainit, which is fully the equal of the best guanos on our market and may be obtained either mixed or unmixed at any of the factories in New Orleans. Experiments in Louisiana, made at the station, and by planters, under the direction of the station, have proven the adaptability of the above mixtures to our soils. On lands badly worn and very deficient in vegetable matter,
the seed and meal can be advantageously doubled. While on
lands, with a tendency to excessive weed, they may be decreased
even to obliteration, using only acid phosphate and kainit.

Varieties of cotton. There are many so-called varieties of
cotton on our market and each year adds to the already extended
list. Some few have great merit, while others are utterly worth-
less. Last year the station grew twenty-two so-called varieties
and carefully compared, first, the yield per acre; second, weight
of 100 bolls; third, the percentage of lint, and fourth, length
of staple with actual market value.

The utter absence of merit of any kind was the conspicuous
feature of most of them. In yield there was no decidedly marked
difference. The weight of 100 bolls varied from sixteen to twen-
ty-five ounces. The number of seed per bushel was from 95,000
to 146,000. The per cent. of lint varied from 24 to 37 per cent.
The valuable lesson of these experiments, which are published
in full at the end of this Bulletin, is the difference in the yield
of lint, showing the folly of growing a variety which will yield
only 24 per cent of lint, when a yield of 37 per cent is obtaina-
ble by another variety. In length of staple the difference was
quite small, as attested by the New Orleans market, where
each variety was carefully sold on its merits, bringing 8\(\frac{3}{4}\)c. and
10\(\frac{1}{2}\)c. as the lowest and highest prices.

CONDITIONS FOR A GOOD CROP OF COTTON.

Thorough drainage, fair stock of vegetable matter in the land,
excellent preparation of the soil, good seed properly planted,
judicious manuring, both in quantity, quality and mode of appli-
cation, early culture, deep and thorough, after culture frequent
and as shallow as possible for good work. a laying by as early
as is consistent with cleanliness and good condition and worms
quickly poisoned as they appear. All these things being accom-
plished, nature will do the rest, and a reasonably large crop may
be confidently expected. The following, taken from the Atlanta
Constitution, shows what has been done in Georgia the past
year. Can’t Louisiana with her fertile soil do as well?
We print this morning the list of awards in the third annual contest for premiums offered by Geo. W. Scott & Co. These premiums are of the best five acres in cotton, the best single acre in cotton, and the best single acre in corn—all to be fertilized with Gossypium Phospho.

The awards show that Mr. Robert G. Ray, of Douglas county, raised 9,688 pounds of cotton on five acres; George W. Truitt, of La Grange, 8,666, and Mr. J. T. Wyatt, of Jasper county, 5,050. On a single acre Mr. James W. Mason, of Palmetto, raised 2,677 pounds; Mr. R. G. Ray, 2,556; Mr. George W. Truitt, 2,057; Mr. J. H. Widner, of Coweta county, 1,775, and Mr. Smallprice, of Sumpter county, 1,682. Mr. Mason and Mr. Ray took over five bales of five hundred pounds each from a single acre.

Now, what does this mean?

Mr. Ray raised twenty bales of cotton of five hundred pounds each, on five acres. The average throughout Georgia last year was one bale to three acres, so that the average Georgia farmer occupied sixty acres with a crop to get what Mr. Ray took from five acres. The average farmer had to plow, plant and cultivate sixty acres, while Mr. Ray cultivated five acres and got the same amount of cotton. He used fifty-one hundred pounds of fertilizer on the five acres, which cost him $70. The cotton yielded him $970. Not only was he saved the labor of cultivating fifty-five surplus acres, but those acres were either lying fallow or were put down in grass or other crops. Mr. Truitt, who this year took eighteen bales of five hundred pounds each from five acres, is cultivating less land than he cultivated five years ago. He got more cotton from it this year than ever before, and has three hundred tons of hay for sale besides.

