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THE RELATION OF COTTON BUYING TO COTTON GROWING.

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INTRODUCTION.

The need of closer contacts between the manufacturer who uses cotton and the farmer who produces the raw materials has been recognized in a recent circular on "Factors Affecting the Production of Long-Staple Cotton."[1] It is desirable to go somewhat more fully into this relation, in the hope of making clear to the manufacturer, as well as to the farmer, the fact that the present methods of buying cotton do not contribute to the improvement of the cotton crop, but tend rather to discourage the planting of better varieties and to the neglect of the precautions that are necessary to produce superior fiber. The farmer who produces better cotton than his neighbors needs to understand why it is often difficult to secure a better price.[2] And at the same time the manufacturer should understand the need of greater discrimination in prices, as the best means of encouraging the production of superior fiber. The greatest improvements in production are to be expected in communities organized to grow commercial quantities of the same variety of cotton. The mutual interest of the farmers and the manufacturers lies in this direction of organized production.

Manufacturers who use long-staple cotton, both in the United States and abroad, have complained of deterioration in quality and diminished supplies of the raw materials, and have believed that their branch of the cotton industry was threatened by agricultural dangers over which they had no control. In reality, there is no agricultural reason why long-staple cottons should not be produced in the United States in much larger quantities than at present and

[1] U. S. Department of Agriculture, Bureau of Plant Industry, Circular 123, p. 3-9, 1913.

[2] Similar conditions exist with reference to the better grades of short-staple cotton. A discussion of the methods and practices prevailing in the western end of the cotton belt is presented by W. A. Sherman, Fred Taylor, and C. J. Brand, of the Office of Markets, in their Studies of primary cotton market conditions in Oklahoma. (U. S. Department of Agriculture, Bulletin 36, 36 p., 1913.)

also of better quality. These possibilities have had abundant demonstration in many districts of the cotton belt, as well as in the newly settled irrigated regions of the Southwest. It now rests largely with the commercial world of manufacturers and the buyers to determine what kind of fiber the farmer shall produce.

The fear that the boll weevil will put an end to the production of long-staple cotton in the United States may be dismissed. The development of new, early-maturing varieties and the discovery of improved cultural methods for shortening the growing season are making it possible to produce excellent crops of long-staple cotton in the presence of the boll weevil. Indeed, in the presence of the weevil there are additional reasons for growing long staples instead of short staples. The extra care and precautions that are required to protect the cotton against the weevil make it possible to produce a better staple. Thus the growing of long-staple cotton, to sell at a higher price, may be considered as a means of securing a return for the increased cost of production or the diminished yield that may be caused by the boll weevil.[1]

THE NEED OF DISCRIMINATION IN BUYING.

With the solution of the biological and agricultural problems of cotton improvement, it has become evident that another class of problems must be solved before any complete development of our resources of cotton production can be expected. These problems may be approached from the commercial side, as they are closely involved with the handling and marketing of the crop, but they have also a very important agricultural bearing that needs to be recognized in planning improvements of commercial conditions. Greater discrimination must be used in the buying of cotton before the farmers will put forth their best efforts toward the development of a new long-staple industry in the United States.

Discoveries that have been made in the investigation of problems of acclimatization and breeding can be applied in commerce as well as in agriculture. Indeed, the commercial applications are likely to determine the extent of the agricultural utilization of the superior varieties that have been developed by acclimatization and breeding.

The selection, or "roguing," that is necessary to maintain the purity and uniformity of varieties can be done much more easily and effectively by taking out the inferior plants early in the season. This not only improves the quality of the seed but also renders the fiber more uniform and more valuable for manufacturing purposes. The same method of field inspection can be used by the buyer to determine the quality of cotton that any field will produce, not only before it is picked, but even before the bolls are set. If selection has been

[1] Cook, O. F. Cotton improvement under weevil conditions. U. S. Department of Agriculture, Farmers' Bulletin 501, 22 p., 1912.

neglected or admixture with other varieties has taken place, the inferior plants can be seen and counted, and different fields can be graded on a percentage basis. Buying cotton in the bale is a mere game of chance compared with what buyers might do in the way of accurate classification if they began with the cotton in the field.

Of course, a system of judging cotton in the field would be very difficult to apply to the cotton industry in its present unorganized condition, with each farmer of a neighborhood likely to grow a different kind of cotton. One of the chief objects to be gained by better methods of buying would be to develop a better system of production, in which the same kind of cotton would be grown throughout a whole community or district. Many advantages, commercial and agricultural alike, would be gained if cotton production were organized on a community basis.[1]

That the present system of buying is seriously defective is now widely recognized, and radical reforms are being sought through legislation and otherwise. But it is highly desirable that reforms in the commercial world be considered in their relation to the improvement of the quality of the crop and not merely to secure higher prices for inferior cotton. There is no prospect that such prices can be maintained by any action that may be taken in the United States. The only secure basis for our cotton industry is in the improvement of the product. Otherwise, we remain exposed to the danger of foreign competition. It is much more important to improve the quality of our cotton crop than to secure high prices without such improvement, since high prices for inferior cotton will only stimulate the rapidly increasing production of low-grade cotton in other parts of the world.

VARIETIES DETERIORATE BY LOSING UNIFORMITY.

The fundamental agricultural improvement that requires commercial cooperation is the preservation of superior varieties, so that a uniform product can be obtained. For manufacturing purposes, uniformity is an even more important quality than length of staple and one that must be guarded continually in the production of long-staple cotton. It is much easier to breed new varieties than it is to keep them pure and uniform after they have passed out of the hands of the breeder into the field of commercial production.

