

The Production and Preparation of Raw Cotton for the Spinner.

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A. M. ALLEN,

Vice President and General Manager, Modern Gin and Compress Co.

LITTLE ROCK, ARKANSAS.

An Address delivered before The National Association of Cotton Manufacturers at its 97th Meeting, Hotel Aspinwall, Lenox, Mass.,

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SB 252
.A6

By transfer

FEB 3 1918



Am. S. Soc. 23, 15

THE PRODUCTION AND PREPARATION OF RAW COTTON FOR THE SPINNER.

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Compress Company, Little Rock, Arkansas.

In the production of cotton, the character of the raw material can, to a marked degree, be determined by the producer, but the knowledge on the part of the producer as to what staple and character of cotton gives the best results in the hands of the spinner is, generally speaking, very meagre.

The planter by cultivating a particular soil in the same way, perhaps, that he and his forefathers have treated the same soil for many years and in some cases for generations, obtains a bale of cotton which may sell above or below the bale of cotton produced by his neighbor, but which, to him, may appear to be practically the same cotton. He himself, however, is unable to make a comparison and determine the elements which make the one more valuable to the spinner than the other. He is not, therefore, equipped to work intelligently for the improvement of his raw material, the production of which he in most cases has chosen for his life business; in other words the planter is without full knowledge of the value of his cotton in terms of yarn. Without this knowledge, to a greater or less degree, the planter is not prepared to make much advance towards reducing the cost of production by increasing his yield and improving his staple and grade. Education along these lines is of importance to the spinner and any assistance rendered to the planter by the spinner will certainly bring profits to both.

When once the cotton has matured and split open the boll, no longer needed, it is then ready to start on its perilous journey

to the spinner, during which this delicate and valuable fibre is subjected to abusive treatment that subtracts from the value it possesses at this time, a sufficient number of millions of dollars every year, which, if employed in extending the spinning industry in America, should in ten years give to the United States the added capacity to manufacture her entire cotton crop.

The unnecessary waste of approximately \$100,000,000 annually is but an addition to the cost of production, ultimately paid by the planter. I use the term unnecessary waste, and do so advisedly, for the loss occasioned by the mutilation of the fibre in the process of ginning and compressing, in exposing the raw cotton to the elements, in dragging it through dirt, oil and deleterious solutions, in putting it in packages that force the cost of transportation far beyond that required, in putting the bales in such form as to invite disastrous fires, in clinging to a method of wrapping and a style of bale that most easily gives to the dishonest man the best opportunity to plate his bale, to water-pack his bale, to substitute old bagging and cheap foreign matter for cotton, all of which, I say, is unnecessary and costs more initially and throughout the entire process than it costs to prepare the cotton in such manner as to eliminate all the above items. The proof of this is found in the fact that it is now being done in a practical and commercial way in sufficient magnitude to make futile all arguments against it.

The enormous economic waste in the handling of this American cotton crop has been the subject of discussion for a generation by the planter and his organizations, by the transportation companies, the bankers, the insurance companies and the spinners, both in America and Europe, until our Government has awakened to a full realization of its magnitude and its uselessness, which, like some great disaster, imposes a loss felt by all our people and one which becomes a heavy tax, especially upon planter and spinner. The Agricultural Department is devoting great energy and skill to the education and training of the planter to aid him in increasing his yield and improving the character of his cotton.

The unsightly and carelessly packed American cotton bale as delivered to the European spinner, our best customer, and whose patronage has in a large degree contributed to the wealth and prosperity of this nation, has so discouraged him because of the seeming uselessness of his appeal for better methods, that within the past two or three years, more especially he has turned his attention with unusual vigor to the development of cotton growing territory in other portions of the world. We, the Americans, have sat idly by, smug in the belief that no other country on the globe could produce this valuable product in competition with us, blandly remaining blind to the fact that it requires only soil, sunshine, rain and industry to produce cotton. The rapid advance of the past few years in the acquirement of knowledge of how to build productive soils has shown us that no country has a monopoly on the production of the raw material which furnishes food and raiment for the human race.

The dream of the foreign spinner has been to free himself from the well nigh intolerable conditions imposed upon him by the American cotton interests. This is so apparent to the observing mind that "he who runs may read," and it is incumbent upon every loyal American to remove the hoodwink from his eyes and set himself to the task of so bettering the American cotton industry as to preserve our hold upon the trade and the foreign customer. To do this, we must deliver to him the raw material in such attractive condition as will make complaint unnecessary, and make strenuous effort to cultivate his good will as we seek to do in all other branches of trade. In view of the fact that we grow more than 65 per cent. of the world's cotton, is it not lamentably short-sighted in us to delay in adopting the most modern and up-to-date methods and machinery for producing and preparing this product for the market.

