THE EFFECT OF THE STANDARD DENSITY GIN PRESS
ON MARKETING ARIZONA COTTON

by

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FIGURE I

STANDARD DENSITY COTTON BALES[1]

Typical Low Density Bales Repressed to Standard Density at a Compress

Bales Pressed to Standard Density at a Gin

1. Photographs courtesy of Scott Hathorn, Jr., Associate Agricultural Economist, University of Arizona.

INTRODUCTION

The competitive position of United States cotton in the world fiber market has changed considerably in recent years. Although improved cultural practices have greatly increased the yield and improved methods have reduced growing and harvesting costs, the competitive position of cotton with other fibers is weakening. New and improved synthetic fibers suitable for many uses are gradually absorbing markets formerly enjoyed by cotton. World cotton production has increased in recent years by the entry of new producing countries (notably Brazil) into the market and by increased production in old cotton producing areas.

America is finding it increasingly difficult to compete with other countries in the world cotton market. A reduced export market will create burdensome problems of distribution and production adjustment in the United States.

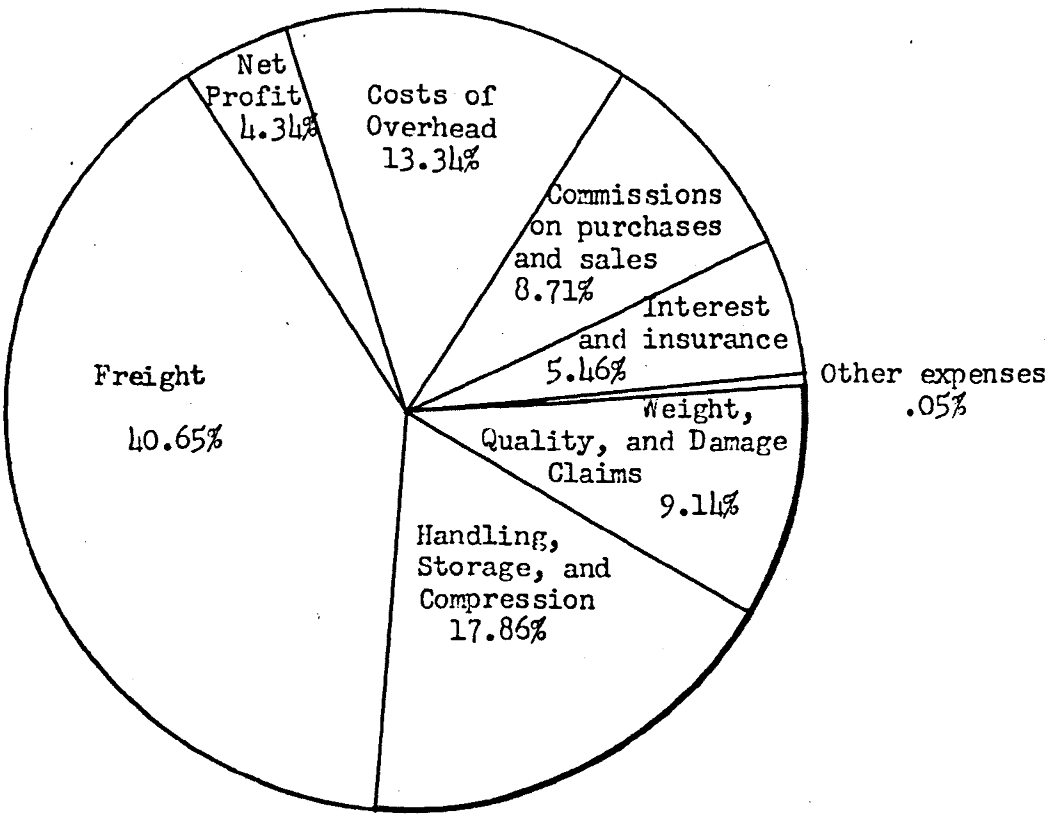
At a time when cotton is losing a portion of the domestic market to synthetic fibers and when it is faced with a declining export market, it is imperative that the competitive position of cotton be improved through lower production costs, improved quality of fiber, and reduced marketing costs.

If the cotton producer and the cotton consumer are to receive maximum benefit, the marketing cost spread between them must be minimized. It was not possible to figure the spread between the grower and consumer, but figures showing the spread between the farmer and the mill were available. In the trade, this spread is referred to as the cost of merchandising raw cotton. This spread alone amounts to about ten percent of the farm value of cotton. The total cost of marketing cotton would absorb a much larger percentage of the farm value.

The items that constitute the cost of merchandising cotton are shown in Figure II.

FIGURE II

THE COST OF MERCHANDISING COTTON



There is some possibility of reducing most of these expenses through improved marketing practices. Some reduction in overhead costs and commissions could be brought about by direct marketing. The most promising areas for reduction in marketing costs, however, are in handling, compression and storage, and weight, quality, and damage claims which comprise 27 percent of the merchandising cost.

If United States merchants are to compete most successfully on the world market, packaging methods should compare favorably with those of foreign competitors. The American cotton bale definitely lags in this respect. The condition of typical shipments of American and West African cotton upon arrival at English warehouses in Liverpool is shown in Figure III. Note the neatly packed bales from West Africa in contrast to the poorly packed cotton from the United States.

Cotton lint has always been difficult to handle and present methods are a result of a long period of experimentation. These methods have evolved in the form of many small modifications rather than definite, abrupt changes. Cotton was first packaged in long bags holding about 300 pounds. Later wooden screw presses and iron screw presses were used to press out the first cotton bales. These screw type presses have now been replaced with various types of hydraulic presses now in use.

As it became evident that the gin presses did not pack the cotton tight enough for economical shipment, compresses were built at warehouses throughout the cotton growing region. These compresses repress the cotton from a density of 12 pounds/cubic foot to 23 pounds/cubic foot for rail shipment and 32 pounds/cubic foot for ocean shipment.

Cotton packaging methods and materials used have been criticized for years. Proposed modifications have met and continue to meet strong objections from the interests affected because large investments in present equipment and facilities as well as the inertia on the part of the trade make changes in established customs difficult.

FIGURE III

COTTON STORED IN AN ENGLISH WAREHOUSE[1]

A Shipment of Cotton from West Africa

A Shipment of United States Cotton

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1. Photographs courtesy of P.K.Norris, Agricultural Economist, United States Department of Agriculture, Office of Foreign Agricultural Relations.

The costs involved in the physical handling of cotton moving from the gin to the mill make up a large part of the cost of marketing. Much of the criticism of the cotton industry is directed at the condition of the bales upon arrival at consuming points. This being the case, any reduction in cost and improvement in cotton packaging will be of significant economic importance.

Standard density compression at the gin offers a possible improvement in cotton packaging and handling. In a later section its suitability and the costs involved will be analyzed in detail to determine the feasibility of gin compression under Arizona conditions.