The causes of deterioration must be understood before we can appreciate the precautions that have to be taken to preserve superior varieties. There is a misleading popular idea that varieties of cotton are bound to deteriorate and that new seed must be planted every few years in order to maintain the crop. Before the art of antiseptic surgery was known, inflammation and suppuration of wounds were

[1] Cook, O. F. Cotton improvement on a community basis. Yearbook, U. S. Department of Agriculture, 1911, p. 397–410. 1912.

Brand, C. J. Improved methods of handling and marketing cotton. Yearbook, U. S. Department of Agriculture, 1912, p. 443–462, pl. 53–56. 1913.

considered inevitable. The deterioration of cotton varieties is often thought of in a similar way, as something that is sure to occur in a few years. But such deterioration can be avoided just as definitely as wounds can be protected from infection.

The most frequent source of the infection that causes a variety of cotton to degenerate is mixture of seed or crossing with other varieties. The planting of different varieties close together and the exchange of seed at the gin are the usual causes of contamination. The present system of public gins might be described as an unconscious conspiracy to destroy the purity of varieties and does millions of dollars' worth of unrecognized damage in this way every year. The machinery of the gin is arranged to hold a bushel or more of the seed of each customer and to mix it into the seed of the next farmer in the line. No farmer can keep his variety pure who allows a public gin to handle his seed in the usual way. To keep his variety pure, a farmer must either have his own gin or he must find a public gin where he is allowed to clean the machinery and thus keep his seed from being mixed. Very few farmers think of taking such precautions. They prefer to believe, as a correspondent recently assured us, that "what little gets in at the gin will not do any harm."

When mixture with other kinds of cotton is avoided, it is still possible for a variety to degenerate, in the sense of losing its uniformity, unless care be taken to recognize and remove the "sports" or aberrant plants that continue to appear in even the most carefully selected stocks. To rogue out these degenerate plants is as necessary as to prevent mixing with other varieties. The degenerate individuals are like so many different varieties, for the characters of many of them "come true" when the seeds of such plants are saved and planted separately. It is only by observing these two precautions of avoiding admixture and roguing out the "freaks" or "sports" as they appear that varieties are kept from deterioration and made to serve the purposes of production for many years.

After a discovery like antiseptic surgery has been made it seems altogether unreasonable that people should disregard it, at the risk of pain or even death. But it is the lesson of history that reforms come slowly, and the improvement of the cotton industry is likely to follow this rule. It is only when we undertake to avoid infection or contamination that we learn how difficult it is to do so. Even after the farmer understands the importance of maintaining a pure stock of seed there are many ways to bring in contamination, and some of the most intelligent and efficient farmers often make fatal mistakes in their first efforts to maintain a pure stock of seed. The most disappointing cases are those where some accident or error occurs after most of the precautions have been taken. It is not until the farmer learns to think, as it were, in terms of pure seed that he is able to guard himself all along the line of possible errors.

CAREFUL FARMERS DESERVE THE HIGHER PRICES.

No complete or permanent improvement is to be expected unless more direct financial advantages are offered to the careful farmer. The scientific and moral encouragement to raise pure, uniform, high-grade cotton so as to enhance the reputation of the district may be urged as a motive of local patriotism, and local agencies may continue to cooperate in the effort to organize the whole community in the interest of long-staple production, but all these considerations may fail of the desired result unless the commercial interests will add a financial object to the other motives.

As a means of illustrating this, it may be well to give extracts from a report by Mr. Argyle McLachlan, of this department, covering the different kinds of mistakes or accidents encountered in a single season in the effort to guard the Durango cotton against contamination from the Upland short-staple and Egyptian cotton previously grown in the Imperial Valley of California. In addition to placing the farmers more on their guard, an account of these errors may make it easier for manufacturers to understand not only that special precautions are necessary, but that the regular observance of such precautions amounts to a real reform of agricultural methods, a reform that needs to be encouraged by a change of commercial policy.

If any single precaution were sufficient to keep the seed pure, a general observance would be much more easily established, but in reality many different precautions must be taken. Most farmers are now so careless or so little intent upon the idea of keeping their seed pure that they fall readily into one or another of the many mistakes that are fatal to the uniformity of a variety of cotton.

Mr. McLachlan's statement is as follows:

That intelligent management is required to preserve clean stocks of any variety of cotton seed is forcibly shown by the numerous accidents which have occurred in the Imperial Valley in connection with the Durango cotton.

Clean Durango seed, purchased at fancy prices, has been planted on land where short-staple cotton was grown in the previous season, thus insuring mixture of seed and cross-pollination from the volunteer short-staple plants. In one case a farmer who had been cautioned against planting his new pure seed on land where Egyptian cotton had previously been grown, afterward planted the seed on land which had been in short staple. This shows that the object of the precaution was completely misunderstood, for if new land could not be had it would have been much better to plant the Durango where the Egyptian cotton had been. Egyptian volunteer plants could have been detected and removed much more easily than the short-staple Upland volunteers.

Several lots of Durango seed were brought in from Texas, and came from as many different planters. Some lots were known to have been carefully grown and ginned separately to avoid mixing with seed of other varieties, but other lots were not known to have received similar care. Special care had been urged in handling these different lots in order to keep the seed that was known to be clean separate from the other lots. In spite of repeated cautioning, the identity of the clean seed was made uncertain

by failure to mark the bags or to keep them separate. The different lots were piled in the same warehouse and some of the piles fell down.

In one instance, at least, seed of another variety had been distributed as Durango on the careless assumption that all kinds of long-staple cotton were much the same, so that a substitution would be only a mild form of deception. The seed used in this instance to replace Durango was of an inferior mixed stock and would give a very misleading idea of the variety.

