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FARMERS' BULLETIN 364.

A PROFITABLE COTTON FARM.

BY

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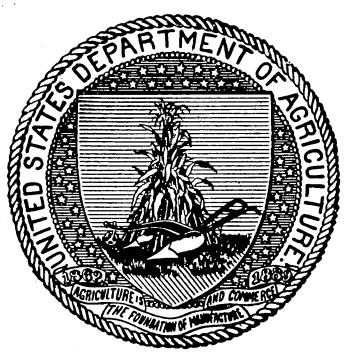

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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., May 24, 1909.

SIR: I have the honor to transmit herewith and to recommend for publication as a Farmers' Bulletin a manuscript entitled "A Profitable Cotton Farm," prepared by Prof. C. L. Goodrich, Expert, under the direction of the Agriculturist in Charge of the Office of Farm Management of this Bureau. The paper contains a description of a South Carolina cotton farm and the methods of management by which it was changed from a failure to a profitable enterprise.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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A PROFITABLE COTTON FARM.

INTRODUCTION.

This bulletin is an account of the progressive and successful farm operations of a farmer of South Carolina who, by combining thorough tillage, crop rotation, barnyard manure, and a judicious use of commercial fertilizer, has changed a previously badly managed and run-down cotton farm into a very productive and profitable enterprise. The impulse prompting the writing of this bulletin is the belief that it may suggest to other farmers of the South ways and means by which they may so improve their methods of management as to make their farms more profitable.

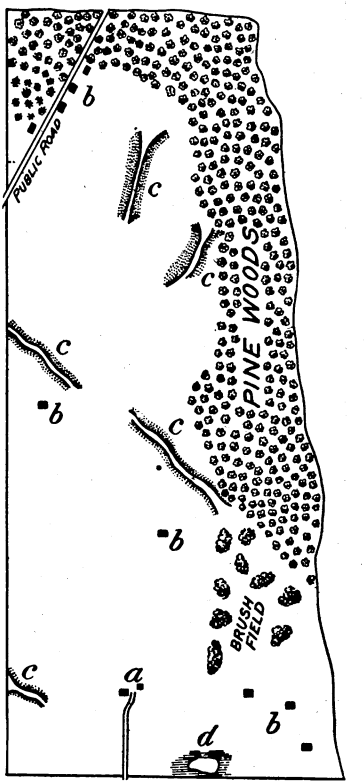

FIG. 1.—Plan of the farm when purchased in 1902: *a*, Old farm buildings; *b*, tenant houses; *c*, gullies; *d*, pond and swamp.

DESCRIPTION OF THE COTTON FARM.

The farm described is located in the east-central part of South Carolina. It lies on a low, sandy ridge having good drainage, the land sloping in all directions from the central ridge like a turtle's back. The soil is a gray sandy loam, in some parts quite loose and almost white in color. It is underlain at a depth of 12 to 15 inches by a yellow sandy subsoil. The forest growth is pine and scrub oak. There are 131¾ acres in the farm, of which 66 acres are under a system of rotation and 30 are occupied by tenant houses and their surrounding lots. The remainder is woodland. The farm has been under cultivation some eighty years, and for the eight or ten years previous to the present ownership had been rented.

Figure 1 gives some idea of the condition of the farm when the present owner took possession in January, 1902. Several tenant

houses were scattered promiscuously over it, a number of bad gullies had been allowed to develop, a swamp hole occupied part of one field, and clumps of scrubby trees, bushes, and broom sedge had grown up, making the fields irregular in shape and giving the farm a rough and unthrifty appearance. The fertility of the soil had been reduced to the low ebb of producing 300 pounds of seed cotton and 5 to 8 bushels of corn to the acre.

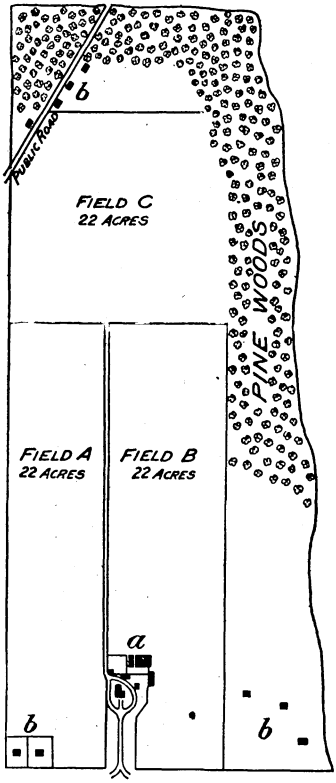

FIG. 2.—Plan of the farm in 1903: *a*, New farm buildings; *b*, tenant houses.

