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United States Department of Agriculture,

OFFICE OF THE SECRETARY.—Circular No. 32.

COTTON, THE GREATEST OF CASH CROPS.[a]

What I have to say to you is simply plain talk to common-sense people about matters that interest them. I have not come here to give you encouragement unless the facts substantiate it. I have simply come to tell you the plain truth, and I am in a position to know the truth about cotton production.

In the general cotton situation you have some things to your advantage, not only here but throughout this southern country. Seventy per cent of the cotton of the world is produced in the cotton States of the United States. The two great necessities of the world as products of the soil are food and clothing. It is seldom in human history, if ever before, that one nation has had a monopoly of either of these great interests. Such is your peculiar fortune to-day that you produce 70 per cent of the material that largely clothes the world, and clothing is just as essential as the food supply.

Look for a moment at the increasing demand for cotton. If you will note carefully you will observe that it has doubled once in about twenty-two years. We may estimate 13,000,000 bales as a minimum supply on the part of the United States for the world's clothing at the present time; then turn back twenty-two years and we shall find that a little over 6,000,000 bales were sufficient; and twenty-two years prior to that 3,000,000 bales filled the demand; and twenty-two years before that 1,500,000 bales met the exigencies of the trade. If we pursue the same line for the future, in 1932 it will require 26,000,000 bales, and in 1954 it will be necessary for us to produce 52,000,000 bales of cotton to meet the demands of commerce.

Here is one of the most wonderful opportunities for wealth that has been known within the historic period. Our lands and climate are exceedingly well adapted to the production of the fleecy staple, and the intelligence of the farmers of the South and their long experience

[a] Address of Dr. Seaman A. Knapp, Special Agent in Charge of Farmers' Cooperative Demonstration Work, Bureau of Plant Industry, on the present outlook for cotton production in boll-weevil territory, delivered at Greenville, Miss., January 17, 1910.

with cotton have equipped them to do the work and do it well. Besides that, our commercial interests are founded on the cotton staple, and it is a tremendous affair to undertake to change the entire economic conditions of a great State or of several States.

The reasons for this increased demand for cotton are manifold. Each person wears more clothing than he used to, and he requires better clothing. Another reason is that cotton is more universally worn. Classes of cotton that combine with wool in broadcloth have been found, so that cotton is used not only in the making of all the cotton clothes but also in association with silk and wool. Another reason is the force of civilization. The railroads, the telegraph, and the fast steamers are rapidly bringing all parts of the world into close connection and sympathy, and millions that never required clothing are clothed to-day, and that clothing is made of cotton.

I have sometimes heard it said that this is the only country that can produce cotton. This is not true. Other countries can produce it and produce it profitably. For certain purposes they produce better cotton in Egypt than we do, so much so that we are importing a good many bales every year. They produce a valuable variety of cotton in Peru, and we import that. At one time it was feared that China would be a strong competitor in cotton production and manufacture. While at Shanghai some years since this fear was dissipated, so far as I am concerned. I found that the cotton there was planted in rows 2 feet apart and 3 or 4 inches apart in the row. The stalks grew about 2 feet high, but each had only a few small bolls. The open space between the rows was planted to vegetables, as a matter of Chinese economy. I said to the Chinaman who accompanied me, "Why don't you pull up some stalks and give more space, so the others may develop and raise more and better cotton?" He replied, "One stalk, he make three boll; two stalks, he make six boll. Why pull him up?"

In British India some of the same conditions prevail. The tenant refuses to pull the stalk up and therefore he gets a low grade of cotton.

There is another reason—they do everything by hand work and we can use machinery. I am told that sometimes on the large plantations in the South you can not get the negro to use machinery. If you can't, you will surely fail. That problem must be worked out. You might just as well say that the carpenter shall return to the old plan of sawing everything out with the handsaw instead of using modern machinery as to say that the farmer shall continue in the old way of doing everything by hand. In the rice fields of Louisiana where machinery is used I found that one American with modern implements could do as much work in a day as two hundred Japanese could do by hand. They till every foot of land with a spade. An acre and a third to an acre and a half is all that

can be worked by one Japanese with his wife and daughters. I have known a man and his wife in Louisiana to cultivate 200 acres in rice by the use of modern machinery. Therefore, the use of machinery is one of the things that is absolutely necessary to the success of the farmer of to-day.