Unmixed Durango cotton raised in the Imperial Valley was sent to the public gin and the seed allowed to pass through the conveyors which had been used with short-staple cotton and contained a quantity of the short-staple seed. An appreciable mixture with the short-staple cotton, in some fields from 4 to 6 per cent, occurred in this manner.

Admixture of Durango cotton with Egyptian also resulted from putting Durango seed into sacks in which Egyptian seed cotton had been carried to the gins. Fields planted with this seed showed a scattering of Egyptian plants among the Durango. The changing of sacks without proper care in cleaning them, it would seem, might be a very common cause of mixture.

The purity of another carefully guarded field of Durango cotton was jeopardized by the carelessness of a neighbor who had left some short-staple seed by the roadside. In preparing the land for the Durango cotton some of the short-staple seed was dragged into the field. The owner knew nothing of this until the scattering short-staple plants were noticed in one corner of the field, and then the origin of the contamination was traced. In this case immediate attention was given to the removal of the short-staple plants, which were easily distinguished from the Durango.

A final instance is that of a farmer who took pains to secure a good stock of Durango seed for planting his field, but he did not secure a complete stand so replanted with Triumph short-staple cotton to fill the vacant places.

As a result of such accidents and oversights a large proportion of the fields are more or less contaminated. But a few of the growers who were able to secure clean seed are following the advice of the Department of Agriculture in order to preserve the purity of their seed. They have planted on land uncontaminated with other cotton and will use proper precaution to prevent mixing with other varieties in handling and ginning the cotton in the fall. They propose to carry through, for planting in 1914, quantities of Durango seed as clean as the stock from which it is being grown this season.

The number of these more careful or more fortunate farmers is not large, but the seed they are raising would plant a large acreage of pure Durango next year if the importance of using clean seed were properly appreciated. But as long as the farmers who have mixed fields can get as high a price for their fiber as those who have pure fields, they are likely to continue the planting of their mixed stocks instead of making a new beginning with pure seed and guarding with more care against contamination in the future.

DISCRIMINATION IN BUYING MORE IMPORTANT THAN HIGH PRICES.

That prices determine the production of a crop is a familiar idea, but the state of the cotton industry shows that high prices alone can not be relied upon to increase the production of superior fiber. The buying of the crop with proper discrimination is just as necessary in establishing and maintaining production as any factor of climate, soil, cultivation, or other agricultural requirement. The higher grades of Egyptian cotton are now worth approximately twice as much as the standard middling grade of short staples, while

Upland long staple brings from 30 to 60 per cent more than middling short staples. Both types can be produced in much larger quantities at such premiums if the premiums are paid to the farmers who produce the superior cotton. Paying high prices without discrimination encourages the wrong class of farmers to plant long-staple cotton, instead of securing the interest of those who might place the industry on a substantial basis.

There is no reason why the farmer who refuses to take the precautions that are necessary to produce good long-staple cotton should get any more for his crop than for short staple. The new early-maturing, long-staple varieties are as productive as most of the short-staple varieties that are now being grown, and in some instances even more productive, as in the case of the Durango cotton in the Imperial Valley. On the basis of the present varieties the greater cost of production of long staples lies entirely in the greater care that must be exercised to produce a more uniform fiber. The farmer who will not take the extra precautions that are necessary with long-staple cotton has no just claim for a premium. Unless the most intelligent and careful farmers can be enlisted, there is little prospect that the culture of long-staple cotton can be established or maintained in any community.

The failure to discriminate in price to the farmer is so general that many buyers do not consider it dishonest, but look upon it merely as one of the ways of increasing the profits of their business. Yet the policy is certainly wrong from the standpoint of agricultural improvement, quite apart from the responsibility of the buyer to pay the farmer a fair price. Indeed, many buyers do not have the skill necessary to determine that one bale contains better fiber than another. In such cases the question of dishonesty need not be raised, but the effect on the farmer is the same. He will not continue the attempt to improve his crop unless he can find recognition in the market price of the cotton. It is no encouragement to him to know that somebody else, whether factor, buyer, or manufacturer, makes larger profits from his improved crop if he is unable to secure a share of these profits.

As long as cotton is bought without regard to quality, it is useless to expect that the farmer will take pains to grow cotton of better quality. The additional care that must be given to the crop to produce superior fiber will not be applied by the intelligent farmer unless he can be assured that the buyer will discriminate and pay more for his cotton than for that raised by his ignorant or careless neighbor. To buy all the long-staple cotton of a district at a flat rate, like short-staple cotton, must be expected to have the same effect with long staples as with short—that of encouraging the planting of the inferior varieties rather than those of higher quality.

The system of buying at a flat rate makes it of interest to the buyer to keep the farmer from knowing how good his cotton is, and this keeps him from trying to make it any better. The buyer, rather than the farmer, draws a temporary advantage from any exceptionally favorable conditions or from the introduction of improved varieties that enable better staple to be produced. In its final result, the present system is opposed to agricultural progress, even to the extent of defeating its own object of securing increased business in handling long-staple cotton.

DEVELOPMENT OF NEW LONG-STAPLE DISTRICTS.

The buyer's function in the general economy of the cotton industry is to take the cotton in small lots from the individual planters and assort it into larger lots of the same kind of fiber for sale to the manufacturer. Unless this work of assembling and classifying the cotton is properly done, so that uniform lots can be sent to the manufacturer, permanent harm may result to the community where the cotton is grown. When the buyer fails to recognize and discriminate in favor of the productive possibilities of a new district the manufacturer also fails, for his judgment is based on the cotton the buyer sends him. If buyers in a certain district send in only mixed or uneven fiber, the manufacturer concludes that the district is not suited to the production of long staples. The manufacturer does not consider that cotton deteriorates because the buyers follow the unfortunate plan of paying the same price for good and bad fiber alike and do not discriminate in favor of farmers who take proper care of their crop. Instead of recognizing that the failure is due to commercial causes, recourse is had to the theory that something is lacking in the climate or the soil, something that prevents the cultivation of long-staple cotton outside of some specially favored region.