Now this is all changed; the borders of the fields have been straightened, the tenant houses moved from the tillable lands, gullies filled up, and the swamp hole drained. The tillable land has been divided into three fields, of 22 acres each; the farm has been fenced; and a new house, barn, and other buildings have been erected. The farm to-day presents an appearance of neatness, thrift, and prosperity.

Figure 2 is a plan of the farm as it is to-day. Figures 3 and 4 give some idea of the buildings.

MANAGEMENT OF THE FARM.

The present owner was a farmer of experience when he purchased the farm, and he knew the value of the rotation of crops, thorough tillage, and the importance of decaying organic matter, or humus, in the soil. He adopted a rotation, bought stable manure, and began feeding cattle for the purpose of converting part of the roughage and grain of the farm into animal products and making farm manure for use on the land. By this method and by the judicious use of commercial fertilizer he succeeded in producing the first year a yield of $1\frac{3}{5}$ bales of cotton, 37 bushels of corn, and 10 bushels of oats to the acre. These yields have been gradually increased, until during the last two years $2\frac{1}{4}$ bales of cotton, 85 bushels of corn, and 80 bushels of oats per acre have been obtained.

The rotation adopted was as follows: First year, corn, with cowpeas planted between the rows at the last working of the corn; second year, winter oats, followed by cowpeas for hay, and third

year, cotton. The system of cropping and the yields for each field are given in Table I.

TABLE I.—*Cropping system and crop yields, 1902 to 1908, inclusive.*

Year.	Field A.		Field B.		Field C.	
	Crop.	Yield.	Crop.	Yield.	Crop.	Yield.
1902	Cotton	1.6 bales	Corn [a]	37 bushels	Oats [b]	10 bushels.
1903	Corn [a]	50 bushels	Cotton	1.8 bales	Oats [b]	45 bushels.
1904	Oats [b]	60 bushels	Corn [a]	65 bushels	Cotton	1.68 bales.
1905	Cotton	2.14 bales	Oats [b]	75 bushels	Corn [a]	62 bushels.
1906	Corn [a]	75 bushels	Cotton	2 bales	Oats [b]	60 bushels.
1907	Oats [b]	75 bushels	Corn [a]	85 bushels	Cotton	1.7 bales.
1908	Cotton	2.27 bales	Oats [b]	80 bushels	Corn	62 bushels.

[a] With cowpeas. [b] Followed by cowpeas.

The three fields varied somewhat in fertility, A being the best, and C being of a very poor, loose white sand. The very poor condition

FIG. 3.—Buildings on the farm.

of field C, indicated by the low yield of the first crop of oats, accounts for the slight irregularity in the cropping systems of fields B and C at the beginning, as it was not considered advisable to plant cotton on field C until a second crop of peas had grown on it. A study of the table shows an immediate return for good management and a gradual increase in crop production. This increase in crop production has been accompanied by a reduction in the amount and the cost of commercial fertilizers used. (See p. 20.)

PLOWING.

Previous to the present occupancy of the farm the soil had been plowed 3 to 4 inches in depth in preparation for crop planting.

Under the present management the soil has been plowed broadcast for both cotton and corn with a 2-horse turning plow cutting 10 inches deep, followed by a 1-horse subsoiler breaking the furrow bottom to an additional depth of 7 inches. This has given the land two deep and thorough plowings each round of the three-year rotation.

SURFACE DRAINAGE.

Under previous management the land on this farm washed and gullied somewhat. This has been largely overcome by deep and thorough tillage. However, to check the possibility of washing during exceptionally heavy rains the soil is now plowed in long beds 60 feet wide. This leaves it in a series of broad, low "lands"

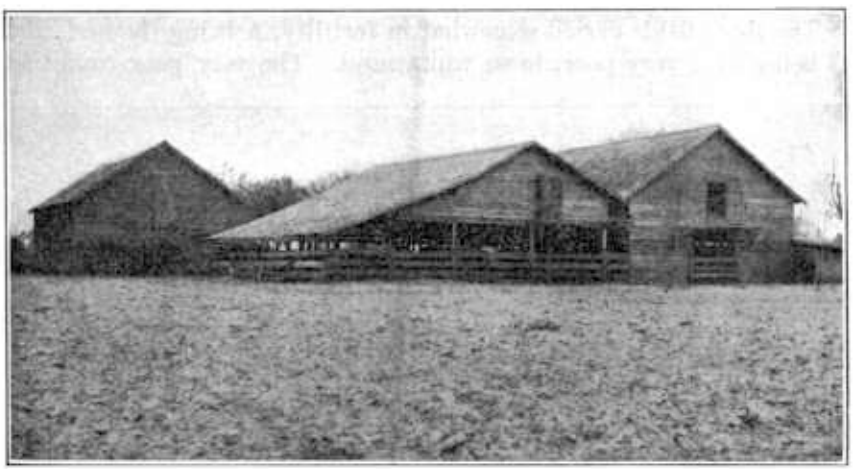

FIG. 4.—Cattle shed and barns.

with shallow depressions between. During heavy rains such water as the soil can not immediately take up finds its way gradually to the shallow depressions, which, having no outlets, hold it until it slowly sinks into the subsoil. As this soil is open and porous in texture and absorbs water readily, there is no danger of puddling from water standing in the furrows between the lands, and this method of plowing eliminates the necessity of terracing.