These farmers have reduced their cotton acreage from sixty acres to five, and have put the other fifty-five acres into other crops. This, it seems to us, is the secret of successful farming.

**COMPOSITION OF THE COTTON PLANT.**

A five hundred pound bale of lint cotton will require fifteen hundred pounds of air dried "seed cotton." Of the latter one-third, or five hundred pounds is lint, another third or five hundred pounds is hulls and the remaining five hundred pounds is kernels. To produce this fifteen hundred pounds of seed cotton, there will be required five hundred pounds of leaves, fifteen hundred pounds of stalks, five hundred pounds of roots and five hundred pounds of bolls and burrs. In other words to produce a five hundred pound bale of lint cotton, an acre must produce forty-five hundred pounds of vegetable matter, or two and a quarter tons.

To produce this amount the following mineral ingredients will be required: Phosphoric acid, potash, lime, magnesia, sulphuric acid, oxide of iron, chlorine, soda and silica.
In other words a soil must furnish the above ingredients besides a goodly amount of nitrogen to make a five hundred pound bale of cotton.

But fortunately most soils hold large contents of all these ingredients and supply them abundantly to all plants, except phosphoric acid, potash and nitrogen. To supply these needed ingredients is the prime object of manuring. But when the cotton planter makes the proper disposition of the products of cotton, let us see how far he needs the aid of manure to maintain the original fertility of his soils. The leaves and capsules should be permitted to fall to the ground and not removed, as is usual, by the depredations of half starved cattle. The stalks should be knocked down and plowed under instead of being destroyed by fire. The seed should be returned to the soil, or else when sold to the oil mill their equivalent in a first class commercial fertilizer should be purchased. When all this is done only the trifling loss of about one-half pound of phosphoric acid and two pounds of potash is sustained to each acre. Theoretically, then, cotton is the least exhausting crop grown, but how is it in practice? Unfortunately the decennial census returns cry out in thunder tones against us and tell the world in convincing figures that our acre yields are fast decreasing under constant cropping in cotton. Our soils are being rapidly depleted and exhaustion will sooner or later come, unless we stop the numerous leaks now found on many cotton plantations. Wisdom and economy would suggest the careful return to the soil of every product of cotton save the lint. But there are two incidents in cotton growing which tend in themselves to soil depletion, which are usually overlooked by the agricultural chemist, and rarely appreciated by the planter. First, Cotton is planted in early spring and harvested in late fall, its period of growth extending through the entire summer and much of the fall. During this period of growth with clean culture under hot suns, nitrification is most intense and with it a rapid oxidation of the vegetable matter of the soil. This partially explains why cotton is the most profitable crop on poor land, but it also tells in plainer language, that the vegetable mould "humus," so essential to fertility, is fast disappearing and with it soil nitrogen. Even
our rich alluvial lands once thought inexhaustible, from this cause, coupled with the baneful practice of selling cotton seed, are now responding in gratifying returns to the well directed use of nitrogenous manures. A crop of pea vines turned under every second or third year would aid materially in restoring this lost humus.

Second—Cotton is removed in late fall and our lands are left naked, unoccupied and exposed to the drenching rains of our semi-tropical winters, and much of the finer material, which furnishes the plant food in all soils is washed away, and a goodly quantity of plant food is carried so far down into the soil as to be forever beyond the reach of plants, even the tap root of cotton. The first loss is very severe in rolling or hilly lands, as is shown by the numerous furrowed hillsides which everywhere meet the eye of the traveller through the South Atlantic States. The second loss is greatest in sandy lands and least in clay. It has been clearly demonstrated that a loss of soil fertility will always occur whenever lands are left in bare fallow. A plant suitable for occupying the ground between the gathering of one crop and the planting of another, would be an inestimable boon to the cotton planter. Oats sown in the cotton in August or September and lightly harrowed in; or planted in October and November, after the cotton has been harvested, affords only a partial remedy.

UTILIZATION OF THE PRODUCTS OF COTTON.