The problem to which this study is directed is to determine what effect installation of standard density gin presses will have on cotton marketing costs.

Specific objectives are as follows:

1. To study the present system of marketing Arizona cotton to determine (a) packaging and handling practices, (b) present packaging costs, and (c) possible weaknesses in the present system.

2. To determine the probable effect of standard density gin compression on (a) packaging and handling practices and (b) packaging costs.

3. To compare 1 and 2 above to determine the economic feasibility of standard density gin compression.

Data and materials used in this study were collected by:

1. Personal interviews with various members of the cotton trade.

2. Correspondence with gin manufacturing companies and others in the trade.

3. Reference sources in the library.

The following plan will be used in this study. First, relevant handling and packaging practices used in Arizona will be analyzed and from this analysis weakness in the present system will become apparent. Second, improvements that can be made in marketing practices will be discussed and then the standard density gin press will be considered in detail as a possible solution to some of the packaging and handling problems. This analysis should reveal the economic feasibility and the suitability of the standard density gin press as a possible means of reducing marketing costs and improving packaging.

ANALYSIS OF MARKETING PRACTICES

Packaging

Arizona cotton gins use up-packing hydraulic presses which make a low density bale weighing about 500 pounds. It has a density of approximately 12 pounds per cubic foot and dimensions as follows: length, 56 inches; width, 28 inches; and thickness, 45 inches. The bale is covered with two 45" x 108" pieces of jute bagging and bound with six 1 1/2 pound steel bands 138 inches long. The total weight of this tare, which is 21 pounds, meets the allowance granted under current trade practices. All Arizona cotton is sold on a gross weight basis.

At the compress the cotton is pressed to standard density for rail shipment or high density for ocean shipment.[1] Each bale is placed in a small press for removal of the bands and the bagging is secured with wire hooks to keep the bale from coming apart.[2] Next, the bale is put into the main press and pressed either to standard or high density, depending on its destination.

The same jute bagging is re-used for covering. Standard density bales are bound with eight 114-inch ties. The six ties from the gin

1. In pre-war years much of the Arizona cotton crop was sold in Japan. At the present time most of it goes to Eastern or gulf points. Since it is impossible to foretell where the future markets will be, the present markets will be used as a basis whenever market areas are considered in the report.

2. Arizona has two cotton compresses, both located in Phoenix. The Arizona Compress Company is an independent firm and the Western Cotton Products Compress is a subsidiary of Anderson and Clayton Company, cotton merchants with world wide interests.

bale are re-used by cutting them off to the shorter length and splicing the discarded ends together to make the two additional ones needed. Thus, compress men figure on putting out the standard density bale without buying additional ties.[1] The procedure is the same for high density bales except nine bands, 90 inches long, are used to tie the bales.

Transportation and Handling

In Arizona most of the gins ship their cotton to the compress by rail. This is generally less expensive than truck transport because a through rate applies (all the way) from the gin to the final destination. At other gins in the state where railroads are relatively farther away it is more convenient and economical to truck the cotton to the compress.

Bales are unloaded at the compress to await sorting and assembling. When orders arrive, the cotton is assembled in suitable lots and compressed to the desired density for shipment to its destination.

Storage

A charge for storage in the gin yard for a usual period of 20 days is included in the ginning charges and an additional charge is made on cotton left in the gin yard beyond that time. Arizona gins charge an average of 2 cents per bale per day for storage and insurance.

The compress performs an important storage function during the time necessary to accumulate large lots of cotton of even running quality. To meet various orders, buyers often have to buy odd lots of cotton from several gins. These are then assembled at the compress where they are

1. W. A. West, Manager, Arizona Compress and Warehouse Company.

sorted into various qualities to meet individual orders. The compress storage charges are 30 cents per bale for each month or fraction thereof on low density bales. On standard or high density bales the charge is 28 cents.[1] On bales not compressed, a "delivery charge" is made in addition to the costs of handling and storage.

Some of the large buyers ship the cotton to gulf and delta points such as Galveston or Memphis. At these points lots are made up of both local rain grown and Arizona irrigated cotton for shipment to the consuming centers. Cotton placed in storage under the government loan program may also be stored at these points. Cotton is not stored over extended periods in Arizona.

Grading and Sampling

The Federal Government operates a cotton classing office in Phoenix which provides free classing service. It is the usual practice for ginners to send samples from each bale as it is ginned to the classing office. It is classed for grade and staple length and a card containing this information is returned to the gin. In past years buyers, mills, and other interested persons have done their own classing. For the most part, this practice still prevails even with the additional service now offered by the government.

The method of sampling used almost universally is simple, direct, often unrepresentative, and always wasteful. It consists simply of cutting into the side of the bale at a random point and pulling out a handful of lint. This may occur any number of times as the bale changes ownership.

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1. Arizona Compress and Warehouse Company, Warehouse Tariff No. 10.

As a general rule, cotton is sampled each time it changes ownership and this practice of multiple sampling not only is wasteful but it also gives American cotton bales a very displeasing appearance. (See Figure IV.)

FIGURE IV

COTTON BALE SAMPLED 15 TIMES BEFORE EXPORT FROM NEW ORLEANS[1]

1. P. K. Norris, Agricultural Economist, United States Department of Agriculture, Office of Foreign Agricultural Relations.

appearance and neatness of the product receives attention as a selling point. Certainly the cotton industry could also profit by offering its product for sale in a more desirable package.

THE NEED FOR IMPROVED PRACTICES

The need for improved practices can be broken down into several distinct problems.

1. Due to duplication and excessive operations, handling expense is an important factor. Before cotton finally gets on its way to the mills it must be loaded on trucks or freight cars and taken to the compress. There it is unloaded, sorted, compressed and reloaded again. Much of the time Arizona cotton is shipped to storage points in the south where the unloading and loading cycle is repeated. Thus handling makes up a considerable part of the marketing cost.

2. Transportation costs could be reduced by more direct methods of marketing. In many cases the cotton goes from a rail point near the gin to the compress, then back over the same route on the way to market. Whether by truck or rail, there is extra expense to shipping cotton by a roundabout route in order to pass it through a compress. The short hauls to the compress are further complicated by the bulky nature of the low density gin bales.

3. Waste and damage enroute should be reduced. This can be attributed to two causes: poorly pressed bales not adequately covered or securely bound, and the trade practice of cutting the bales for samples. Sampling frequently occurs from one to six or more times, depending upon the number of times the bale changes ownership. Cotton merchants figure these losses in their basis and for the most part, they ultimately accrue to the grower.

4. The appearance of the bale can be improved. In every industry the

IMPROVEMENTS IN MARKETING PRACTICES

Reduced Handling Costs in the Marketing Channels

The charges incident to handling at the compress and the excessive duplication of the prevailing weighing and sampling practices constitute a large part of the handling costs.