METHODS OF GROWING THE CROPS.

The present management of the individual crops is as follows.

COTTON.

Preparation of the soil.—In November the land is flat-broken or plowed broadcast 10 inches deep, in 60-foot beds, with a 2-horse

turning plow. A 1-horse subsoil plow follows the turning plow, breaking the furrow bottom to a depth of 7 inches. The field is then harrowed with a 3-section smoothing harrow. In January the field is laid off with a 1-horse plow, marking furrows being run 5 feet apart. Two furrows are then thrown together on to the marking furrow and the middles are broken deep with a 2-horse middle breaker or double moldboard plow (see fig. 5), leaving a deep, wide furrow.

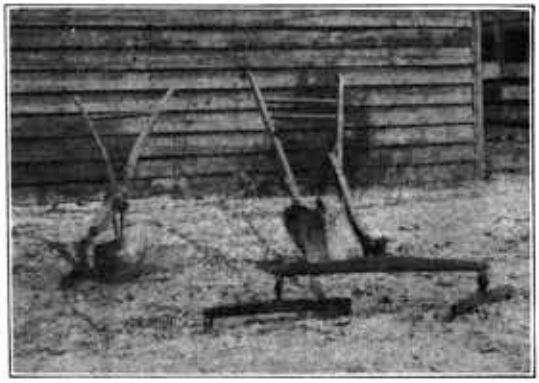

FIG. 5.—A straight-shovel plow (on the left) and a "middle buster," or opening plow (on the right).

"Black"[a] manure is then hauled to the field, dumped into piles, distributed in the furrows (see fig. 6), and covered as rapidly as possible (see fig. 7) in order to prevent its drying. The covering is done by running down each

FIG. 6.—Field showing "black" manure in cotton furrows.

side of the furrow with a bull-tongue, or subsoiler, which covers the manure and again stirs the lower soil. The field is then left until planting time.

[a] A southern term for barnyard manure.

Just before planting, a bull-tongue plow is run down the row to mix the manure with the soil thoroughly and to open the furrow for

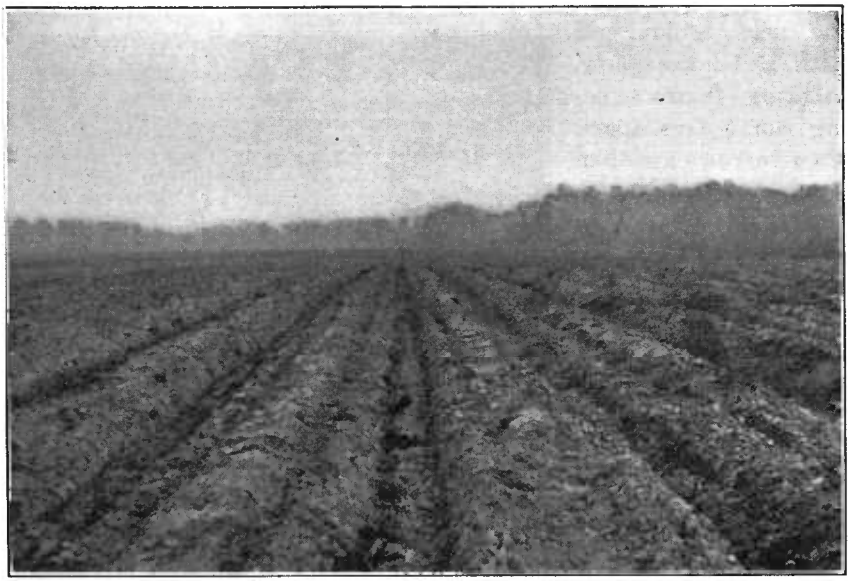

FIG. 7.—Field showing manure covered in cotton furrows.

the reception of commercial fertilizer, which is applied with a distributer. (See fig. 8.) Two furrows are then turned onto this