"The cotton fibre can be bred up just as a breed of horses can be improved," says Mr. Thomas Pry, who has been for eleven years studying the cotton fibers in the cotton fields of China, India, Arabia, Egypt, Mexico and America, and there is no apparent reason why our staple should not improve each year. Instead of that, little or no effort is made at improvement, and dirty cotton, badly packed, is to-day as common as years ago. This should not be. Care is necessary all through a cotton crop, and will pay here as everywhere else. Perhaps this indifference arises from a knowledge of the vast amount of speculation between the planter and consumer. A rehearsal of a few
may be apropos to this occasion: First, our compulsion to use the patent heavy iron bands made by a monopoly stock company, with millions of capital, upon which they pay enormous dividends, when neat steel wire bands, at one-fourth the cost would secure our cotton; second, putting up our cotton in loose, large, and ungainly bales, that every factor in every city through which it passes may get his pound or two of sample, and the compress its fee for compressions. Follow a bale of cotton from the planter to the consumer, through the number of rings which fatten on it, drag it through the mud and slush with an ignorant careless drayman, expose it to rain on rail and boat, dump it on a muddy, unsheltered wharf, store it in some dirty warehouse until the call of the inspector of some factory, who takes it in hand, cuts the coverings, removes the outside soiled cotton until all is as white and clean as lint from the gin, and samples again this much sampled bale; then the cotton is weighed, the weight of covering, ties and soiled cotton deducted, and the consumer buys at this weight.

Be not deceived farmers and planters, when you think you are getting paid for your bagging and ties and mud and water on your cotton. Far from it; the middle-men know too well the shrinkage and peculation in which they share, to pay just enough for your cotton to cover all deductions and leave them handsome profits, Mr. Edward Atkinson who has carefully studied the subject, declares that there is a loss of 10 per cent. in waste between the planter and consumer, in the manner of handling our crop, or upon our present crop, over $30,000,000. Were political carpet-baggers robbing us of ten per cent, of our products, a howl of indignation, followed by a political revolution, would spread over this State. Yet we submit to this extensive loss, with scarcely a murmur of complaint. Great reforms are needed in the improvement of the lint, the proper preparation of it for market, and more than all, the proper marketing of it.

COTTON SEED.

Each 500 pound bale of cotton gives 1,000 pounds of cotton seed. Estimating our present crop at 6,000,000 bales, gives us 3,000,000 tons of seed. Formerly these seed were permitted to
rot at the ginhouse, till an accident revealed their manurai qualities. Later, oil mills sprang into existence and the oil was expressed from the kernels. These oil mills, while they have been bonanzas of profit, have yet been in the past the only instructor of the farmer as to the value of seed. Deprecating their value for homepurposes, they have managed to obtain seed at prices far below their value. However, the value of the products of cotton seed are now so well known that the time seems near when the seed shall equal the lint in price. Every ton of seed yields 22 pounds of short lint at 8 cents, $1.32; 35 gallons of oil at 32 cents, $11.20; 700 pounds of meal at $1.00, $7.00; 1,000 pounds of hulls at $3.00; total per ton, $22.52; cost of seed in New Orleans, $12.00, or nearly $10.52 for each ton manufactured. To a mill working 100 tons per day, surely a handsome profit. The mills in New Orleans pay $12.00 per ton for seed delivered. What the farmer receives depends upon his location and accessibility to market. But what are they worth to him as a manure? Cotton seed contains 3 per cent of nitrogen, 1.4 per cent phosphoric acid, and 1.14 per cent of potash. Applying the commercial tariff adopted by the association of official chemists in the South, we have a manurai value of $14.94 per ton. In other words, if he sells his seed and buys commercial fertilizer he would have to pay this much, by this tariff, for the ingredients contained in it. But the seed contains about 30 per cent of oil which is of no value as a manure, and whenever they are used as such, the oil is simply lost. True patriotic economy would therefore suggest that the oil be extracted. In doing so however, two conditions should be imperatively observed. First, that the farmers should share in the heretofore enormous profits of the mills, and second, an equivalent in plant food to the seed sold, should be annually replaced in a good commercial fertilizer. Observing these, $75,000,000 could annually be added to the wealth of our country by the sale of five-sixths of our seed, after reserving one sixth for planting, and no detriment would accrue to our soil fertility. The large amount of oil in the seed makes it objectionable as a cattle food, and no combination with other foods can reduce it to the amount required for a perfect ration, while one of its
products, cotton seed meal, is the best supplement known for foods deficient in protein and fats. This, our English farmers have long known, and the price of our oil cake is regulated by the demand of English stock raisers. Highly instructive to the thoughtful planter is the seemingly paradoxical lesson taught us across the ocean, that the manure from a ton of cotton meal is worth more than the meal, the distinguished English chemist giving the value to the farmer of $27.60 per ton, while the latter is delivered at $25.00. The cattle have added nothing to the meal, on the contrary, they have extracted what was necessary to make flesh and blood, and voided nearly all of the fertilizing ingredients in a form easily assimilated by plants. True economy would therefore suggest the use of cotton meal first as a feed stuff and then as a manure. When the cotton planter realizing what a bonanza of wealth there is in his seed, shall add to his planting the more profitable business of stock raising, there will come that day of prosperity which the poet in fancy has painted and which the true student of agriculture has predicted as the legitimate natural inheritance of a land so peculiarly blessed as ours.