Our first study should be of the soil, seed and cultivation. What more important than the production in one district of one variety of cotton and that the best adapted to the particular soil, climate and conditions of that particular district? Our Government is doing splendid work along these lines and in some

cases local bankers and merchants are supplementing the work of government agents by offering substantial prizes for best results. If the spinners will add their quota of encouragement by recognizing the greater value of large quantities of the same grade and staple in one neighborhood by the prices which they pay for it, the planter will then have substantial inducement for bettering his grade and staple. Results will be obtained when the planter finds that it pays.

One of the most unfortunate obstacles in the procuring of a better grade of cotton is the custom in many local communities of paying practically the same price for all cotton. The planter, being unable to class his own cotton, discovers, however, that his neighbor who neither selects his seed nor cultivates with care, and who picks his cotton, gathering with it the bolls and trash, sells his cotton for practically the same price for which he is selling his carefully selected, well cultivated and clean picked cotton. The local buyer makes no discrimination, either because he is not a judge of cotton, or because the low grades thus help to hold down the local market. While he may occasionally buy a low grade bale for more than it is worth, he is generally able to buy the high grades for much less than they are worth.

The remedy for this would seem to be the establishment of neighborhood classing stations under the direction of state or government agents by which the planter could obtain from reliable disinterested sources some knowledge of the spinning value of his cotton. This would serve the double purpose of giving the planter an idea of the value of his cotton and enable him to compare the results obtained from different methods of cultivation and different varieties of seed.

After the cotton is picked, demonstrations have shown that it can be greatly improved if, prior to ginning, it is placed in a closed bin and allowed to warm just short of over-heating. This results in a hot-house growth of the immature fibres, while all the fibres take up a little more oil, giving the strength and character so much desired by the spinner. Actual results by this treatment have shown an added market value of from one-half cent to one and one-sixteenth cents per pound.

We dream of a mechanical picker that will gather the crop free from trash. The genius of the world is, I believe, approaching a solution of this problem and a mechanical picker will be produced which will pick the cotton clean and at a material reduction in cost from that of hand picking, which is the most expensive operation in the entire process of preparing cotton for market.

Ginning is the first real torture to which the cotton is subjected. The saw gin is by far the most practical of all machines yet produced for separating the seed and the fibre. To realize that this process consists in forming the seed cotton into a roll resembling a wooden log, then holding it against a gang of saws upon a mandrel usually composed of seventy or eighty sharp-toothed saws, ten or twelve inches in diameter, running at a speed of four hundred revolutions per minute, is but to wonder how a single fibre can escape mutilation and reach the spinner whole, yet a saw gin so constructed that the relation of the saw tooth and rib at the point where the fibre and seed are separated is such that the fibres are in reality pulled from the seed instead of being separated by a shearing cut, will in the hands of an expert separate the fibre from the seed, unscarified and practically its full length. In the hands of the unskilful, the saw gin is the most destructive agency used in the preparation of the raw material, not excepting the rapid steam compress to which we will refer later.

A very large per cent. of all cotton bolls contain one or more small immature seed, which, in ginning, are carried through the ribs with the lint cotton, but these, with other trash heavier than the lint, are largely thrown from the cotton by centrifugal force after passing through the ribs. In those gins using a brush to doff the cotton from the saws, these imperfect seed and other trash are again mixed with the fibre and pass into the cotton bale, to be removed again at the spinning mill, thus reducing the value of the cotton as offered to the spinner. By substituting an air-blast to remove the cotton from the saws and providing means for collecting the motes and trash after

once they are separated, the cotton can thus be cleaned in the process of ginning. Practical machines are now in operation doing this work successfully.

The air-blast system which handles the seed cotton from the planter's wagon or the seed cotton house to the feeders, the gins and into the bale box, has much to commend it from the standpoint of the spinner. The cotton being subjected in thin sheets to a blast of air throughout the process loses much of its moisture; the fibres in passing from the saws to the condenser are straightened out and with a proper condenser are formed into a bat which, if pressed closely by passing between rollers, can be laid in the bale in layers, instead of dumping in uneven wads to be still further punished under the powerful compress.

Upon reaching the initial bale box, the treatment which has brought disgrace on the American cotton industry begins. If a steam tamper is used over the initial bale box to pack the cotton, every pound of water from the condensed steam which escapes from the steam cylinder drips to the centre of the bale, giving what is known as the water packed bale. As the sale of water at the price of cotton is alluring, the addition of forty to eighty pounds of water which cannot be detected except by laboratory test is some inducement to be careless about a leaking steam cylinder. This, with the storing of loose bales on open platforms at the ginners to absorb still more moisture from heavy dews and rains, amounts to a fraud which has taken from the spinners annually many millions of dollars, as shown by your Secretary's report of last year.

I wish to say, however, that adding water to cotton bales is not limited to America. While in Havre last year and passing through well filled cotton warehouses, I saw men everywhere throwing streams of water on the dirt floors, ostensibly to lay the dust, but in reality to throw tons of water into the warehouse to be absorbed by the cotton stored there. I concluded this was one way of restoring to the bale the weight of large samples which many bales seemed to have given up. I am not attempting to cast reflection on any one or on any class in the

cotton trade, but am simply calling attention to customs which result in enormous waste which is a final tax on production. Practical machines are in use which eliminate and make almost impossible these abuses. The roller folder or dry packer eliminates the steam tamper. A mechanical device which draws a perfect sample throughout the bale as the bale is being formed makes unnecessary, under proper organization, the future sampling of the bale. The use of a light weight closely woven burlap to entirely cover the bale will absorb much less water than the heavy coarse woven bagging in general use, and gin compression makes unnecessary open uncovered warehouses.