The farmer who uses modern machinery in planting and cultivating his crop will succeed, and the one who does not will make a failure. The old way of making a crop by hand by the use of the hoe and the plow must soon be a thing of the past. We must come to the use of modern implements, and the sooner we start and let the negro understand that he must work his crop in this way the better off we shall be.

Now, there are some things that are tending to prevent our holding our own in cotton production. One is the tendency to put the price of cotton so high that it will force production in other countries. Once they have learned the art and secured commercial adjustment it will be difficult to win back our former supremacy in cotton. The planter is entitled to a just compensation for the production of cotton, but if the price is forced to a point above what the world can afford to pay for its clothing it will recoil on the planter. If it were not for the boll weevil I believe we should now be making 20,000,000 bales of cotton annually. Not that the boll weevil reduces the crop so much, but it does so reduce among planters the confidence that a crop can be made that fewer acres are planted. Let us now take up the production of cotton under boll weevil conditions and face the situation.

There are certain facts that we may consider settled:

First. The boll weevil will henceforth be a prominent factor in cotton production.

Second. Its life history was ably and exhaustively outlined to the world by the Bureau of Entomology of the United States Department of Agriculture nearly seven years ago, and little of practical value as to its habits has been added since.

The great problem, then, is how to make cotton under boll-weevil conditions. This is evidently a plant problem. Under diversity of soils, increased precipitation, less or more cloudy weather, and other changing conditions affecting the plant, the habits of the weevil remain unchanged, but the habits of the cotton plant are modified in many ways.

On our strong alluvial soils the tendency of the cotton plant is to a larger growth of stalk. A spring of more than usual rainfall increases this tendency to abnormal growth, because the generally level formation of alluvial soils prevents rapid drainage, and the presence of the boll weevil still further tends to promote growth, because it prevents fruitage, which arrests, in part, the growth of the stalk. The result

of such conditions is a swamp of weeds preventing cultivation and forming an ideal harbor for the weevils.

To overcome the three difficulties mentioned it will be necessary under boll-weevil infestation to strictly observe the following plans on alluvial lands:

First. Plant only on well-drained land (if not naturally drained it should be artificially drained) and devote the poorly drained back lands—always unsafe for cotton in wet seasons—to rice or crops that will yield under excessive moisture.

Second. Plant cotton that has acquired the dwarf habit and fruits heavily close to the ground—not necessarily small-boll cotton, because large-boll cotton with good length of staple may acquire a dwarf habit by cultivation and selection.

Third. Prepare the seed bed thoroughly.

Fourth. Select seed of the best variety and of the greatest vitality.

Fifth. Plant as early as the season will permit, in rows a little wider than under nonboll-weevil conditions. It is better to delay the planting a few days and let the ground become warm enough for rapid germination than to force the season.

Sixth. Use a section harrow across the rows before planting, after planting, and as soon as the plants are up, to avoid crust and grass, the natural enemies of young plants.

Seventh. Commence to work the cotton as soon as possible and never let the field become grassy. Use shallow, rapid cultivation. Continue this till some of the bolls are open.

Eighth. As soon as the weevil begins to puncture the forms or squares, attach a pole or some brush to the handles of the cultivator to knock off the dead squares, all of which should be immediately picked up and burned. By this method the weevils are soon mostly annihilated. The old weevils soon die and no new generation appears, because all the eggs are laid in the squares and these are destroyed. Then by rapid cultivation a good crop is made. We have numerous reports for 1909 where every square was punctured up to the last of June, owing to the impossibility of adequately working the crop, on account of almost continuous wet weather, and after that day a good crop of cotton was made—from three-fourths of a bale to a bale per acre—because the punctured squares were picked and it was possible to give the plants intensive shallow cultivation.

The only known method of making cotton under boll-weevil conditions is twofold. First, destroy the weevils; second, force the plants to early maturity. I have described the method of forcing the plant. The destruction of the weevil is accomplished as follows:

First. Burn the immature bolls and the rubbish in and about the fields in the fall, and then break the land.

Second. When weevils appear on the young cotton in the spring, destroy them by picking or by poisoning.

Third. The punctured squares must be picked up and burned for a period of about six weeks.