Cotton seed meal is largely used as a fertilizer, either alone or mixed with phosphate and potash. Experiments have demonstrated that the nitrogen of meal is fully the equal of that in any other form, and to-day thousands of tons of commercial fertilizers are vended with meal as their only source of nitrogen. Neither as a manure or as a food stuff should it be used alone, but in proper combinations it is a specific almost without a rival. There are now nearly one hundred oil mills in the South turning out annually about 30,000,000 gallons of oil. The query arises, what are they doing with this vast amount? The recent movement against the great corporation which a year ago bought up nearly all the oil mills in this country, have thrown a world of light on this interesting subject. The pork packers of the West have loaded this monopoly with invectives, and thrown the influence of their great wealth against it, because, forsooth, they made them pay five cents per gallon more for their oil with which they adulterated their lard. Messrs. Armour & Co. are reported as using annually as much as 8,000,000 gallons alone in their
business. The result to us is a large number of rival oil mills; increased prices for our seed and cheap lard. Cotton seed oil is almost identical in composition with olive oil, and is largely used to adulterate it. So great has been this adulteration that the Italian government a year or two ago levied a heavy tariff on the importation of cotton seed oil; since which time our olive oil has been made in New York. This oil is largely used in the South and West as a substitute for lard. Only prejudice can object to it since it is pure as olive oil and much purer than lard from hogs which have been unnaturally fed for adipose tissue. It is, however consoling to know that those whose refined tastes and delicate stomachs, will not tolerate cotton seed oil in their foods will have hereafter to raise their own hogs in order to obtain pure lard, and such a prejudice may after all transfer our smoke houses from the West to the South, where they ought always to have been. This adulteration of Northern lard with Southern oil has aroused Northern indignation, and already petitions have been presented to Congress, for a law to prevent it, while their righteous souls can find no harm in mixing Northern glucose with Louisiana molasses and sugar, and vending the mixture under the name of the latter.

Cotton seed oil is used as a burning oil in mines and as a lubricant. After treatment it is used as a paint oil, its drying properties equaling linseed oil. It is also successfully used in replacing olive oil in pharmaceutical preparations.