Overweight bales often necessitate rehandling. This is also true of big ended and rolling bales and other cases of irregular packing. Since these irregular bales may cut the bagging and break the ties, considerable time is spent at the compress in reconditioning such bales before they may be satisfactorily repressed to higher density. This lack of weight and size standardization presents a definite problem and results in much unnecessary handling expense. Careful handling by all concerned could eliminate such difficulties.

Preventing Damage and Losses

This is essentially a problem of an adequately protected bale. Damage and losses result from three things: (1) carelessness at the gin or compress, (2) the trade practice of multiple sampling and (3) the lack of appropriate bale covering.

Cotton bales pass through the compress at a rather rapid rate. Most of them come out in relatively good shape but many do not. They may need reworking because a ginner has packed them unevenly. If these bales are shipped without reworking they are very likely to arrive at their destination with broken ties resulting in loss or damage to the lint. Others may have large areas of lint exposed as a result of sample cutting. Even though the sample holes are not patched they can be closed in such a way that exposure of the lint in minimized.[1] Some bales leave the compress with the ties misplaced. Even spacing of the ties eliminates uneven pressures and reduces the possibility of breakage.

Undoubtedly the greater part of the losses occurring in transit are, directly or indirectly, results of the present sampling practices. Ragged sample holes in the bagging constitute a fire hazard; they offer a place for dirt and other foreign matter to collect; they contribute to slipping ties; they sometimes cause much lint to be lost from the bale.

Automatic sampling equipment for gins has been developed.[2] If this were adopted, together with a system of bale identification, the sampling problem and its associated losses could be eliminated.

Inadequate bale covering may cause losses due to an accumulation of foreign matter in the exposed surfaces of the bale. At the speed the compress must operate it is usually difficult to place the bagging for maximum protection. In Arizona open weave jute bagging is used exclusively. Probably the finer types of burlap or cotton bagging offer better protection.

It has been demonstrated that lighter weight tare will maintain and protect the bales as well or better than the heavier materials in general use today. For example, the use of wire ties instead of steel bands would

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1. Although patching service is available at most warehouses, sample holes often go unpatched.

2. The United States Department of Agriculture has developed an automatic sampling device which attaches to the lint flue. An airfoil swing valve opens automatically at intervals to divert a small amount of lint into the sample box. This occurs six times during the ginning of a bale of cotton to secure a representative sample.

reduce both the shipping weight of the bale and the amount of steel in the ties by several pounds. This offers a possible two-way saving. The adoption of net weight trading would do much to encourage such changes.

It is evident that improved practices by growers, ginners, compress men, and merchants could result in large savings and a better market for any cotton producing region where they were adopted. But established custom and conflicting interests make progress difficult. From the standpoint of reducing marketing costs and improving packaging, compression of cotton to standard density at the gin in a manner that will meet all domestic needs, offers a very promising marketing improvement.

THE STANDARD DENSITY GIN PRESS
AN IMPROVEMENT IN MARKETING COTTON

Suitability

In this section the suitability of the standard density gin press from the standpoint of (a) handling, transportation, and storage, (b) mill requirements, and (c) engineering design features, will be considered in detail.

Handling, Transportation, and Storage: Cotton bales pressed to standard density at the gin are always more uniform in shape than those pressed to standard density at a compress. Compress bales are sometimes rolling or otherwise irregularly shaped which makes handling difficult. Freight car loading can be simplified and loading time reduced on uniformly shaped bales that always fit into place. Gin compressed bales have flat heads which permit end to end storage. Due to their rounded heads, compress bales will seldom, if ever, stack end to end without being supported.

When gin fires occur, the burning cotton sometimes gets into the bale. Such bales create a nuisance as there is always the possibility of the fire breaking out later. The United States Cotton Ginning Laboratory at Stoneville, Mississippi, reports that no bales fires have occurred in standard density bales as a result of gin fires.[1] Indications are that the extra pressure effectively extinguishes the burning lint.

In contrast to compress bales on which the bagging is often poorly placed and not securely sewn at the ends, bagging can be properly placed

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1. J. W. Wright et. al., The Packaging of American Cotton and Methods for Improvement, United States Department of Agriculture Circular #736.

and well secured on bales pressed to standard density at gins with little or no additional effort. Except for sample cuts, standard density gin bales will remain well covered and protected to their destination.

Standard density gin bales have approximately the same dimensions as those pressed at a compress but they occupy slightly less space due to their more uniform shape. Car loading minimums can be met with gin pressed bales at a density of 22 pounds per square foot. A slightly higher density may be required in the case of irregular shaped compress bales.

As long as the present method of sampling is practiced, provision must be made for cutting samples from the bale. Proper arrangement of the ties allows sampling as usual from the gin compressed bale.

Processing at the Mill: When cotton is opened at the mill the bale is placed in the same position as when it was pressed to allow upward expansion when the tare is removed. In this position the narrow (22 inches wide) gin compressed bale requires considerably less floor space than the recompressed standard density bale (30 to 32 inches wide). Thus the gin compressed bale is somewhat more convenient to handle.

Before the lint can be processed further, it must be thoroughly fluffed out. In this connection the low density bales are, of course, the easiest to handle. In compress operations the bales are "killed" with excessive pressure which is partially released after the bands are applied. This results in a loss of resiliency and adds to the need for fluffing out the lint. Cotton pressed to standard density at the gin is not killed and can, therefore, be more easily processed.

If low density or recompressed standard density bales are pressed to high density for ocean shipment, considerable side pressure is required to reduce the width. This results in the formation of hard-packed creases in the bale. In the narrow width gin compressed bale these creases do not occur. Creases greatly increase the length of time required in the fluffing out process.

Uniformity tests show that the standard density gin bale takes dye better than the standard density compress bale. This is believed to result from the greater resiliency of the gin pressed bale.[1]

To obtain uniform yarn size, changes in machinery settings are required for lint pressed to different densities. This precludes mixing lint from different density bales. Tests have shown that standard density gin and compress bales may be run together without any changes in the required settings. In all other respects the gin compressed cotton and that pressed at a compress perform equally well.

Engineering Design Features: When standard density pressing equipment is installed, the best operating features consistent with reasonable costs are the engineering objective. Tests made by the United States Cotton Ginning Laboratory and the various manufacturers indicate that a press box 20 inches wide by 54 inches long is most satisfactory.[2] This size is most suitable for several reasons which will be discussed briefly.

As standard density gin presses will handle only a small part of the crop during the next few years, it is desirable that they retain the same general bale dimensions as the usual compress bales. Any radical departures would render them difficult to handle in the marketing channels. The

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1. Tests conducted by the United States Department of Agriculture Cotton Ginning Laboratory, J. W. Wright, op. cit., p. 45.

2. The Lummus Cotton Gin Company is an exception. They use a 20 x 50 inch box which presses a 500 pound standard density bale 36 inches thick.

following table shows approximate dimensions of low density bales, standard density gin bales, and standard density compress bales, all having the standard 500 pound weight.