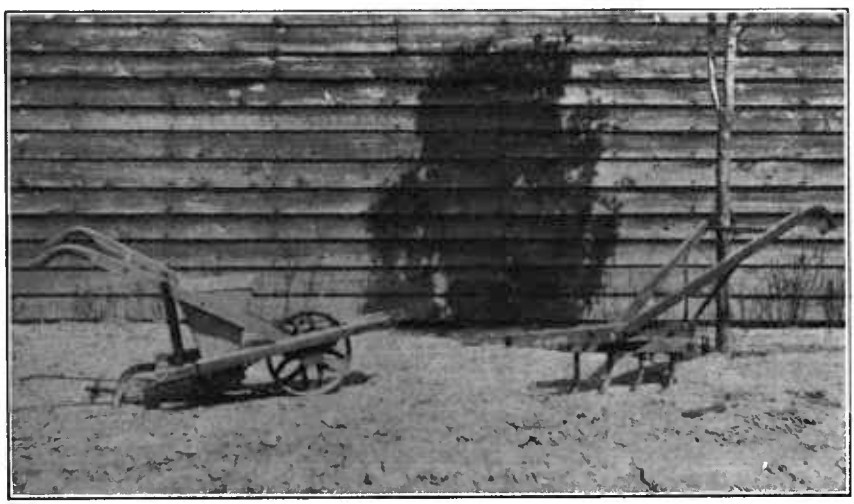

FIG. 8.—A fertilizer distributer and a side harrow.

manure and fertilizer, making a low bed on which the cotton planter is run. This early application and immediate covering of the

"black" manure in a well-rotted and moist condition, its further rotting during the eight or ten weeks before planting, and the thorough mixing of it with the soil eliminate all danger of causing the crop to "burn" in dry weather, a condition which is apt to occur when barnyard manure is applied in a coarse, unrotted condition only a short time before planting.

Manure and fertilizers.—In 1902 five 2-mule loads of about 1 ton each of "black" manure were used to the acre in the furrows. This amount has been gradually increased until in 1908 seven loads per acre were used. This manure is partly purchased from a near-by livery and sales stable and partly produced by feeding to cattle roughage and grain grown on the farm.

In 1902, 1,200 pounds per acre of commercial fertilizer were used at planting time. This consisted of 500 pounds of 13 per cent acid phosphate, 500 pounds of cotton-seed meal, and 200 pounds of muriate of potash. About July 1 nitrate of soda was applied in the middles at the rate of 150 to 200 pounds per acre. In 1903 and 1904 the amount of fertilizer used at planting time was reduced to 900 pounds, consisting of 400 pounds of acid phosphate, 400 pounds of cotton-seed meal, and 100 pounds of muriate of potash. Since then only 300 pounds of acid phosphate, 300 pounds of cotton-seed meal, and 100 pounds of muriate of potash, a total of 700 pounds to the acre, have been used at planting time. The 150 to 200 pounds of nitrate of soda applied during the growing season have been continued each year. It has now been decided that the nitrate is not needed, and its use will be abandoned in the future.

Varieties planted.—The seed is planted about the first week in April. The "King" variety was used in 1902, then "Excelsior" until 1908, when "Money-Maker," somewhat mixed, was planted.

Cultivation.—About April 15, or as soon as the rows show up well, cultivation, or "working" the crop, begins, and continues as follows:

(1) A 4-toothed side harrow or cultivator (see fig. 8) is run on both sides of the row.

(2) As soon as the third leaf begins to show itself, chopping begins and the plants are thinned to a stand of one plant every 2 feet. At a later chopping every second plant is taken out and the stand reduced to an average of one plant every 4 feet in the row. This leaves the cotton plants 4 by 5 feet apart. In 1902, when the land was poor, the rows were run 4 feet apart and the plants thinned to 18 or 20 inches in the row, but as the land became more fertile and the plants grew larger it was necessary to give them more room.

(3) The third working consists in breaking the middles with a 2-horse plow or a 10-inch straight shovel.

(4) About a week or ten days later a 24-inch sweep is run down the rows, throwing just enough dirt to cover any small weeds that

may be appearing in the rows. Previous to making the rows 5 feet apart an 18-inch sweep was used for this working.

(5) A little later a 24-inch sweep is used, which levels the ground and destroys any weeds that may be appearing.

(6) Three more workings are given with the 24-inch sweep.

The deep furrow that is made for the reception of the stable manure at the time of preparation for the crop is not entirely filled up in bedding for the seed. This results in the cotton being planted in a shallow furrow. This method of planting lessens the amount of chopping or hand work necessary, for when the sweeps are run down the rows enough soil is allowed to fall into the depression or furrow to cover any weeds that may be starting, and when cultivation ceases the land is left practically level. This method of planting would not be advisable on close, stiff soil, as there would be danger of water settling in the furrow after heavy rains and injuring the plants. Neither could it be used on low lands where it is necessary to throw up ridges or beds in order to plant early.

CORN.

Preparation of the soil.—The cotton stalks are cut down with a stalk cutter and the land is plowed for corn in December. The plowing is the same as for cotton, namely, broadcast in 60-foot beds 10 inches deep with a turn plow, and subsoiled 7 inches deeper.