We now come to the main question. Can cotton be made on the Delta and alluvial river lands successfully and profitably? Without any hesitation or mental reservation I say it can, and I am in a position to prove it. As to profit, the only additional cost over the old method is picking the squares, and this averages from $1.10 to $1.25 per acre for the season. The seemingly added cost by frequent cultivation is more than met by the ease with which it can be done and the freedom of the crop from grass.

We have assured you that cotton can be made in the Delta, but it can not be made on the old plan. Producing cotton under boll-weevil conditions will cause some changes in the methods that you have followed in the past. In the first place, it will be necessary to have good drainage, because it is of great importance to get a good stand and allow the cotton to be worked at all times. With good drainage and a properly prepared soil or seed bed we are almost sure to get a good stand of cotton if we use good seed.

The three main features of cotton production which we urge are the seed bed, the seed, and the cultivation. I will not discuss these topics, because you are all intelligent planters and understand the importance of having early-maturing varieties of cotton, and cotton that puts out fruit limbs among the first branches. The necessity of keeping the soil in the best mechanical condition requires more or less rotation of crops; otherwise diseases will attack the cotton plants, which are liable to anthracnose, to wilt, and to root-rot. All of these facts go to show that we must change our methods, and we must have more or less rotation of crops, such as cotton followed by a corn crop or a grass crop, because a certain amount of humus must be kept in the soil. This will require more work per acre, and of course with the present labor it means fewer acres will be cultivated. We hear it said on all sides that "We should diversify and raise less cotton." I agree with you. We should diversify, but we must raise more cotton per acre with fewer acres to the crop. It will be necessary to raise more corn, more alfalfa, more cowpeas, have more winter cover crops, and use certain portions of your land for pastures; or it may be advisable in some cases on alluvial lands to have farm pastures in the hilly section where the stock can be kept during the summer.

Hitherto you have usually leased your lands and allowed the tenant to farm at his will. In the future the successful planter will be obliged to have his plantation supervised and his work done according to a

definite plan. In the case of a planter having several farms it can easily be arranged. In the case of small farmers it will be necessary that one man be employed to supervise and give special directions, because it will never be safe under boll-weevil conditions to permit the old loose way of cultivating crops. This is sure to result in failure. In fact, it has always been a failure to the extent that the soil yielded only a third of the possible crop.

The planters of Louisiana and of a portion of Mississippi have been under boll-weevil conditions during the past year. Let us face the facts with sanity. Before the weevil strikes a territory, capital becomes alarmed and credits are reduced. A part of the labor immediately leaves, and less cotton is planted. This situation is intensified as soon as the weevil appears. The planters frequently become discouraged and plow up large areas. The loss from failure to plant and from the abandonment of the cotton planted and plowed up is all charged to the weevil. No allowance is made for a bad season. Louisiana is a case in point. Prior to the advent of the weevil the annual crop production of cotton varied occasionally over 50 per cent. The crop of 1905 was less than half that of 1904, though the damage by the weevil in 1905 was practically nothing and the loss was attributed to a bad season. In 1908, with the weevil over a large portion of the State, the cotton crop was only 45,195 bales less than that of 1905, when the weevil had barely entered the State. It is safe to say that had it not been for the continuous rains in July, which rotted the bolls nearly made, the crop of 1908 would have been much larger than that of 1905.

The cotton crop of 1909 in Louisiana was about 270,000 bales, one of the worst seasons known. How much of this decrease in product was due to the weevil? Suppose a full crop for a bad season should have been 511,738 bales, the same as was produced in 1905 when the weevil had just appeared upon the border of the State but had done practically no damage. Starting with this as a basis our investigations show that 30 per cent less acreage was planted in 1909, and during the wet weather of May and June 40 per cent of the acreage planted was abandoned or plowed up. Deduct these percentages from what the crop would probably have been without any weevil under the weather conditions, and we find that the 30 per cent less planted and the 40 per cent abandoned and destroyed would leave a crop of 214,931 bales, due to bad season, failure to plant, and destruction of the crop by plowing up. The crop did amount to 270,000 bales; consequently the great loss was not caused by the weevil, though it is charged to that account.