TABLE I

DIMENSIONS OF DIFFERENT TYPES OF COTTON BALES

	Weight (pounds)	Length (inches)	Width (inches)	Thickness (inches)
Gin - low density	500	56	28	45
Gin - standard density	500	56	22	32
Compress - standard density	500	56	32	22

Examination of the table shows that the standard density gin bale has the same dimensions as the standard density compress bale although achieved in a different way. If the width of the standard density gin press remained the same as that of the low density bale no changes in the tramper would be required. However, other more important economies preclude this possibility.

When changing to standard density equipment, the low density hydraulic system may be modified and used if maximum working pressures are not exceeded. Pressures required for low density pressing run up to about 1400 pounds per square inch while a standard density press of the same dimensions would require up to 4000 pounds per square inch. Pressures required for a 20 x 54 inch standard density box reach a maximum of about 2200 pounds per square inch, which in most cases falls within the working pressure limits of the low density system.[1] Fittings designed for 2600 pounds

1. J. W. Wright, *op. cit.*, p. 30.

per square inch pressures would be safe for use with this size press box.

The standard density press uses three 9 1/2 inch rams with a 90 inch stroke instead of the smaller single ram used with the low density press. These are necessary to keep down working pressure and pressing time.

In order to keep down the pressing time, existing power and pump capacity will usually have to be increased. If the existing pump is in good condition, the increased volume can be attained most economically by installing an additional pump. Most Arizona gins use from 15 to 20 horsepower to drive the hydraulic pump. In cases of low ginning volume this power may be sufficient; however, a larger pump and a 25 horsepower motor should be used to assure enough volume for rapid pressing in five or six stand gins. Probably the best arrangement would be an additional pump with an additional 15 horsepower motor to operate it as recommended by the Continental Gin Company.[1] With this installation a pressing and tying-out time of about five or six minutes should be possible.

All standard density presses manufactured today come complete with the tramper included. There is, of course, the possibility of rebuilding other presses or buying only part of the installation. In such cases the existing tramper can be used by reducing the width of the pressing block and altering the lint slide and cutoff gate to fit the smaller box.[2] General specifications are given in Appendix A.

Cost Analysis

Initial Cost: New standard density presses with all necessary equipment

1. Continental Gin Company, Dallas, Texas, letter of November 5, 1948.

2. For those interested in low density conversions a discussion is given in the United States Department of Agriculture Circular No. 733, Standard Density Cotton Gin Presses, August, 1945.

cost about $15,000, f.o.b. factory.[1] Freight from Dallas, Texas, the closest manufacturer, is approximately $1,000 on 36,000 pounds. Installation costs vary, depending on gin construction, labor costs, and facilities available at the gin. Estimates from manufacturers vary considerably since relatively few installations have been made in this country. One Texas ginner reports his installation cost on a new standard density press last year was $1,250.[2] Necessary labor should not exceed 400 man hours.

Standard density presses are sold complete with tramper and three hydraulic rams. In most gins hydraulic pumps designed for use with the single ram low density press have inadequate capacity. The most satisfactory way to provide pumping capacity in such cases is to buy an additional pump and a 15 horsepower motor to drive it.

There is a possibility of some resale value for old presses replaced with new standard density installations. In any case they will have some salvage value which will reduce somewhat the cost of installing new equipment where replacements are made.

Operating Costs: A comparison of the estimated costs of pressing cotton to standard density and low density with subsequent recompression at a compress is made in Table II, page 23. The breakdown of ginning volumes is based on the bales ginned by Arizona gins during the 1947-48 season.[3]

Because of the larger investment, interest and depreciation are greater on the standard density gin press than on the low density press. Also, there is an increase in power consumption. These result in an increased

1. The following estimates are based on letters from several manufacturers and ginners. Since these costs are continually changing, they cannot be determined exactly.

2. W. G. White, Lamesa, Texas, letter of April 2, 1949.

3. Refer to Appendix B-1.

cost to ginners for standard density pressing varying from $.63 per bale at an annual gin volume of 1500 bales to $.08 per bale at a volume of 12,500 bales.

The current compression rate at Phoenix is $1.40 per bale. By subtracting the increased cost to ginners for standard density gin compression from the prevailing compression charges, the actual savings can be determined. Net savings from standard density compression at the gin vary from $.77 per bale for a gin volume of 1500 bales to $1.32 for a gin volume of 12,500 bales.

The cost of packaging the bale, complete and ready for shipment, is given in Table III, page 24. The packaging cost for gin pressed standard density bales is compared with the costs under existing methods of packaging.

The increased cost to the ginner for packaging the bale varies from $.55 at an annual ginning volume of 1500 bales to $.01 per bale at a volume of 12,500 bales. Actual net savings per bale range from $.84 to $1.39 for gin volumes varying from 1500 to 12,500 bales annually.

Thus far the costs discussed apply only to new gin equipment. There is, of course, the possibility of replacing a currently operating low density press that has not been fully depreciated. An indication of the possible savings that could be made by replacing a low density press with half its life remaining with a new standard density press is given in Table IV, page 25. In this case the pressing cost is increased by the amount necessary to write off the old press and install the new one. The adjusted net savings vary from $.18 at a 1500 bale volume to $1.25 at a 12,500 bale volume.

Since the standard density bale can be handled by the same crew as the usual low density bale, there is no increased labor cost associated with the change. The increased operating expense is due to the added power requirements and slightly higher maintenance costs required to operate the standard density press.

T[illegible]E II

ESTIMATED COSTS OF PRESSING COTTON TO STANDARD DENSITY (22-[illegible] pounds per cubic foot) AT GINS IN COMPARISON WITH COSTS OF PRESSING TO LOW DENSITY (11-15 pounds per cubic foot) AT GINS [illegible] SUBSEQUENT COMPRESSION TO STANDARD DENSITY AT COMPRESSES