This is the history of many attempts that have been made to grow long-staple cotton in new districts. The first plantings with pure seed are successful. The samples are approved by expert buyers and manufacturers, and one or two crops of good staple are raised. But with each season the seed becomes mixed more and more, and about the time that the stage of commercial production is reached the manufacturer finds the staple too uneven for his purposes, decides that the district is not suited to long-staple production, and refuses to make further purchases from that quarter. The buyers or the farmers may be left with unsalable cotton on hand which they can dispose of only with difficulty and at ordinary short-staple prices.

An excellent example of the importance of intelligent buying in the development of a long-staple community is now to be found in South Carolina. A flourishing, long-staple industry is developing in

the district around Hartsville, largely as the result of the public-spirited efforts of Mr. D. R. Coker. This new long-staple industry is based on the Columbia type of long-staple cotton originally selected from a short-staple stock by Dr. H. J. Webber, then of the United States Department of Agriculture. Mr. Coker has not only maintained the Columbia stock and developed special selections from it, but, what is even more important, has assumed the responsibility of buying and finding a market for all of the good Columbia cotton that is raised by his neighbors. Familiarity with the variety has enabled him to buy with discrimination and thus encourage the use of pure seed in a much more effective way than would have been possible if attention had been given to breeding alone without participation in the commercial field. Farmers who mixed their cotton could not sell it except at a lower price than those who had a pure stock, and thus the quality of the long-staple cotton grown about Hartsville has been maintained. Mr. Coker's services to his community as a discriminating buyer should be even more highly appreciated than his efforts at breeding improved strains. There are other districts where the Columbia cotton has fallen into the hands of careless or inexperienced buyers, and where the planting of pure seed was not encouraged by the necessary discrimination in price. The result, as might be expected, is that the New England spinners are buying long-staple cotton from Hartsville while refusing that of other localities where the natural conditions are favorable but where the precautions that are necessary to maintain uniformity have been neglected for lack of proper discrimination in buying. Thus, the presence of a careless or incompetent buyer is a serious danger to the long-staple prospects of a community.

Many unsuccessful attempts have been made to grow Upland long-staple cotton in the Carolinas in the last half century. The last was made a few years ago in connection with a long-staple variety called Florodora, which was planted in many places as a result of extensive advertising of the seed. But the necessary uniformity was lacking in this variety, with the result that both the manufacturer and the farmer were disappointed and returned to the idea that only short staples could be grown to advantage. The lesson that lack of uniformity in the variety was the chief cause of failure was not learned.

The same lack of uniformity is to be expected in any long-staple variety that is brought into a short-staple region and not guarded against admixture with other varieties and degenerate sports. The note of disappointment is already beginning to be heard from manufacturers who have experimented with inferior stocks of Columbia cotton and have thus reached an adverse opinion of the possibilities of a long-staple industry in South Carolina, or in other States where the Columbia cotton may be grown. The history of the Florodora

cotton is likely to be repeated with the Columbia, for mixed stocks are being sold in Texas and elsewhere on an advertising basis, and a large amount of inferior fiber is likely to come into the market.

Of course, there are some parts of the cotton belt, like the drier portions of Texas, where the conditions are not really favorable for the production of long-staple cotton. Only a few varieties and a few localities may be able to produce a staple equal to that of the Mississippi Delta region, but a large part of the cotton belt could produce excellent long staples if proper care were taken. Most of the former attempts at long-staple production failed, in all probability, not because of agricultural difficulties but because the varieties were not kept uniform and because the buyers did not discriminate between the good fiber that was worth a premium and the mixed stocks of long and short cotton that possibly had even less value than short cotton alone. If the mixed fiber had been rejected promptly, no more of it would have been grown and the production of uniform stocks would have continued and increased. Instead of using discrimination in time, the mixing is allowed to go on for two or three years until the stock has deteriorated and the crop has been refused by the manufacturer. Thus, the prospects of establishing a new center of long-staple production are seriously diminished, if not altogether destroyed.

In some respects the best opportunities for developing new long-staple districts are in the irrigated regions of the Southwest. The natural conditions must be admitted to be extremely favorable, with such advantages as rich soil, control of water supply by irrigation, freedom from wet weather in the harvest season, and absence of the boll weevil. Moreover, in these newly settled communities it is easier to secure a general agreement on the planting of a single kind of cotton. In the Salt River Valley of central Arizona, where only Egyptian cotton is grown, the crop has increased from 33 bales in 1911 to 262 bales in 1912, and about 3,000 bales are expected in the present season. In the Imperial Valley of southern California there has been a still more rapid expansion of the Durango cotton from about 3 acres in 1911 to 200 acres in 1912 and to about 5,500 acres in 1913, using all the seed of this variety that could be bought. If the present crop brings a fair price, the Durango variety is likely to be planted next year for the entire crop of the Imperial Valley, or to an extent of 20,000 to 30,000 acres.

The danger that seems likely to interfere with the progress of such communities is that the buyers will continue to follow their usual policy of taking the entire crops at flat prices and thus encourage the farmers to neglect the precaution of keeping the varieties pure. It was not to be expected, perhaps, that the manufacturers who bought the small early crops to encourage the pioneer planters would

give themselves the further trouble of discriminating among the numerous small lots. Nevertheless, it was bad policy to take the mixed, weak, or uneven fiber at the same price that was paid for the best.