Hulls, which constitute one-half the seed, are burned under the boilers and furnish more fuel than is needed. Used with cotton seed meal they furnish a complete ration for cattle and stockmen assert that the two properly combined will add two to four pounds a day to a full grown beef. They are also used as a litter in stables. As a fertilizer they are inferior, containing a small amount of nitrogen and large excess of woody fibre, which prevent early decay in the soil. When burnt, they give an ash rich in potash, and with a fair proportion of phosphoric acid. These ashes are in considerable request as a fertilizer upon the soils of New England and New Jersey, where potash manures are badly needed. Upon the tobacco fields of Connecticut they are eagerly sought and highly prized. They are little used in
the South, our supply going mainly to the North at low prices. The cotton plant produces other valuable materials besides those already mentioned. The bark of the stalk makes a fibre of great beauty and high tension. The stalk makes an excellent pulp for coarse paper. Even the plant, after the seed has been picked might be cured into a rough hay. It has been proposed to ensilage the ground stalk with green fodder, with the expectation of the latter dissolving the former. The root yields a medicine described in the Pharmacopæa, well known to our untutored negroes. A dye has also been obtained from the same source, which is said to be of great promise. And now, in conclusion, permit me to say that no other crop has, within it so much promise and potency as that which we of the South have so long defied as king cotton. It clothes the world with the cheapest and best garments; it furnishes the lard for our kitchen, the oil for our salad, the butter for our bread, the soap for our toilet, and the candle for our bed-room. It feeds our Jersey cow, it fertilizes our garden and field-crops. It paints our houses, dyes our hosiery and makes our ointments. It furnishes us with paper, delicate enough to receive the sweetest strains of whispered love, or strong enough for the wheels of the ponderous locomotive. It gives us thread as fine as the spider’s silken web, or strong enough to lash the navies of the world together. Such, now, is this wonderful plant, and who can deny the magnificent possibilities of its future?

MANURES FOR COTTON.

The experiments begun in 1886 have been continued with slight modification through 1887, though not with the success expected. The excessive rains of June destroyed the cotton on some plots which were badly drained and prevented an accurate comparison of results. The following were the questions proposed to our experiments:

1st. What ingredients of commercial manures do our soils need for the successful production of cotton. Having determined this we have.

2nd. What form of these ingredients was most beneficial to cotton.
3rd. What quantity produced the best results.

The first question is asked directly in plat 5 and incidentally in them all. The second and third questions are answered as to nitrogen in plat 5, as to phosphoric acid in plat 6, and as to potash in plat 7.

Plat 5 was devoted to nitrogenous manures, using the following as sources of nitrogen, viz.: Nitrate of soda, 15 per cent. nitrogen; sulphate of ammonia, 21 per cent. nitrogen; dried blood, 10 per cent nitrogen; cotton seed meal, 7 per cent. nitrogen; fish scrap, 10 per cent. nitrogen, and tankage, 7 per cent nitrogen. The first and second are minerals, the fourth vegetable and the rest animal forms.

Besides the above, a mixture of nitrate of soda, sulphate of ammonia and cotton seed meal, called "mixed nitrogen" is also used.

Such quantities of each are used alone and in combination as to represent equal quantities of nitrogen and each are used alone and in combination in quantities representing 10½ and 21 pounds of nitrogen per acre. The following are the experiments:

**PLAT V.**

**NITROGENOUS MANURES (calculated to the acre.)**

<table>
<thead>
<tr>
<th>Expt. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No manure</td>
</tr>
<tr>
<td>2</td>
<td>140 lbs. Nitrate of Soda</td>
</tr>
<tr>
<td>3</td>
<td>100 lbs. Sulphate of Ammonia</td>
</tr>
<tr>
<td>4</td>
<td>210 lbs Dried Blood</td>
</tr>
<tr>
<td>5</td>
<td>300 lbs Cotton Seed Meal</td>
</tr>
<tr>
<td>6</td>
<td>210 lbs Fish Scrap</td>
</tr>
<tr>
<td>7</td>
<td>280 lbs Acid Phosphate</td>
</tr>
<tr>
<td>8</td>
<td>80 lbs Muriate potash</td>
</tr>
<tr>
<td>9</td>
<td>300 lbs Cotton Seed Meal</td>
</tr>
<tr>
<td>10</td>
<td>300 lbs Cotton Seed Meal</td>
</tr>
<tr>
<td>11</td>
<td>80 lbs Muriate Potash</td>
</tr>
<tr>
<td>12</td>
<td>280 lbs Acid Phosphate Mixed Minerals (see page 22)</td>
</tr>
<tr>
<td>13</td>
<td>Mixed Minerals</td>
</tr>
<tr>
<td>14</td>
<td>140 lbs Nitrate Soda</td>
</tr>
<tr>
<td>15</td>
<td>Mixed Minerals</td>
</tr>
<tr>
<td>16</td>
<td>50 lb Sulphate of Ammonia</td>
</tr>
<tr>
<td>17</td>
<td>100 lbs. Sulphate of Ammonia</td>
</tr>
<tr>
<td>18</td>
<td>Mixed Minerals</td>
</tr>
<tr>
<td>19</td>
<td>No Manure</td>
</tr>
</tbody>
</table>
Expt. No. 20. { 105 lbs. Dried Blood. 
                          Mixed Minerals.
                          Mixed Minerals.
Expt. No. 22. { Mixed Minerals.
Expt. No. 23. { 150 lbs. Cotton Seed Meal. 
                          Mixed Minerals.
Expt. No. 24. { 300 lbs. Cotton Seed Meal. 
                          Mixed Minerals.
Expt. No. 25. { Mixed Minerals.
Expt. No. 26. { 105 lbs. Fish Scrap. 
                          Mixed Minerals.
Expt. No. 27. { 210 lbs. Fish Scrap. 
                          Mixed Minerals.
Expt. No. 28. { Mixed Minerals.
Expt. No. 29. No Manure.
              24 lbs Nitrate Soda
              16 lbs Sulphate Ammonia
              50 lbs Cotton Seed Meal
              Mixed Minerals
Expt. No. 31. { Mixed Nitrogen.
              47 lbs Nitrate Soda
              33 lbs Sulphate Ammonia
              100 lbs Cotton Seed Meal
              Mixed Minerals
Expt. No. 32. { Mixed Minerals.
Expt. No. 33. { 150 lbs. Tankage.
Expt. No. 34. { 80 lbs. Muriate Potash.
Expt. No. 35. { 300 lbs. Tankage.
Expt. No. 36. No Manure.

The destruction of a portion of the above experiments by the excessive rains, prevented an accurate comparison of the seemingly discordant results. Hence the latter are not given. It was quite evident however, that the organic nitrogen gave better results than the mineral forms on this soil and crop. The excessive rains seem to have leached the latter beyond the reach of the roots in the early growth of the plant. Dried Blood and Cotton Seed Meal appeared to have produced slightly better results than the other forms of Organic Nitrogen. The present year, plats better drained have been selected for a continuation of these experiments, and they will be repeated both at Baton Rouge and Calhoun.

There were slightly increased results where double quantities of Nitrogen were used; perhaps not enough to justify increased expense.

*Mixed Minerals above always mean 280 lbs. Acid Phosphate, 80 lbs. Muriate Potash.
PLAT VI, *  

PHOSPHORIC ACID MANURES. (calculated to the acre.)

Expt. No. 1.  No Manure.
Expt. No. 2.  280 lbs. Dissolved Bone Black.
Expt. No. 3.  280 lbs. Acid Phosphate.
Expt. No. 4.  280 lbs. Bone Meal.
Expt. No. 5.  280 lbs. Charleston Floats.
Expt. No. 6.  300 lbs. Cotton Seed Meal, { Basal Mixture. * 80 lbs. Muriate Potash,
Expt. No. 7.  { Basal Mixture.
Expt. No. 8.  { Basal Mixture.
Expt. No. 9.  { Basal Mixture.
Expt. No. 10. No Manure.
Expt. No. 11. 140 lbs. Acid Phosphate.
Expt. No. 17. 140 lbs. Precipitated Acid Phosphate.
Expt. No. 18. 280 lbs. Precipitated Acid Phosphate.
Expt. No. 20. No Manure.
Expt. No. 27. 90 lbs. Gypsum.