Item	Cost of pressi[illegible]n cents per bale at gins with annual volume (bales) of											
	1500	2500	350[illegible]	4500	5500	6500	7500	8500	9500	10,500	11,500	12,500
Standard density pressing at gins:												
Gin fixed costs:												
Depreciation (8 1/3% or $1,277 per year)[1]	85.13	51.08	36.[illegible]	28.38	23.22	19.65	17.03	15.02	13.44	12.16	11.10	10.22
Interest on average investment ($383 per year)[2]	25.53	15.32	10.[illegible]	8.51	6.96	5.89	5.11	4.51	4.03	3.65	3.33	3.06
Total	110.66	66.40	47.[illegible]	36.89	30.18	25.54	22.14	19.53	17.47	15.81	14.43	13.28
Power costs[3]	3.43	2.57	2.[illegible]	1.97	1.78	1.65	1.55	1.48	1.39	1.33	1.27	1.23
Additional power cost to gin a bale equipped with a standard density press[4]	0.88	0.57	0.[illegible]	0.72	0.32	0.28	0.13	0.25	0.19	0.22	0.15	0.16
Press maintenance and repair	1.50	1.50	1.[illegible]	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Total	116.47	71.04	51.[illegible]	41.08	33.78	28.97	25.32	22.76	20.55	18.86	17.35	16.17
Low density pressing at gins and compression to standard density at compresses:												
Gin fixed costs:												
Depreciation (8 1/3% or $586 per year)[1]	39.07	23.44	16.[illegible]	13.02	10.65	9.02	7.81	6.89	6.17	5.58	5.10	4.69
Interest on average investment ($175.80 per year)[2]	11.72	7.03	5.[illegible]	3.91	3.20	2.70	2.34	2.07	1.85	1.67	1.53	1.41
Total	50.79	30.47	21.[illegible]	16.93	13.85	11.72	10.15	8.96	8.02	7.25	6.63	6.10
Power costs[3]	1.91	1.44	1.[illegible]	1.09	1.00	.93	.88	.83	.78	.75	.72	.69
Press maintenance and repairs	1.00	1.00	1.[illegible]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total	53.70	32.91	23.[illegible]	19.02	15.85	13.65	12.03	10.79	9.80	9.00	8.35	7.79
Compression[5]	140.00	140.00	140.[illegible]	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
Total	193.70	172.91	163.[illegible]	159.02	155.85	153.65	152.03	150.79	149.80	149.00	148.35	147.79
Increased costs to ginners for standard density pressing at gins	62.77	38.13	27.[illegible]	22.06	17.93	15.32	13.29	11.97	10.75	9.86	9.00	8.38
Net savings from standard density pressing at gins	77.23	101.87	112.[illegible]	117.94	122.07	124.68	126.71	128.03	129.25	130.14	131.00	131.62

1. The cost of a new low density gin press including tramper is $7,032 a[illegible] [illegible]e cost of a new standard density press including tramper is $14,140. The additional pump and 15 h.p. motor required costs $1,183, making a total cost of $15,323 f[illegible] [illegible]andard density equipment. The life of each press is estimated at 12 years and depreciation was computed at a rate of 8 1/3 percent annually. These prices are f.[illegible] [illegible]factory and do not include installation costs.

2. Average investment in the low density gin press is $3,516 and in the [illegible] [illegible]ard density press, $7,660. Interest was computed at the rate of 5 percent per year on the average investment.

3. The average energy consumed per bale by the press pump and tramper in [illegible] [illegible]ating the standard density gin press is 1.06 kilowatt hours as compared with 0.60 kilowatt hours for a low density press. Power costs were based on the consumption [illegible] [illegible]0 kilowatt hours per bale in driving the gin machinery and a low density press and 20.46 kilowatt hours per bale in driving the gin machinery and a standard density gi[illegible] [illegible]ss. The following rate schedule was used in computing power costs: (1) Service charge per meter - $.50 per month per horsepower of demand but not less than $[illegible] [illegible] year per horsepower of connected load: (2) Energy charge per meter - first 1,000 K.W.H. in month at $.020 per K.W.H., next 100 K.W.H. per horsepower of demand [illegible] [illegible]012 per K.W.H., next 100 K.W.H. per horsepower of demand at $.008 per K.W.H., and all excess K.W.H. in month at $.006 per K.W.H. Connected load for low density [illegible] was 175 h.p. and 190 h.p. for the standard density gin. The h.p. of demand for the low density gin was 155 and 160 for the standard density gin.

4. A slightly higher horsepower of demand for standard density gin equip[illegible] results in a slightly higher cost on all electric power consumed in the gin because the electric rate structure is set up in terms of K.W.H. per h.p. of demand.

5. Phoenix rate for standard density compression, 1948-49 season.

TABLE III

COMPARATIVE COSTS OF PACKAGING COTTON AT STANDARD DENSITY GINS AND LOW DENSITY GINS WITH SUBSEQUENT COMPRESSION TO STANDARD DENSITY

Item	Annual ginning volume in bales											
	1500	2500	3500	4500	5500	6500	7500	8500	9500	10,500	11,500	12,500
	(cost in cents per bale)											
Cost of packaging a bale of lint cotton:												
Standard density:												
Gin pressing[1]	116.47	71.04	51.46	41.08	33.78	28.97	25.32	22.76	20.55	18.86	17.35	16.17
Bagging and ties[2]	230.00	230.00	230.00	230.00	230.00	230.00	230.00	230.00	230.00	230.00	230.00	230.00
Total	346.47	301.04	281.46	271.08	263.78	258.97	255.32	252.76	250.55	248.86	247.35	246.17
Low density:												
Gin pressing[1]	53.70	32.91	23.99	19.02	15.85	13.65	12.03	10.79	9.80	9.00	8.35	7.79
Bagging and ties[2]	237.00	237.00	237.00	237.00	237.00	237.00	237.00	237.00	237.00	237.00	237.00	237.00
Total	290.70	269.91	260.99	256.02	252.85	250.65	249.03	247.79	246.80	246.00	245.35	244.79
Compression to standard density[3]	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
Total	430.70	409.91	400.99	396.02	392.85	390.65	389.03	387.79	386.80	386.00	385.35	384.79
Total increased cost to ginner per packed bale	55.77	31.13	20.47	15.06	10.93	8.32	6.29	5.97	4.75	2.86	2.00	1.38
Net savings per bale packed at standard density gins	84.23	108.87	119.53	124.94	129.07	131.68	133.71	135.03	136.25	137.14	138.00	138.62

1. See footnotes 1, 2, 3, and 4 of Table II.

2. Costs of covering rectangular bales based on a price of 29¢ per linear yard of 45-inch, 2-pound jute bagging, and $3.15 per bundle of 30 ties, 138 inches long. Length of ties and number per bale are as follows: Low density bales, 138 inches, 6 ties; standard density bales, 114 inches, 8 ties. Bagging dimensions are as follows: Low density bales, 45 by 108 inches; standard density bales, 50 by 90 inches. A standard density bale requires 926 inches of ties (114 x 8) compared with 826 inches (138 x 6) for low density bales. Standard density bales require 5.556 yards of bagging and low density bales require 6 yards.

3. See footnote 5 of Table II.

TABLE IV

ESTIMATED COSTS OF PRESSING COTTON TO STANDARD DENSITY (22-25 pounds per cubic foot) AT GINS IN COMPARISON WITH COSTS OF PRESSING TO LOW DENSITY (11-15 pounds per cubic foot) AT GINS AND SUBSEQUENT COMPRESSION TO STANDARD DENSITY AT COMPRESSES.