The care that must be used in maintaining the quality of future crops is just as necessary as any other part of the work of production, planting, irrigating, cultivating, or picking, but it is a part that has been neglected in the past and is likely to be neglected in the future if the value that it adds to the fiber is ignored by the buyer. In other words, increased production of long-staple cotton is very largely a commercial problem. Further improvements of varieties and methods are to be expected, but the varieties and methods that are now available make it possible to produce almost unlimited quantities of long-staple cotton in the United States. All that seems now to be needed is that the commercial world appreciate its agricultural responsibilities. The supply will correspond to the demand, but the demand must be made effective by proper discrimination in price.

COMMERCIAL CAUSES OF DETERIORATION OF COTTON.

The manufacturing world, in Europe as well as in the United States, seems to be unanimous in the opinion that the cotton crop has deteriorated in recent decades. The same complaint is made regarding all of the principal types of cotton—Upland short staples, long staples, Egyptian, and Sea Island. While direct evidence on the fact of deterioration is not easy to obtain, there is circumstantial support for the idea that deterioration has taken place, for the system of buying has allowed changes that would naturally tend toward a decline in the quality of the crop. The necessary precautions of selection and for avoiding admixture of seed have been relaxed, and even the planting of inferior varieties has been encouraged.

The general disregard of the essential qualities of length, strength, and higher grade on the part of buyers has had the natural effect of leading the farmers to believe that the most desirable character a cotton variety can have is that of giving a high percentage of lint, "a large outturn at the gin." This erroneous idea is now firmly fixed in the popular mind, and is not likely to be eradicated while the present system of buying continues. No matter how inferior in other respects a variety may be, thousands of bushels of seed can be sold by advertising a high percentage of lint.

The fact that some of the varieties with highest lint percentages produce extremely short, inferior fiber does not interfere with the planting of such varieties as long as the farmer can sell three-quarter-inch cotton for as much as inch cotton or even inch-and-an eighth cotton. The popularity of such varieties is a result of the present

system of buying. In former decades, when the quality of the fiber was considered, nobody would have thought of growing such cotton or of breeding such varieties. In addition to their inferior lint, the high percentage varieties usually have smaller seeds and weaker seedlings, a very undesirable character from the agricultural standpoint. It is easier to secure higher percentages by selecting variations toward small seeds than to increase the amount of lint on the seeds.[1]

Manufacturers have assumed or have been led to suppose that the dangers threatening the cotton industry were purely agricultural, such as the exhaustion of the soil, change of climate, or attacks of the boll weevil, and this makes it harder for them to understand that the primary causes of deterioration in the quality of the fiber have been commercial rather than agricultural. This does not mean, of course, that there are not many other agricultural improvements that need to be made, but it does mean that the manufacturer should take greater care to see that the farmer has the necessary inducement to plant superior varieties and to adopt the more careful methods that are necessary to produce better fiber.

DETERIORATION OF THE SEA ISLAND COTTON CROP.

Until recent years some of the planters of Sea Island cotton in South Carolina have been able to sell their crops direct to the European manufacturers. In order to be sure of having the particular strain of fiber that the planter raised, the manufacturer often made contracts for several years in advance and at prices well above the ordinary market quotations. The possibility of securing these advantageous contracts led the more intelligent planters on the Sea Islands to use one of the most highly specialized systems of selection that has ever been applied to cotton or to any other field crop grown from seed. In order to provide the uniformity of fiber so much desired by the manufacturer, the Sea Island planter raised the crop of each year from seed derived from a single individual plant. In order to do this, it was necessary to select a superior individual three or four years in advance and keep its progeny separate while the stock of seed was being increased.

As long as the planters had the prospect of securing a fair return for these precautions, extra care was taken to protect the uniformity of the stocks. But now that the system of buying has been changed and the special contracts are no longer made, the policy of strict selection is being relaxed. A rapid deterioration of the Sea Island crop is said to have taken place, and this is easily understood from the diversity that exists in many of the fields. Some of the planters

[1] Cook, O. F. Danger in judging cotton varieties by lint percentages. U. S. Department of Agriculture, Bureau of Plant Industry, Circular 11, 16 p., 1908.

have abandoned the Sea Island cotton altogether and are now planting Upland short staple varieties. Hybrids between the Sea Island and Upland types are of frequent occurrence, thus adding another factor of diversity and deterioration.

The manufacturers probably believed that they could secure the same cotton at lower prices by letting it go into the open market so that the buyers could secure it at a flat rate, and this they may be able to do, but only for a short time. The decline of the industry has begun, and this course is not likely to be stayed unless there can be a return to greater discrimination in buying. If it be true, as some of the planters believe, that the contracts were withdrawn on the assurance of the buyers that they could furnish the same cotton at lower prices, any such assurance was based on a misunderstanding of the essential factors of production, and the manufacturers have been deceived. The buyers can not continue to furnish the same cotton at lower prices, because the growers will not continue to produce cotton of the same quality.

If the farmers are no longer to look for special prices for special quality of fiber, they will no longer make quality the prime consideration, but must begin to take more account of quantity, as in other branches of the cotton industry. The planters are preferring more prolific stocks and are abandoning the special selections formerly grown on the basis of contracts. The buyer may send the manufacturer cotton from the same plantation, but it is no longer the same cotton. The commercial interests are beginning to recognize this as one of the causes of deterioration of the Sea Island crop, but it is equally important to understand that the attempt to buy the cotton at flat prices places a premium on quantity instead of on quality. Of course, the buyer wants the cotton to have quality when he takes it to the manufacturer, for his profits depend on this, but it is hardly businesslike to expect the planter to provide special quality without being paid for it.