Planting.—About March 1 the land is laid off by running furrows 6 feet apart with a 2-horse opening plow, or middle breaker, as deep as 2 mules can pull it. The seed is then planted in the furrow. (See fig. 9.) In 1902 the corn was dropped 3 feet apart in the row, but as the soil has gradually improved the distance has been lessened to 15 or 18 inches.

Fertilizers.—In 1902–3, 200 pounds of a guano analyzing 8 per cent of phosphoric acid, 4 per cent of ammonia, and 4 per cent of potash were distributed in the furrows at planting time. This practice was discontinued in 1904. About June 15, or when the ears begin to shoot, a mixture of 200 pounds of 13 per cent acid phosphate, 200 pounds of cotton-seed meal, and 100 pounds of muriate of potash is scattered by hand beside the corn and worked into the soil.

Cultivation.—The care of the growing crop is as follows:

(1) About April 1 a furrow is broken out down the middles or between the rows of corn with a 10-inch straight shovel.

(2) May 1 to 10 a 1-horse plow with wings removed and fender attached is run down the planting furrow about 2 inches from the corn, the fender keeping the soil from the corn and the point simply stirring the soil without making a furrow.

(3) About May 15 a 1-horse plow with a small wing is run around the corn. This stirs the soil and makes a little bank next the corn, but throws no soil to it.

(4) About June 1 a 1-horse plow with a longer wing is run around the corn in such a way as to throw some soil into the middle furrow to cover any grass that may have started. This also raises the bank a little next to the corn, but throws no soil to the corn.

(5) About June 15, or at ear-shooting time, if a crust has formed in the center furrow it is broken. Peas are sown in the furrow and fertilizer is dropped next to the corn by hand, then one round with

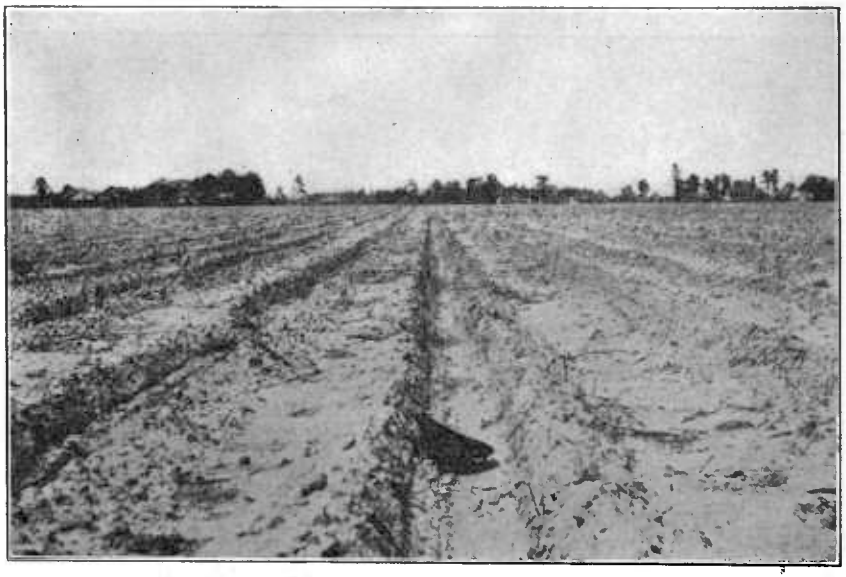

FIG. 9.—Field with corn planted in deep furrows.

a 30-inch sweep covers the peas and fertilizer and levels the land. This completes the cultivation.

Since 1905 the third and fourth workings have been omitted and the crop has been made with only three workings, namely, splitting the middles, running around the corn once with a Dixie point and fender, and covering the peas and the fertilizer and leveling the soil with a 30-inch sweep.

Harvesting.—The fodder is pulled by hand. In September the ears are broken off and hauled in and the stalks, the pea vines, and such crab-grass as may have grown are cut with a mower. The coarser stalks are separated in the curing of the hay and hauled to the cattle shed for bedding, the hay being used for feeding.

OATS.

The first crop of oats was planted in January, 1902, on field C. The land was plowed shallow and harrowed, then 2 bushels of oats were drilled in with 150 pounds of fertilizer (one-third each of acid phosphate, cotton-seed meal, and kainit). The yield obtained was 10 bushels per acre. This oat crop was followed by a crop of cow-peas, which were cut for hay.

Oats were again sown on the field in October, 1903, on the pea stubble. This crop was fertilized at planting time with 500 pounds of acid phosphate per acre and in the spring with a dressing of 100

FIG. 10.—Field of oats planted by plowing under shallow.

pounds of nitrate of soda. The yield was 45 bushels per acre. Subsequent oat crops have been fertilized in the spring only, and then with 200 pounds of nitrate of soda, until 1908, when the soda was omitted.