Assuming a Low Density Gin Press with Half Its Life Remaining is Replaced by a Standard Density Gin Press

Item	Cost of pressing in cents per bale at gins with annual volume (bales of											
	1500	2500	3500	4500	5500	6500	7500	8500	9500	10,500	11,500	12,500
Additional cost if low density press is scrapped at the end of 6 years[1]	45.90	27.54	19.67	15.30	12.52	10.59	9.18	8.10	7.25	6.56	5.99	5.51
Additional freight and installation expense if low density press is scrapped at the end of 6 years[2]	13.06	7.83	5.60	4.35	3.56	3.01	2.61	2.30	2.06	1.87	1.70	1.57
Total additional cost if low density press is scrapped at the end of 6 years	58.96	35.37	25.27	19.65	16.08	13.59	10.79	10.40	9.31	8.43	7.69	7.08
Increased costs to ginners for standard density pressing at the gin[3]	62.77	38.13	27.47	22.06	17.93	15.32	13.29	11.97	10.75	9.86	9.00	8.38
Adjusted total increased cost to ginners for standard density pressing at the gin	121.73	73.50	52.74	41.71	34.01	28.91	24.08	22.37	20.06	18.29	16.69	15.46
Net savings[3]	77.23	101.87	112.53	117.94	122.07	124.68	126.71	128.03	129.25	130.14	131.00	131.62
Adjusted net savings	18.27	66.50	87.26	98.29	105.99	111.09	115.92	117.63	119.94	121.71	123.31	124.54

1. If a low density press with half of its life still remaining is scrapped and a standard density press is installed, the unused value of the press would be $3,516 at November, 1948, replacement prices and interest on this remaining investment would be $615.30, making a total of $4,131.30 to be spread over 6 years, or $688.85 annually. For interest computation on remaining investment in the low density press, see Appendix B-2.

2. Freight and installation costs are included in this table for the following reason: They represent an additional expense to the ginner because the replacement is not necessary at this time. If replacement were necessary, these costs would be approximately the same for either type press. Since this table represents only the period of time necessary (6 years in this case) to write off a press with half its life remaining, only half the freight and installation costs are added. These costs with interest are divided equally over the 6-year period. (See Appendix B-3 for interest computations.

3. From Table II.

Packaging Materials

Bagging and ties commonly used on low density bales can be used satisfactorily on standard density bales.[1] However, special 50 by 90 inch bagging will cover the standard density bale completely with a saving of about 5 square feet in the amount needed per bale. Standard 1 1/2 pound ties and arrow buckles can be used if the ends are doubled over to prevent shearing. Two thicknesses of the tie passing through the buckle also reduces slippage. Eight ties should be adequate in most cases; however, extremely dry cotton may require more.

Wire ties,which have proven satisfactory, offer a substantial reduction in the weight of the tare. Eleven wire ties are needed to replace eight steel bands. Both light weight burlap and cotton bagging now used by some gins give better protection to the lint as well as reduced tare weight. Weight reductions are important from the standpoint of reducing transportation costs. However, unless net weight trading is adopted by the cotton industry there is no point in reducing tare weight except when gins have direct outlets. Although it is not a general practice, some of the gins using standard density presses make direct sales to mills on a net weight basis. This practice is likely to increase in instances where good quality, well packaged cotton is available.

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1. See Appendix B-4 for a comparison of bagging and tie dimensions.

ASSOCIATED PROBLEMS AND PROBABLE CHANGES IN MARKETING PRACTICES

Concentration and Storage

The cotton warehouse performs many important services in addition to compression. One of these is concentrating the cotton of several gins at a point where large even-running lots may be selected to fill specific orders. Although more important in less integrated growing areas, it still represents a needed service in Arizona. This is especially true with gins having a small annual volume. Even in a one-variety area like Central Arizona, differences in grade and staple make sorting necessary.

It is the present practice of the local compresses to make a delivery charge on cotton stored but not compressed by them. This amounts to almost as much as the compression charge and would increase the cost of temporarily storing cotton pressed to standard density at the gin.

If cotton is pressed to standard density at gins, some changes in storage practices will be necessary. Far-sighted warehouse managers will adjust their tariffs to meet changing conditions and to maintain their competitive position. Unless adequate tariff adjustments are made by existing warehouses, new storage facilities will be built to meet the need. Gins having large annual volumes may find some type of protected gin yard storage desirable in any event. There is also a possibility that mill area storage facilities will be increased.

Marketing Channels

Gin pressed standard density cotton bales make it possible to vary marketing channels to a certain extent. The amount of change that will occur depends largely on the cotton merchants and warehousemen. If they modify their handling methods to accomodate the new bale, marketing channels will change slowly. In cases where existing installations do not adjust to the changing conditions or where progressive ginners arrange direct sales to mills, the marketing channels can be easily shifted to meet the situation.

The various channels that may be taken by the standard density gin bale is shown in Figure V, page 29. Under existing practices all the gin bales go through the local compress before proceeding to other points. This may be contrasted with the standard density gin bale which has several channels open to it. It is likely that the standard density bale will, for the most part, pass through the local compress for temporary storage, concentration, and in some cases, compression to high density before passing on through the marketing channels. Merchants may have direct shipment made to ports, central storage points, or mills. In general, the handling problem should be simplified by standard density gin compression.

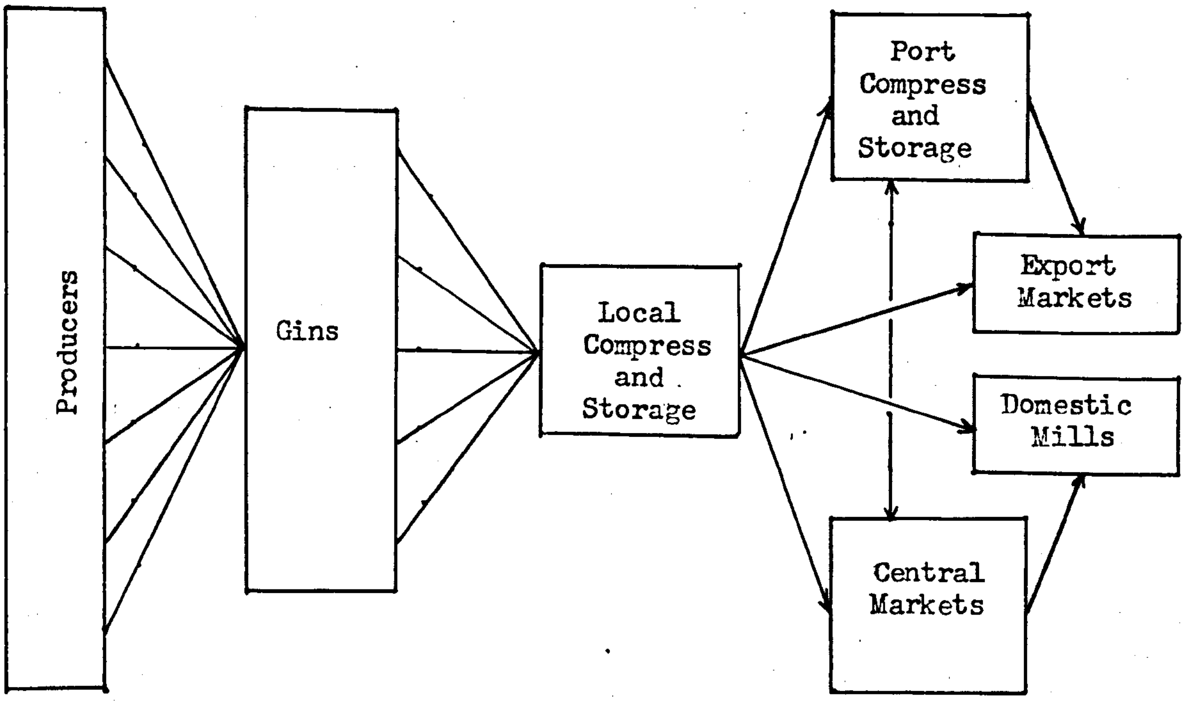
One of the important advantages of standard density gin compression is the feasibility of direct marketing. Many Arizona gins have a large enough volume to assemble large even-running lots at the gin yard; thus mill orders can be filled at the gin, eliminating much handling expense.