In the same way we are investigating the crop in Mississippi in 1909. The wet weather, the reduction in credits, the enormous loss of labor in the infested counties, and the tropical storm after

the cotton matured are sufficient to account for most of the reduction in crop yield, but of course it is all charged to the weevil. I am not intending to state that the boll weevil does no damage, but am trying to eliminate the damage from the scare, the loss of credits, the loss of labor, and a bad season from the total loss and find out how much should be charged to the weevil. Let us eliminate the scare and become sane. Let confidence be restored and the labor brought back, and the weevil problem will become simple.

The advent of the weevil is only hastening some things that must have come sooner or later, and one important item is better economic conditions. The planters, the small farmers, and the tenant farmers must raise their food supplies for themselves and their work stock. If the boll weevil had not made this necessary, a world competition would have ultimately forced it. For a farmer to buy everything with one crop is unsafe and uneconomic, and therefore must ultimately be a failure. The South has had greater opportunities to gain wealth than any portion of the United States. It has made the money but it has not kept it, because it has failed to produce the things necessary for sustenance upon the farm and has chosen to buy them at greater expense from abroad.

This boll-weevil fight and scare is to us no new conflict. I recall that when the boll weevils were advancing along the prairies of southwestern Texas the pessimists said, "Just wait till they reach the woodlands east of the Brazos, where nearly every small farm is surrounded by a belt of timber, forming an ideal place for hibernation! No use in attempting to produce cotton under such conditions." The alarm was such that in the wooded portions of Limestone and Robertson counties, Tex., nearly half the farms were abandoned and one-third of the stores in the towns closed. Production in Limestone County when the boll weevil reached it fell from a normal crop of about 50,000 bales per annum to 17,025 bales. This was in 1903. Our agents commenced work there in February, 1904. The crop of 1904 was 43,968 bales, and in 1906 the production was 76,283 bales—about 26,000 bales, or over 50 per cent, more than the normal production before the weevil appeared. Prosperity smiled on the land till a prominent director of the local banks came to me with the complaint that the banks were full of money and that they could not lend it to farmers because I had told them not to borrow. The politicians complained that political speeches were not in demand; the people only wanted to hear about cotton, and the hardware men were dissatisfied because they could not sell jackknives, as all of the dry-goods-box whittlers had gone to the cotton fields.

Then, county by county, we fought our way through eastern Texas against the pessimists and calamity howlers, who finally made a last stand on the eastern border of the State and said, "Wait till the weevil

reaches the extreme eastern counties, where the precipitation is 50 inches, and cotton production will be impossible." Under this wave of discouragement the cotton crop in Harrison County, on the Louisiana border, fell from a normal crop of about 20,000 bales per annum to 7,649 bales in 1907. In February of that year we sent an agent to that county, but the demoralization was so great that many planters refused to put in any crop, believing that cotton could not be produced under boll-weevil infestation. We succeeded, however, in securing demonstration plats over the county, and by the close of the season confidence was largely restored, so that in 1908 the total crop was 17,221 bales. For 1909 the statistical report is not yet complete, but the amount ginned for the season up to the 13th of December was 592 bales more than for 1908, and if the proper percentage be added for the amount usually ginned after the 13th of December the total crop will be something over 18,000 bales, which is a remarkable showing, because the crop of 1909, a bad year, with heavy boll-weevil infestation, is practically equal to the crop of 1906, an excellent year for cotton and with but little infestation. In addition, the county has diversified, land values have doubled, and the greatest prosperity since the county was settled has come to the people.

Our next battle with pessimism was in Louisiana, and we are getting that State in line as fast as we can get funds with which to work. The first year we can only put in a few sample plats, and it requires about three years for the work to take a good hold upon the planters. We have the names of 2,000 reliable planters in Louisiana who made good crops the past season (1909). They represent nearly every cotton-producing parish in that State, and especially those in which the worst conditions prevail. We have a letter from Colonel Maxwell, of Madison Parish, which states that he worked 1,500 acres of cotton under government direction in 1909, that he had ginned from this tract 700 bales, had 60 more picked, and had some more still to pick.