Since 1902 oats have been sown broadcast on the corn and pea stubble in October and plowed under by turning a broad, shallow furrow. The field is then harrowed. When the oats are plowed under in this manner they roll to the lower side of the furrow slice, and when they come up the field has the appearance of having been drilled. (See fig. 10.) The oats are harvested with a binder.

COWPEAS.

In June, after the oat crop is harvested, cowpeas are sown broadcast on the oat stubble and plowed under by turning a wide, shallow furrow. No fertilizer is used. The yields have averaged about 2 tons of hay to the acre.

Cowpeas are planted between the rows of corn at the last working of the corn. Seed is saved from them. Previous to 1907, 150 to 200 bushels of seed have been harvested each year from the 22 acres planted. In 1907 only 100 bushels were gathered, and in 1908 the peas made no grain. There has been more or less pea wilt each year, which has reduced the yield of seed. The cowpeas usually make a good growth of vine, the wilt not attacking them until just before fruiting. The peas, which are sown after oats, are cut for hay before the vines are destroyed by the wilt, so that the crop is not a total loss. Next year the Iron cowpea will be used, on account of its wilt-resistant character.

In making cowpeas into hay the vines are cut with a mowing machine, then stakes are driven in the ground to stand about 4 feet high. The vines are then piled on these stakes. The stakes keep the vines up from the ground and allow a free circulation of air through the pile. The vines cure in about a week, and are then removed to the barn or sold directly from the field.

LIVE STOCK.

A feature of this farm found on comparatively few southern farms is the feeding of cattle primarily for the production of "black" manure, to be used under cotton. An average of twenty-five head of native stock is carried through the year, though the number varies at times from twelve to fifty, according to the rapidity with which the cattle are brought in and turned off. These cattle average 600 pounds in weight when purchased, and are fed on cottonseed hulls and meal, oat straw, cornshucks, and other roughage. The cattle have been kept in open yards until the present year, when a shed was built for their protection and for the protection of the manure. (See fig. 4, p. 10.)

The cattle are given the run of the fields between harvest and the preparation for the next crop. Cornstalks, straw, and cotton motes (cotton-gin refuse) are spread over the ground in the yards and under the sheds as bedding and absorbents. The manure accumulates during the year, and is hauled out in January and applied to the cotton land. The manure from the cattle, together with that from the four work mules and the two stock sows and their progeny, amounts to from seventy-five to one hundred 2-mule loads a year. In addition to this, forty to sixty loads are purchased from a near-by livery and

feed stable. This manure, together with the cowpea stubble, has been the leading factor in increasing the fertility of the soil and thereby increasing crop products and profits.

EQUIPMENT OF THE FARM.

This farm carries four work mules and employs four contract hands, a force larger than is necessary for the actual work of the farm. When the laborers are not needed on the farm they are kept busy at outside work, at which they earn sufficient to greatly reduce their cost to the farm.

A statement of the tool and machine equipment of the farm and its value on January 1, 1908, follows:

Two 2-horse plows	$20.00
One opening plow or "middle buster"	10.00
Three 1-horse plows	4.50
One 3-section smoothing harrow (slant-tooth)	14.00
Three iron-headed scraper stocks	3.00
Attachments for scraper stocks: Two 18-inch sweeps, Two 24-inch sweeps, Two 30-inch sweeps, One 5-inch straight shovel, One 10-inch straight shovel	5.20
Amount brought forward	$56.70
One stalk cutter	35.00
One fertilizer distributer	7.00
One cotton planter	8.00
Two 4-toothed side cultivators	5.00
Two 2-horse wagons	100.00
One mower	40.00
One hayrake	20.00
One binder	115.00
The usual small tools, hoes, rakes, forks, etc	10.00
Total	396.70

COST AND VALUE OF CROPS PRODUCED IN 1908.

Cost of production of crops in 1908.

LABOR.

4 men, 12 months (cash, rations, house rent)	$600.00
Picking 50 bales of cotton	375.00
Ginning 50 bales of cotton, at $1.25	62.50
4 mules' feed (raised on farm)	400.00

FERTILIZER.

5½ tons of acid phosphate, at $12.25	$67.38	
5½ tons of cotton-seed meal (raised on farm), at $24	132.00	
2.2 tons of muriate of potash, at $42.50	93.50	
1.93 tons of nitrate of soda, at $53.50	103.25	
		$396.13

MANURE.