Distribution of Savings

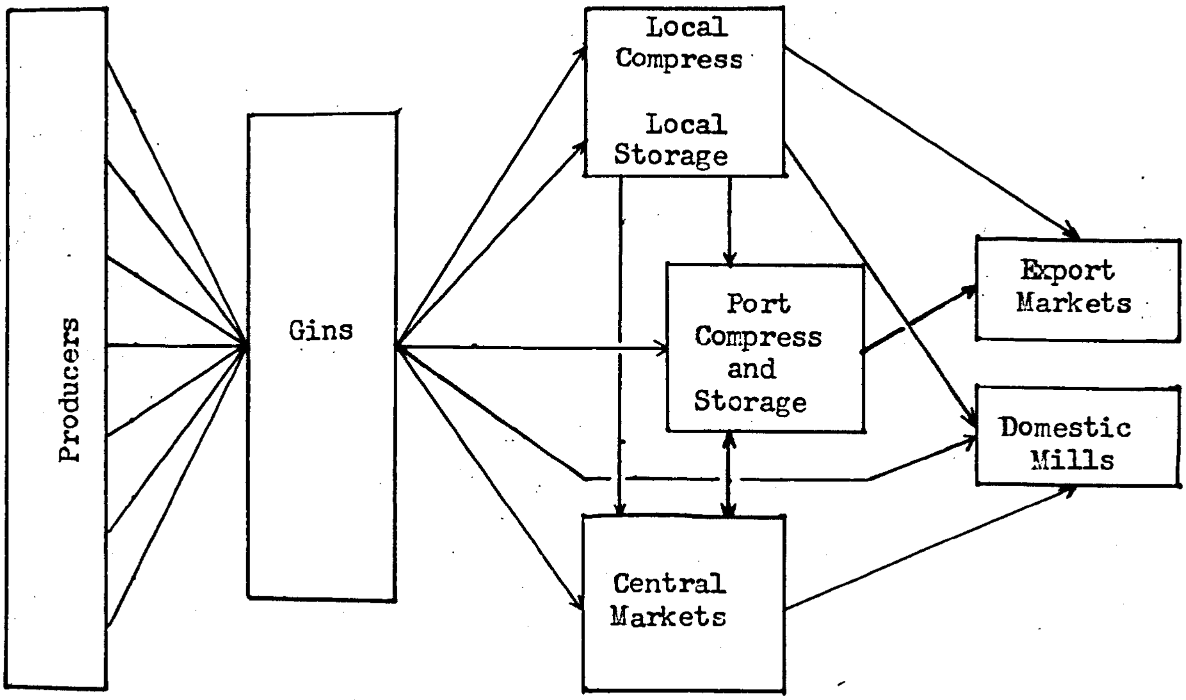
It has been demonstrated in a previous section that cotton can be packaged to standard density at the gin for considerably less than the cost of low density gin pressing followed by recompression at a compress. Standard density gin pressing results in increased costs to ginners, but

FIGURE V

PHYSICAL MOVEMENT OF COTTON THROUGH THE MARKETING CHANNELS



A. From gins having low density presses



B. From gins having standard density presses in overall savings in the costs of marketing. The net saving can be transferred to the growers either through lowered ginning charges or a better basis from buyers, or a combination of the two.[1]

A comparison between the present method of meeting compression charges and possible methods under a system of gin compression is given in Figure VI, page 31. These sketches show the distribution of the freight and compression charges under various assumed conditions. For purposes of illustration freight is set at 122 points, compression cost at 28 points, and the increased cost to ginner for standard density compression at 5 points.

Under existing practices the buyer discounts the price he pays to farmers for their cotton by 150 points to cover the cost of freight and compression (Figure VI, Section 1). The buyer then pays the railroad 147 points for freight and compression. The railroad pays 25 points to the compress and keeps 122 points for freight. The additional charges incident to compression are borne by the buyer -- in this example, 3 points.

Figure VI, Section 2, shows variations in the freight and compression portion of the basis if ginning charges are reduced, remain the same, or are increased to meet the increased cost of standard density pressing.

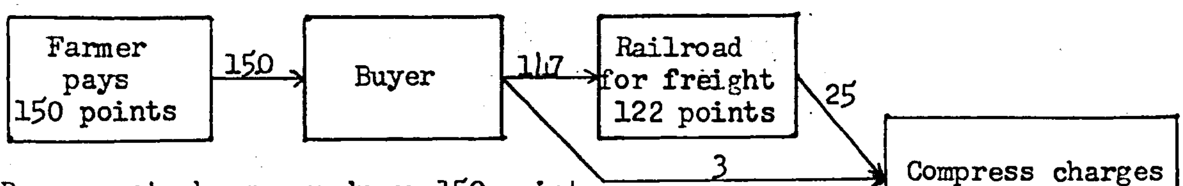
If the savings are passed on to the grower through lowered ginning charges the basis offered by buyers will remain about the same (Figure VI, Section 2-a). During years of reduced production, gins having standard density presses could effectively meet competition in this way. In this case the 25 points formerly paid the compress by the railroad could be

1. The "basis" in points per pound (a point equals 1/100 of a cent) is the amount on or off the New York futures price that is offered growers by merchants as the local sale price for the cotton. Mills offer to buy delivered cotton on points on (or above) the New York quotation. By subtracting marketing costs and profit from mill quotations the buyers are able to arrive at the price they can pay locally.