Thus, it may be seen that the plan of buying Sea Island cotton at flat prices without proper discrimination in favor of producers of superior fiber is having the same effect in the Sea Island district as in other branches of the cotton industry. The general tendency is to discourage and cause the neglect of the special precautions that are necessary to produce fiber of the highest quality. The next step in deterioration is a general decline in uniformity and reduction of demand. If these commercial tendencies are not resisted, the ultimate effect must be to discontinue the production and put an end to the superior fiber. The present theory of the commercial world—that larger profits can be made by refusing premiums for superior fiber—if worked out to its logical conclusion, means that all the higher types of cotton will be excluded, so that the cotton production

of the future will be limited to very short staples, three-quarters of an inch or less.

There can be no doubt of the desirability of finding some means of counteracting this tendency toward the planting of inferior varieties. Indeed, some other course must be opened, or further deterioration is inevitable. As long as the farmer accepts the lint percentage or ginning outturn as the sole standard of the value of a variety, the preference for varieties with inferior lint is likely to continue. The only effective way to change the farmer's opinion on this point is to pay him less for the short, inferior fiber and more for the long, strong, and uniform fiber.

LIMITATIONS OF THE PRESENT SYSTEM OF BUYING.

A system of buying that discourages the production of the commodity that it handles is like a transportation line that injures its business by charging more than the traffic will bear. Farmers will not take more pains to grow good cotton merely for the satisfaction of knowing that the buyer can make more money out of it. The farmer must get at least enough advantage to induce him to grow the cotton or the buyer loses his business; and the manufacturer also suffers when the farmer ceases to produce the necessary raw materials. Even if the manufacturers are able to protect themselves against the unskillful buyers, the agricultural damage continues. It is not what the manufacturer pays for the cotton but what the farmer gets for the cotton that determines production.

Long-staple manufacturers have been uncertain of their future supplies and anxious that production should be increased, but they should understand that the remedy is in their own hands. Nothing in the way of permanent progress is to be gained by advising or exhorting farmers to plant better varieties or to maintain their uniformity by selection unless they are able to market superior fiber at higher prices than ordinary or inferior fiber.

Some of the manufacturers have supposed that the production of long-staple cotton could be increased and a more abundant supply maintained by direct action of the Department of Agriculture in urging the planters to grow long-staple cotton. It is desirable, of course, to have the improved varieties brought to the attention of planters, or even urged upon them, but if it appears afterwards that the farmers who have planted the new varieties and taken the pains to carry out the precautions advised by the Department of Agriculture can get no more for their cotton than their careless neighbors, no permanent benefit is secured. Indeed, the reaction that comes with the failure of such efforts often leaves a worse condition than before. There is less inclination to make such efforts in the future or to

adopt other improvements advised by the Department of Agriculture.

The general underlying fact is that most of the farmers are unaccustomed to take the precautions that are necessary to preserve uniform stocks and have no adequate conception of the need of such precautions. Moreover, they are not likely to get such a conception, except through a long educational process, unless the issue is made more practical and direct by greater discrimination in buying. The work of the department is of an educational character, but the information that the department can give the farmer is not likely to be used when it means additional care and effort without any corresponding advantage. When the farmer asks how much more his long-staple crop will bring if he pulls out all of the short-staple plants in the field, he can get no direct assurance. He can be assured that his cotton will be worth more, but not that he can get more, for the chances are that the buyer will be unable to detect the admixture of short cotton. But if the farmer knew that his field was to be inspected and that the presence of short-staple plants would be detected and would result in his receiving a lower price for his crop, he would not hesitate about taking the trouble to pull them out. Farmers are willing enough to adopt easier methods or crops that can be raised more cheaply, but the production of good cotton requires additional attention, something beyond what the farmer has been accustomed to give in raising short staples, and some positive inducement becomes necessary or the extra care will not be taken.

INJUSTICE OF THE PRESENT SYSTEM OF BUYING.

The present system of buying without adequate discrimination means the same average price for lots of cotton that differ greatly in value. Doubtless it is an easier and more convenient system for the buyers to take their cotton at flat prices and classify it afterwards into the different qualities required by their various customers. But, whatever the commercial advantages of this system, it is certainly unwise and unjust in its relation to the farmer. It takes what belongs to the good farmer and gives it to the poor farmer.[1] The farmer who raises cotton above the average in quality is mulcted to make up for the loss on cotton that is below the average. When the nature of the system is considered, it is easy to understand that the general tendency has been toward the growing of inferior cotton rather than to the taking of extra pains from which no advantage could be gained.

No individual buyer, of course, nor any organization of buyers, is to be held responsible for the present system. Buyers, like other

[1] For specific instances of injustice and loss to farmers resulting from the present system of marketing, see Sherman, W. A., Taylor, Fred, and Brand, C. J., already cited.

people, simply have been inclined to take the courses that seemed to promise the easiest returns, without realizing that these courses were so seriously at variance with the interests of both the producer and the manufacturer. But now this divergence of interests has become apparent, and there is no good reason why it should continue. Buyers who wish to do so can learn how to serve their clients better than under the present system. The skillful buyers would do a larger proportion of business as production became more concentrated by community organization. The unskillful buyers, who have been buying the cotton raised by unskillful farmers, would go out of business.