154 loads for cotton (55 bought, 99 produced on farm), at $1.50	231.00	
		627.13

Amount brought forward		$2,064 63
SEEDS.		
22 bushels of cotton, at 25 cents	$5.50	
5 bushels of corn (grown on farm), at $1	5.00	
44 bushels of oats (grown on farm), at 75 cents	33.00	
55 bushels of cowpeas (grown on farm), at $2	110.00	
		153.50
MISCELLANEOUS.		
Bagging and ties for 50 bales of cotton, at 75 cents		37.50
Interest on 66 acres, valued at $100 per acre, at 8 per cent		528.00
Interest and depreciation on machinery, at 18 per cent		71.41
Total cost of crop production		2,855.04

Quantity and value of crops and farm products produced in 1908.

FIELD A.	
50 bales of cotton, at $42.50	$2,125.00
25 tons of cotton seed exchanged for 18¾ tons of cotton-seed meal, at $24	450.00
FIELD B.	
1,800 bushels of oats, at 75 cents	1,350.00
54 tons of oat straw, at $10	540.00
44 tons of cowpea hay, at $15	660.00
FIELD C.	
1,364 bushels of corn, at $1	1,364.00
2¾ tons of pulled fodder, at $25	68.75
Total value of crops produced	6,557.75
Total cost of production	2,855.04
Net value of crops produced	3,702.71

PORK.		
4,000 pounds of pork were produced, having a market value of	$320.00	
Estimated cost of production of pork on farm refuse	160.00	
Net proceeds on pork		160.00
Net proceeds from farm		3,862.71

No financial statement of the stock-feeding operations is given, as there are not sufficient data at hand. The owner states that there is a small profit on the feeding and that the manure is produced without cost.

USE OF FERTILIZERS.

Table II gives the total amounts and the cost of fertilizers and manure applied to and the yields of the three cotton crops grown on field A during the period from 1902 to 1908.

TABLE II.—*Comparison of yields of cotton with quantity and cost of fertilizers and manure applied directly to the crop on field A.*

Year.	Fertilizer used per acre.	Manure used per acre.	Cost of fertilizer per acre.	Yield of cotton per acre.
	Pounds.	*Tons.*		*Bales.*
1902	1,375	5	$20.24	1.6
1905	875	5	15.39	2.14
1908	875	7	22.75	2.27

This table shows that the total quantity of commercial fertilizer used per acre in 1908 was 500 pounds, or a little more than 36 per cent, less than in 1902; the amount of stable manure was increased by 2 tons per acre, or 40 per cent. The cost of manure and fertilizer has increased only $2.31, due to increase in market price, while there has been a steady increase in the yield of cotton, amounting in 1908 to a little more than two-thirds of a bale per acre, or 42 per cent, over the yield of 1902. Figure 11 presents graphically the relation to the yields of cotton of the commercial fertilizer used.

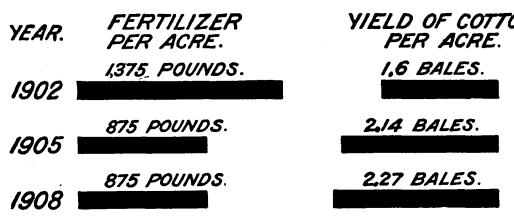

FIG. 11.—Diagram showing the relation of the quantity of commercial fertilizer used to yields of cotton on field A.

This increase in yield with the diminished quantity of fertilizer is to be accounted for very largely by the increased fertility due to the nitrogen-bearing humus furnished by the four cowpea crops intervening between 1902 and 1908 and by the liberal amounts of barnyard manure applied to the soil. Thorough tillage has also undoubtedly played its part.

Figure 12 gives a similar comparison of fertilizer and yield for the three crops of corn grown on field B. This diagram shows a decrease of 200 pounds, or 28½ per cent, in the amount of fertilizer applied to corn from 1902 to 1907, and at the same time an increase in yield of 48 bushels per acre, or about 130 per cent. This is to be accounted for, as in the case of the cotton on field A, partly by thorough tillage and very largely by the cowpea stubble and barnyard manure turned into the soil during the period from 1902 to 1908.

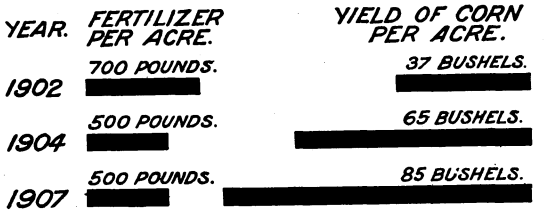

FIG. 12.—Diagram showing the relation of the quantity of commercial fertilizer used to yields of corn on field B.

RECOMMENDATIONS REGARDING WINTER COVER CROPS.

It will be noticed that the present system of crop management on this farm—plowing the cotton land for corn in December and plowing the cowpea stubble in November, then furrowing and applying manure for cotton in January—interferes with growing winter cover crops.