The phosphoric manures used above were represented by Dissolved Bone Black, Acid Phosphate, Precipitated Dissolved Bone Black, Precipitated Acid Phosphate, Bone Meal and Charleston Floats.

The same quantities of each were used.

* Basal mixture in this plat always means:
300 lbs. Cotton Seed Meal.
80 lbs. Muriate Potash.

Here too results were seriously vitiated by excessive rains, but there was quite an amount of evidence showing the superiority of the soluble forms of Phosphoric Acids over all others. There was no appreciable difference between the results from Dissolved Bone Black and Acid Phosphate,
PLAT VII.

Potassic Manures. (Calculated to the Acre.)

Expt. No. 1.  No Manure.
Expt. No. 3.  60 lbs. Muriate Potash.
Expt. No. 4.  120 lbs. Sulphate Potash.
Expt. No. 5.  { 300 lbs. Cotton Seed Meal.  
               }   Meal Phosphate.  
               { 220 lbs. Acid Phosphate.  
               { 240 lbs. Kainite.  
Expt. No. 9.  60 lbs. Muriate Potash.
Expt. No. 10.  Meal Phosphate.
Expt. No. 11.  No Manure.
Expt. No. 13.  120 lbs Sulphate Potash.
Expt. No. 15.  Meal Phosphate.

*Meal Phosphate in this Plat is always 300 lbs. Cotton Seed Meal, 280 lbs. Acid Phosphate.

Here potash is furnished in the form of Kainite (12 per cent. potash), sulphate (24 per cent. potash) and muriate (50 per cent. potash).

Results here show that no form of potash has appreciably benefited cotton on this soil.

Varieties of Cotton.

Twenty-two varieties were grown as nearly under like conditions as possible. These, were separately picked and weighed. At the close of the season they were again weighed and ginned upon an excellent gin, and the lint and seed carefully weighed. The varieties nearest alike in staple were baled together, and each bale was sent to New Orleans and sold on its merits. Besides the above, each member of my agricultural class, carefully selected fifty bolls from both the middle and top of each variety, weighed them carefully, ginned them by hand and weighed resulting lint and seed. In this way the percentages of lint and seed, weight of one hundred seed and number of seed per bushel were calculated. The same experiments were duplicated by myself and farm superintendent. The results obtained varied.
greatly with some varieties, while nearly constant with others. It was curious to note the differences in weight between one hundred bolls picked from top and middle, also in yield of lint of some varieties, while on the other hand the results which each experimenter obtained on a few varieties, were surprisingly concordant. I append results results of sixteen varieties:

<table>
<thead>
<tr>
<th>Names of Variety</th>
<th>Per Cent. of Lint By Hand</th>
<th>Per Cent. of Seed By Hand</th>
<th>Weight of 100 Bolls By Gin.</th>
<th>Top</th>
<th>Middle</th>
<th>Number of Seed to the Bushel of 30 pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peterkin</td>
<td>37.63</td>
<td>37.30</td>
<td>62.37</td>
<td>62.70</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Bramon</td>
<td>37.31</td>
<td>36.70</td>
<td>62.69</td>
<td>63.30</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Boyd's Prolific</td>
<td>31.17</td>
<td>28.50</td>
<td>68.50</td>
<td>71.50</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Allen's Long Staple</td>
<td>32.91</td>
<td>32.10</td>
<td>67.09</td>
<td>67.90</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Tennessee Silk</td>
<td>29.62</td>
<td>28.40</td>
<td>70.38</td>
<td>71.60</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Mallius Prolific</td>
<td>33.90</td>
<td>32.30</td>
<td>66.10</td>
<td>67.70</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Herlong</td>
<td>33.30</td>
<td>32.60</td>
<td>66.70</td>
<td>67.40</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Jones' Improved</td>
<td>34.10</td>
<td>33.50</td>
<td>65.90</td>
<td>66.50</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Jowers Improved</td>
<td>35.91</td>
<td>34.40</td>
<td>64.09</td>
<td>65.60</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>S. B. Maxey's</td>
<td>31.60</td>
<td>32.00</td>
<td>68.40</td>
<td>68.10</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Cherry's Long Staple</td>
<td>32.29</td>
<td>31.56</td>
<td>67.71</td>
<td>68.44</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Shine's Early</td>
<td>27.24</td>
<td>28.50</td>
<td>72.76</td>
<td>71.50</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Griffin's Improved</td>
<td>31.70</td>
<td>30.50</td>
<td>68.30</td>
<td>69.50</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Taylor's Improved</td>
<td>31.00</td>
<td>29.60</td>
<td>69.00</td>
<td>70.40</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>Bancroft's Herlong</td>
<td>33.42</td>
<td>32.80</td>
<td>66.58</td>
<td>67.20</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Sea Island</td>
<td>22.74</td>
<td>23.60</td>
<td>77.26</td>
<td>76.40</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