As already stated, it is not a question of paying more for the cotton, but of paying more to the farmers who produce good cotton and less to those who produce poor cotton. This simple expedient would do more than any amount of exhortation to increase the proportion of farmers who would take the care that is necessary to produce good cotton. Buyers who really have the powers of discrimination that are needed in their business would have no serious difficulty in learning how to determine the value of the crop in the field much more reliably than they can determine it by drawing samples from the bales. The risks they now take in trusting to bale samples alone could be avoided almost entirely by learning how to judge the cotton in the field. In order to have a beneficial effect on production, discrimination must be based on real differences in the cotton. Arbitrary discrimination is naturally resented by the farmer as a dishonest effort at buying his cotton for less than its actual market value. When different prices are paid for bales that were raised in the same field, gathered by the same pickers, and ginned at the same gin, the farmer is compelled either to doubt the honesty of the buyers or to question their ability to distinguish the quality of cotton in the bale. Differences of 3 or 4 cents a pound in the valuation of the same lots of cotton are common in long-staple markets.

UNIFORMITY BEST DETERMINED BY FIELD INSPECTION.

Uniformity in the length and strength of the fiber is one of the most important factors in determining the value of long-staple cotton to the spinner. One of the most serious defects of the present system of buying on the basis of samples drawn from the bales is that it is not adequate for the determination of uniformity. Buyers commonly fail to detect an admixture of 5 or 10 per cent of short cotton, and even 15 or 20 per cent often "gets by." The buyers, of course, are not inclined to admit this, but the fact is well known to manufacturers. Differences in the amount of "waste" become apparent, of course, when the manufacturing processes are reached, though they are not to be detected with accuracy by the methods of

sampling upon which the buyer relies. But by field inspection admixtures of 1 or 2 per cent are quite as easily and definitely detected as percentages of 10 or 20 per cent. A buyer or inspector having sufficient familiarity with a variety could establish definite percentage grades of purity of stock for all of the cotton of a neighborhood, and these percentages could be used as a basis for buying. The short-staple plants or inferior individuals stand out very distinctly, so that they can be seen at a glance by those who have sufficient familiarity with a variety, and they can be pulled out or counted as easily as the same number of weeds that a careless farmer might leave in his field.

Buyers are on their guard, of course, against deliberate mixing or "plating" of bales by putting good cotton on the outside and poor cotton in the middle, but when the long and the short cotton grow together in the same field and are picked together the chances of detection are greatly reduced. Dishonest farmers have been known to add a proportion of short-staple seed before planting, in order to increase the yield and sell the crop at regular long-staple prices. This has been done, not alone in out-of-the-way places where there were no regular long-staple buyers, but in recognized long-staple markets. The buyer pulls only two or three samples from the bale, and unless he happens upon short cotton in "pulling the sample" the bales may be passed and paid for as long staple. Hence, the present system of buying affords no protection against the deterioration of varieties of long-staple cotton. The mixture is likely to go on to the point of complete contamination of the stock before the buyer detects the damage.

In failing to make use of the opportunity of judging cotton in the field, the present system of buying becomes wasteful and inefficient. Buying cotton at a flat price without discrimination of quality means that all the different grades and qualities that a region produces are brought together, and then they are sorted out again, though there is much less chance of correct judgment as to quality than before they were brought together. Buying from a knowledge of the cotton in the field would require, no doubt, more work from the buyer than he now applies to his business, but the effort would be worth while and might be expected to find proper remuneration.

FIELD INSPECTION IN THE INTEREST OF MANUFACTURERS.

What the long-staple manufacturers might do, and what they undoubtedly would do if sufficiently alive to their future interests, would be to send men into districts where long-staple cotton is grown, in order to gain direct familiarity with the facts that determine the value of the cotton for manufacturing purposes. The knowledge that might be gained in this way could be used either in

direct buying from the farmer or in placing orders with buyers who would, in turn, find it to their interest to know in advance the possibility of supplying the needs of their more discriminating customers.

The same amount of skill that is now used in classifying cotton in the bale could be applied much more effectively in the field, and with enormous advantage to agriculture in assuring the farmer a return for the special care required to produce superior fiber. The chief obstacle to the adoption of such methods of buying on a basis of field inspection is that neither the manufacturers nor the buyers have, at present, any familiarity with cotton in the field, either with the plants as they grow or with the fiber as it comes from the bolls. A certain amount of time is required to become familiar with the plant and lint characters, as they have to be judged in the field, but anybody who is able to make the fine discriminations necessary in classing cotton in the bale would have no serious difficulty in learning to distinguish the different kinds of plants in a mixed field or in recognizing differences in the lint while still on the seeds. Indeed, the recognition of such differences is really much easier than the classification of cotton in the bale, because the differences are greater and more obvious, and because it is seldom necessary to depend upon one character alone. Varieties differ, usually, by many characters, and even in the same variety several characters are likely to be changed under a different set of external conditions. If the lint is shortened by adverse conditions, the bolls and leaves are likely to be smaller and the whole aspect of the plants will be different. Sufficient familiarity with the characters and behavior of a variety enables one to tell in advance with considerable confidence the length and strength of the lint before taking it in hand, or even before the bolls have opened.

OTHER CAUSES OF UNEVEN FIBER.

It is true that mixing varieties and diversity among the plants in the field are not the only causes of inequality in the length and strength of cotton fiber. Unless the conditions of growth are favorable, even the best variety may yield only inferior cotton. Adverse conditions during a part of the crop season may render the fiber uneven, notwithstanding the care that may have been taken to keep the stock pure. As a result of differences in the soil, one part of a field may grow good fiber while another part of the same field may yield only inferior fiber. When one side of a field is allowed to grow up in weeds, an adverse effect on the fiber is often apparent. Inequalities of soil or moisture supply are often shown in a striking manner in the growth of the plants.