In consequence, during two winters out of three the land is without a cover. It is suggested that this winter cover might be accomplished as follows:

After cutting the cowpeas for hay, plow or thoroughly disk the land the last of September or early in October and sow vetch, bur clover, or crimson clover. The vetch or bur clover could be planted at the time of planting the peas and thus save the extra plowing or disking in the fall, for seeds of these crops usually do not germinate until cool weather, while the crimson clover if planted too early is apt to come up and be injured by the hot sun or by drought. Broadcast manure on this winter crop during the winter and turn all under the latter part of February or early March.

Vetch or bur clover might be sown in the cotton at the last working. This would come up at its proper season and form a winter cover. The cotton stalks could be cut down any time during the winter and the land plowed for corn after the cotton land is prepared. The growing of these winter legumes on the land, besides the great benefit to be derived from the humus itself, would so supplement the work of the cowpea in furnishing nitrogen-bearing humus to the soil as to eliminate the necessity of purchasing any nitrogen in commercial fertilizer.

In undertaking a change like this it would be advisable to make it gradually, as it would be necessary to get the soil inoculated for these legumes before they could be grown to best advantage, and that would necessarily take some time to accomplish on a large scale. Also, it would be well to avoid the possibilities of disaster from introducing radical changes on a large scale.

For farms which are so located or equipped that use can not be made of barnyard manure, the growing of legumes, both winter and summer, is strongly advised on account of their great influence on soil fertility by furnishing the soil with nitrogen-bearing humus.

SUMMARY.

The important features to be noted in the management of the farm described are as follows:

(1) The straightening of the field borders, the clearing away of bushes and scrubby trees, the filling of gullies, and the getting of the fields into better shape for cropping operations.

(2) The deep plowing in broad, gently sloping lands, instead of terracing, to control surface water and prevent the formation of gullies.

(3) The deep and thorough system of soil preparation for crops by broadcast plowing and subsoiling.

(4) The adoption and practice of a systematic rotation of crops, including money crops (cotton is the principal money crop), feeding crops (corn, oats, cowpeas), cleansing crops (the clean-cultivated corn and cotton), and a manurial crop (cowpeas), thus providing for the maintenance of soil fertility and for a liberal cash revenue besides the necessary hay and grain for maintaining the work stock and a small herd of cattle and hogs.

(5) The feeding of cattle and hogs for the purpose of converting a part of the grain and roughage of the farm into animal products for sale and into manure for the maintenance of soil fertility.

(6) The building of a cattle shed for the comfort of the stock and for the protection of the manure from leaching rains and burning sun.

(7) The maintenance of and the increase in the supply of humus in the soil by the use of barnyard manure and the plowing in of vegetable material for the control of moisture, plant food, ventilation, and germ life, most important factors of soil fertility.

(8) The application of barnyard manure to the cotton land in a rotted and moist condition, covering it immediately two or three months before planting, and the thorough mixing of the manure with the soil before putting in the crop, thereby diminishing, if not entirely eliminating, the tendency of the crop to "burn," which often occurs in dry seasons when the crop is planted on recently applied coarse manure.

(9) The greater space given each individual cotton plant as the soil became more fertile and the plants grew larger, thus giving room for large, well-branched, heavily fruited plants.

(10) The closer planting of the more slender growing corn as the soil became more fertile, thus insuring a greater number of stalks to the acre and increasing the possibility of securing larger yields.

(11) The immediate good results the first year of the present management indicated by yields of 1½ bales of cotton per acre and 37 bushels of corn per acre, as compared with previous yields of 300 pounds of seed cotton and 5 to 8 bushels of corn per acre.

(12) The continued increase in crop yields accompanying a decrease in the amount of commercial fertilizer used, the cotton yield increasing from 1.6 bales per acre in 1902 to 2.27 bales per acre in 1908 with 500 pounds less of commercial fertilizer, the corn yield running up from 37 bushels in 1902 to 85 bushels per acre in 1907

with 200 pounds less of commercial fertilizer, and the oat yield increasing from 10 bushels per acre with 150 pounds of commercial fertilizer in 1902 to 80 bushels per acre in 1908 without a pound of commercial fertilizer.

(13) The substantial and gratifying financial returns.

SOME FEATURES OF THE SYSTEM OF MANAGEMENT DESCRIBED APPLICABLE TO MANY FARMS.

While the system of managing this farm could be carried out in detail on comparatively few other farms, one or more of the main features of the system are applicable to nearly every farm in the cotton belt.

Crop rotation can be introduced with advantage on every farm not already practicing it. On nearly every farm it would be economical to grow the grain and forage necessary for home consumption, and it would be profitable to grow some for market also. Some form of stock raising, dairying, mule raising, or cattle feeding could be made at least self-sustaining and indirectly profitable through its influence on soil fertility.

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