The mechanical sampler in connection with the gin compress furnishes the most perfect sample that can be drawn from a bale for it is a complete cross section of the bale. In my own experience, I have had no difficulty in making the one sample serve as the only one extracted from the bale in its transmission from the gin to the spinner. An 8-ounce sample from each of 15,000,000 bales amounts in the aggregate to 15,000 bales, worth at 12 cents a pound, \$900,000. Is this not quite enough to pay for establishing the character of the cotton crop? Certainly three or four or five times this amount is too much.

The last step in the preparation of the cotton for the spinner and the last mechanical operation through which it passes is one demanded by the transportation companies, viz., compressing. The introduction of the rapid steam compress has made millions of dollars for those who have owned and operated them, but they have cost the cotton industry millions upon millions in loss and damage from the unsightly bale, but more especially from the air cutting and mutilation of the fibre. Some knowledge of the fibre and a glance at the operation of the rapid press furnishes convincing proof of these facts. Compressing cotton is merely pressing the air out of the bale. The steam compress is designed to instantly drive out the air by dropping upon a 500 pound bale 2,000 tons, equivalent to the weight of a railroad train of fifty cars, allowing forty tons for each car and load. This smashes the bale instantly to a density

of sixty to seventy pounds to the cubic foot, when with the ordinary bale the jaws of the press are ten inches apart. That is twice the density of pine wood. The air as the bale reaches the high density must cut its way through the bale to escape, which it continues to do, until the density of the cotton prevents it, then the air remaining is compressed inside the bale, but expands when the bale is thrown from the jaws of the press. Much of the cotton heretofore called "gin cut" is in reality "air cut," the inside of many bales when opened having the appearance of being slashed in many directions with a sharp knife. In striking contrast to the brutal treatment accorded the cotton fibre by the rapid steam compress is the work of the gin compress, in which the power is applied slowly giving the air opportunity to escape from the interior of the bale without injury to the fibre and securing the required density without compressing to a density much beyond that of the bale after it is thrown out of the press. Five hundred tons so applied to a bale of the dimensions of two feet by two feet by four feet, will enable the bale to be tied out with a density of thirty-two pounds to the cubic foot, or about the density of pine wood. If the bale is then bound with bands, slotted in the ends and fastened with rivet hooks, as in the Egyptian bale, for example, the bale will not only retain its size and shape but it will be practically a fire-proof bale, charring on the outside very much as a log of wood. There being no air in the bale and the bands being riveted so they cannot yield, the density of the bales remains unchanged and the fire does not burrow into the cotton.

What then is the ideal commercial cotton bale? My answer would be, 1st, a bale completely covered; 2d, uniform size for all bales; 3d, exact equal weight of tare on all bales; 4th, a bale that samples easily, if sampling is necessary.

Such a bale is possible only when made at the gin where the bale is formed and compressed in one operation. Uniformity in size of bales makes possible the cutting of all covering the same size and all bands the same length, resulting in uniform weight of tare. In my own practice, I have found that bales

made twice the length of the square store with the greatest economy of space. For example the bale two feet by two feet by four feet will load 100 bales or 50,000 pounds to the standard 34 or 36-foot car, and will load in two layers. Five pounds of closely woven burlap is sufficient to completely cover this bale while six bands fastened with riveted hooks are ample, making a total tare of 11 pounds. These bales are formed in the initial bale box by placing the cotton in layers, which not only separate easily when opened up in the picker room, but make sampling of the bale easy when that is desirable.

A careful calculation of the train cost of handling the entire cotton crop, loaded at the gin with 100 bales, or 50,000 pounds to the car, as compared to the custom of loading 25 bales at the gin, transporting to the compress, unloading, repressing, reloading and forwarding shows a saving to the railroads of 5 per cent. on more than \$200,000,000 annually; this is 5 per cent. on more than one-half the cost of the Panama Canal, a princely contribution from the cotton carrying railroads toward the maintenance of a system that has brought disgrace upon the most important of all the export industries of the United States. The adoption of modern methods and gin compression would bring to the railway companies the saving of this vast sum without a dollar of investment on their part. I shall be glad to furnish detailed figures in support of this statement to those who may be interested.

The arguments against gin compression thus far made have been fully and completely refuted by actual facts and practical experience. There is no longer a commercial or economic reason for postponing the adoption of gin compression and modern methods. The machinery of various makes are at hand and at small cost.

The spinner can bring about the needed reforms by paying the market value for the good bale and penalizing the bad bale at least for as much as the actual commercial difference in their respective values.

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