Any sudden change of conditions of growth, such as checking the plants by drought or forcing them into very rapid development by heat and moisture, is likely to affect the quality of the fiber as well

as the yield. The crop is reduced by the shedding of floral buds and young bolls. Bolls that are farther advanced are not so likely to be shed, but they often fail to reach normal maturity and produce weak, inferior fiber. Thus, long and short fiber or strong and weak fiber are often to be found on the same plant.

Some varieties have a tendency to inequality in the length of lint, the fiber at the base of the seed often being much shorter than that at the top. This difference of length sometimes amounts to half an inch or even more, giving the so-called "butterfly" outline, when the fiber is combed out from the sides of the seed. This factor of inequality may be avoided by choosing varieties that do not have the undesirable butterfly tendency. The new Durango type of long-staple cotton is unusually free from this defect.

There are other factors of inequality in addition to the mixing of varieties or the failure to continue selection. A farmer who has planted pure seed may still have only inferior cotton if his soil is poor or his methods careless, either in raising or picking the crop, or if the fiber is damaged by rain during the harvest season. The condition of the cotton must be taken into account apart from the quality. Good cotton may be in bad condition, but poor cotton can not be made good by careful handling at the end of the season. The farmer who plants mixed seed can not produce uniform fiber, no matter how favorable the conditions or how careful the methods in other respects. Quality is best determined by field inspection, for any form of inequality can be detected in the field much more easily than in the bale.

ECONOMIC PECULIARITIES OF THE COTTON INDUSTRY.

Cotton differs from many other crops in that it can not be used on the farm or by retail consumers in the neighboring town. There is no possibility of the cotton grower dealing directly with an individual consumer of cotton, unless he should return to the manufacture of his own cloth, as in colonial times. The modern industry is organized on the basis of assembling a large quantity of fiber to supply a vast manufacturing establishment. As economy of production depends on this concentration of supplies, we may say that raw cotton has only a wholesale market. The retail market is not reached until the manufactured goods are distributed. Thus, the cotton crop is peculiarly dependent on its commercial environment, because the farmer has no alternative but to sell to the manufacturer or his representative, the cotton buyer. This absence of ordinary retail competition may be considered as a reason for the persistent demand for special legislation to control the marketing of cotton.

The economy and efficiency of the present system of concentration of manufacturing processes depends on the supply of suitable mate-

rials, and a regular supply must be maintained or the whole industrial and commercial structure falls. It may be too much to ask manufacturers to understand the agricultural factors of production, but at least the commercial factors might receive their attention, in view of the important differences between cotton and other crops. Unless the buyer represents the manufacturer to the extent of discriminating in favor of the fiber that the manufacturer wants, the farmer will also fail to discriminate; that is, he will neglect the precautions that are necessary to produce longer and more uniform fiber.

CONCLUSIONS.

The production of cotton of superior quality in the United States is influenced by methods of buying, as well as by the prices paid for the crop. Failure to use proper discrimination in buying encourages careless or dishonest mixing of varieties on the farm or at the gin and leads to deterioration and loss of uniformity, so that the market value of the product is soon destroyed. Long-staple cotton of superior quality could be grown to great advantage in many parts of the American cotton belt if the necessary care were taken to preserve the purity and uniformity of varieties. The natural conditions are favorable for the production of such cotton, and almost unlimited supplies could be grown if precautions against contamination and degeneration were observed.

Manufacturers have complained for many years that supplies of long-staple cotton were inadequate and uncertain, and the boll-weevil invasion has been supposed to jeopardize the very existence of the long-staple industry. But these dangers no longer threaten. New early-maturing varieties of long-staple cotton have been developed; also improved cultural methods that make it possible to produce good crops of long-staple cotton in many parts of the United States despite the presence of the boll weevil. The problem now is to induce the farmers to take the precautions that are necessary to maintain the uniformity of varieties, and the manufacturers who use the long-staple cottons have the key to this problem.

The prices that have ruled for the last few years have been high enough to stimulate the production of long-staple cotton, but the methods of buying have been too indiscriminate to lead the farmer to understand the necessity of maintaining the purity and uniformity of varieties. Little of permanent benefit can come from the development of superior varieties by the Department of Agriculture if the farmer is not led to appreciate the necessity of preserving such varieties after they are placed in his hands. As long as the buyers take inferior mixed fiber and pay as much for it as for the best and most uniform, the farmer can not be expected to observe the precautions that are necessary to maintain the purity and uniformity

of a variety of cotton, nor even to regard very highly the advice of the Department of Agriculture regarding the necessity of such precautions. More general planting of long-staple cottons can not be advised unless marketing conditions are improved.

Greater discrimination in buying would be the most effective way to encourage the production of long-staple cottons, by giving the farmer a more direct interest in maintaining the purity and uniformity of his crop as a means of securing the full market price. The present tendency to buy long-staple cotton at flat prices like short-staple cotton does not encourage greater care and discrimination on the part of the farmer, but encourages the opposite tendencies to carelessness, loss of uniformity of fiber, and degeneration of varieties. Accordingly, there may be urged upon manufacturers and others who are interested in the development of the long-staple cotton industry the importance of improving the methods of buying, so that greater discrimination may be used, instead of paying the same prices for mixed fiber as for fiber raised from pure stocks of seed.

Inspection of the cotton in the field affords a much better basis of judgment regarding the essential quality of uniformity than the present method of pulling samples from the bales. Field inspection should precede warehouse grading, especially with long-staple cottons. Familiarity with a variety of cotton makes it possible to recognize much smaller percentages of admixture or degeneration than can be detected in the bale, thus affording a greater degree of protection to the buyer and manufacturer and at the same time offering a greater inducement to the farmer to maintain the purity and uniformity of his cotton.

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