We also have a letter from Hon. S. W. Hill, a large planter and banker of Natchitoches, La., which states, among other things:

> Two years ago it was thought that cotton farming in Natchitoches was out of the question. * * *
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> Our people are going to make some money this year. * * *
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> We are making a good average crop of cotton, which means about 15,000 bales for this parish. In the best cotton season we have had we only made 25,000 bales, and then we planted the fence rows and river banks. We are making this 15,000-bale crop on half the acreage that was planted the old way. * * *
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> Our banks went right on helping the people, and we made them diversify, and thus enabled them to go ahead even if their cotton did fail. Our lands went down where there was absolutely no market for them, and now they are back to their old value very nearly, that is, river land. Of course the idea of making cotton on low, stiff soils surrounded by woods will have to be abandoned. We must have light

loamy or sandy soil, something that will make our cotton mature quickly. Our people have got their nerve back and have gone to work, and with any sort of favorable season we will never have any more crop failures in this section. You have to go right through it all to appreciate the change, and when other sections follow suit by adopting the diversity-of-crops plan they will be better off. * * *

Bank deposits are largely on the increase. The deposits are coming from farmers and small planters as a rule. * * *

Mark well our words: The foundations of an agricultural prosperity are now being laid in this State to an extent never before known. A sound scientific system of agriculture is gradually taking the place of the single-crop, long-credit system. Thrift and laborious activity are grappling with the new conditions and succeeding admirably.

As I have stated before, the essentials for fighting the boll weevil are better drainage of the soil, so that there will be a good stand and the crop can be worked soon after rains. There must be excellent preparation of the soil for planting. Plant as early as the season will permit and be safe. Seed of an early-maturing variety—one that puts out its fruit limbs low on the stalk and fruits heavily—must be used. Rows must be wider apart than usual. The seed must also be of the best quality. Cultivation should be shallow and intensive.

Do not lay by cotton as usual, but continue to cultivate until the bolls begin to open. Cotton is thus made all the time. If the rules for producing cotton are followed a good crop can be made.

To gain the greatest good you must supervise your tenants. You must give them to understand that the day of the haphazard methods has gone. It is the man who uses the most horse and mule power who wins the day. The successful man is the one who enslaves machinery.

We are in the period of higher prices for labor. It is here to stay, I believe, and the man who will win is the one who will see to it that he gets more work out of his labor by the use of better teams and tools.

The South should be the richest country in the world; that is, from an agricultural standpoint. You have advantages over every other country for the production of good crops, and if you do not succeed it is your fault, because you failed to apply the proper methods for planting and making a good crop.

Don't get scared by the boll weevil; it can be whipped. Diversify your crops and get more out of the soil. When you talk about abandoning cotton you are laying the foundation for agricultural distrust, and that means an agricultural panic. You might just as well put dynamite under your cities and blow them up as to destroy your agricultural districts. The prosperity of the two must go together. The Government gives you a method by which you can succeed, if you will.

Cotton is a national and a world crop. If you fail to produce a full supply, the clothing of every toiler upon the land and in the factory, world wide, will cost more. You must not fail; failure means more to the world than to you. If you could not raise a pound of cotton, your lands would still be worth vastly more than you ask for them for growing corn, alfalfa, rice, and other products, as well as for stock raising. With your superb soil, worth $200 an acre for general crop production; with a people of great intelligence and indomitable courage; with one of the best agricultural colleges in the land, founded by that great soldier and scholar, Gen. Stephen D. Lee, and worthily supported by its present president, Hon. J. C. Hardy, and with such splendid public men as you have in every service, are you going to permit a little boll weevil to deprive you of your homes and drive you from the soil? If a foreign enemy were to invade your State every man would form in line with rifle to the shoulder to repulse the invader. Meet this insidious enemy in the same way. Organize for the fight. Every man should assist—the banker with his money and the laborer with his hoe—till victory is won. You will live to see your land worth three times what it is to-day and you can not afford to sacrifice it. Hold your land and there is no reason why you should not succeed. This is the greatest country on earth for the production of the world's greatest crop. You can make a crop here just so long as you work your land properly. Let there be no more pessimism. Mississippians do not know how to surrender, much less to be captured by boll weevils. Unfurl a banner on every farmhouse and emblazon on it, "We do not surrender to an invading army! We fight!"

S. A. Knapp,
Special Agent in Charge of Farmers' Cooperative Demonstration Work.

Approved:
James Wilson,
Secretary of Agriculture.

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