The above cottons brought in the New Orleans market from $8\frac{7}{8}$ to $10\frac{3}{4}$ cents. per pound.

THE COTTON WORM.

How to destroy it. Paris green, London purple and white arsenic, all compounds of arsenic are used for the destruction of this pest. Since all of the above are poisonous to man and best, they must be handled with great care and caution.

The almost unanimous opinion of farmers and planters is that of the above, Paris green is by far the best poison. It is used in three ways, first, in liquid suspension; mix one pound of pulverized Paris green, with forty gallons of water and put this on one acre, by and with a large watering pot or from the barrels placed in a wagon, by use of spray pumps. In either case the mixture must be kept well stirred, since Paris green is not soluble in water, but is held mechanically suspended; a little flour
just soured in a bucket of water and then added to the mixture, gives it greater adhesive power.

Second, dry, mixed with some deluent as cheap flour, yellow ochre, fine clay, plaster or ashes. A little dextrine is sometimes added to increase adhesiveness. One pound of Paris green is mixed with twenty-five pounds of the deluent.

This mixture, used during showery weather is sifted over the plants by hand, through coarse sieves.

Third. The finely ground Paris green is dusted from an oblong sack, made of course muslin, attached to the end of a long pole, carried by a man on horseback. In this way it is easily and cheaply distributed; the only objection is, that as ordinarily performed, more Paris green is used than is necessary. Care should be taken to keep man and beast on the side from which the wind is blowing, so as to avoid inhalation of arsenical dust.

Either of the above methods can be used with certainty of success, if proper care in following directions be exerted.

HOW TO MAKE A COMPOST.

"Compost and compost, again is the word. The modern Olympus is the compost heap and the God enthroned on it is called Jupiter Ammoniac."

Below is appended the formula best suited for cotton.
100 bushels Cotton Seed.
100 bushels Stable Manure.
1 ton Acid Phosphate, high grade.

If the above is to be used on very sandy lands, one-half ton of Kainite may be advantageously added. Dissolve in water and use the latter to wet the compost.

Since the success of a compost depends materially upon the proper manner of preparing it, full directions are here inserted:

DIRECTIONS FOR MAKING COMPOST.

Take an equal part of the Stable Manure, say ten bushels, and spread it out in a level place, under shelter, to the depth of
three inches. Sprinkle over it 100 pounds of Acid Phosphate. Next spread over this ten bushels of Cotton Seed, mad thoroughly wet. Then another sprinkle of 100 pounds of Acid Phosphate. Continue this rotation till the quantities are exhausted and then cover with a rich earth, from the fence corners, five inches deep. Permit it to remain until ready for use, four to six weeks will do, and cut vertically down with a mattock. Mix well and apply from 300 to 1000 pounds per acre in the drill at the time of planting.

Be careful to wet the Cotton thoroughly and buy only a first-class Acid Phosphate.