FIGURE VI

DISTRIBUTION OF FREIGHT AND COMPRESSION COSTS UNDER: (1) THE PRESENT MARKETING SYSTEM AND (2) A SYSTEM OF STANDARD DENSITY GIN COMPRESSION

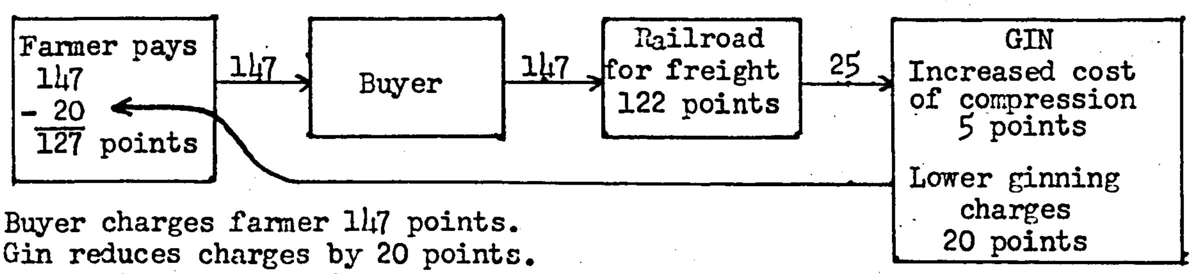
1. Present System



Buyer must charge producer 150 points to cover these costs.

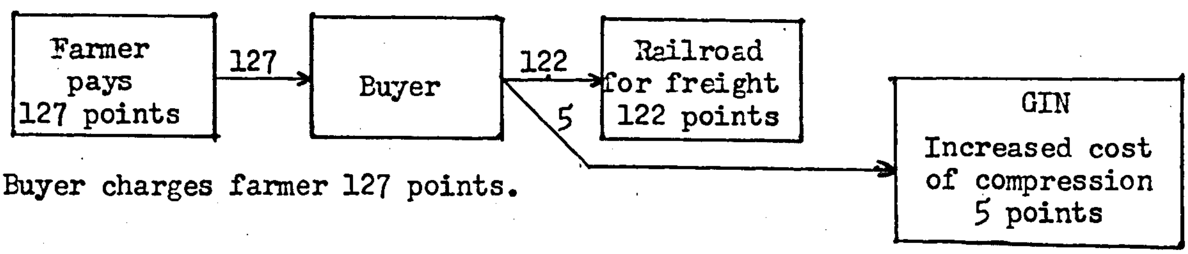
2. Using Standard Density Gin Presses

a. With reduced ginning charges



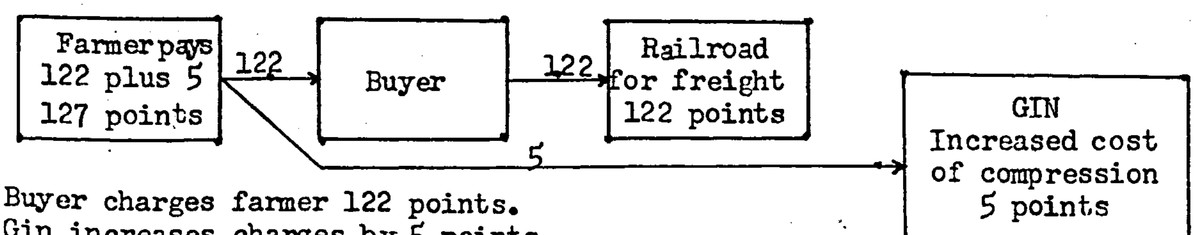
Buyer charges farmer 147 points.
Gin reduces charges by 20 points.
Net cost to farmer 127 points.

b. Using the same ginning charges as before



Buyer charges farmer 127 points.

c. Using higher ginning charges



Buyer charges farmer 122 points.
Gin increases charges by 5 points.

paid to the gin. The gin, in turn, could allot 5 points to the increased cost of compression and 20 points to reducing ginning charges to the cotton growers.

If the ginning charges remain the same, the buyer can offer a better basis when bidding for the cotton (Figure VI, Section 2-b). This is possible because his expenses are only 122 points for freight and 5 points for gin compression. In this example the grower receives the savings in the form of a higher price for his cotton.

In Figure VI, Section 2-c, the grower pays the gin the increased cost of compression. The basis in this case would be still better since the buyer would have only freight to pay.

Government Loan Value

At the present time the government loan value of cotton is based on a low density bale at the local warehouse. Shipping, compression, and storage charges against it are paid when the cotton is sold and the loan terminated. Thus, the producer does not have to bear these expenses until he sells the cotton. Under prevailing loan arrangements the savings gained by standard density gin compression would not be realized unless the grower could sell his equity in the cotton before the loan repossession date expires (usually July 31 of the current crop year). At this time the accrued charges against the stored bale would be less for the gin compressed cotton than on cotton pressed in the usual manner. If the program continues and the need becomes apparent the government will probably make an adjustment provision for gin compressed cotton.

SUMMARY

Marketing practices used in handling Arizona cotton are similar to those used in the cotton belt. Since Arizona is located a considerable distance from mill areas, it is important that Arizona cotton be marketed as efficiently as possible if it is to compete favorably with southern cotton. Increased marketing efficiency can be achieved through improved marketing practices.

Improved practices are needed to:

1. Reduce the amount of handling in the marketing channels.

2. Reduce transportation costs.

3. Reduce the amount of waste and damage occurring in the marketing channels.

4. Improve the appearance of the bale package thereby increasing its salability.

The amount of handling required in the marketing channels can be reduced by more direct marketing methods and by the use of more care in packing and forming the bales at the gin and compress. Direct marketing and net weight trading offer a means of reducing transportation costs. Much of the waste and damage occurring to cotton in the marketing channels could be eliminated by improved sampling methods, more care in packaging, and more adequate bale covering materials. The appearance of the bale can be improved by better sampling methods and compression practices.

The standard density gin press offers a possible solution to some of these problems. From the standpoint of handling, transportation, and storage, standard density gin bales meet the requirements of the trade.

The incidence of "fire bales" is less than in low density bales. Since standard density gin bales are uniform in size and shape, they are easier to handle and require less storage space than bales repressed to standard density at a compress.

The standard density gin bale is slightly more suitable for processing at the mill than the compress bale for various reasons: (1) because of its narrow width, less floor space is required, (2) due to greater resiliency, the standard density bale fluffs out more easily and has better dyeing qualities than the compress bale, and (3) though spinning characteristics are slightly different, cotton pressed to standard density at gins can be run interchangeably with standard density compress bales at the mills.

From an engineering standpoint, the standard density gin press can replace existing low density presses with a minimum of alteration in other equipment. The press box size is such that the moderate hydraulic working pressures required make it possible to use the existing hydraulic pump and fittings if supplemented with an additional pump to give adequate pumping volume. If slightly modified, the existing condenser and tramper may be used on the standard density press. Although the size of standard density gin bales is approximately the same as those pressed to standard density at a compress, they are much more uniform in shape.

To buy and install a new standard density press in Arizona costs approximately $17,000. Included in the figure are the cost of the press and tramper, hydraulic pump, 15 horsepower electric motor, freight, and labor necessary to install the press. The total cost will vary slightly, depending on the availability of gin tools and facilities necessary for installation purposes and the resale value of the old press.

To operate a standard density gin press will cost slightly more than to operate a low density press because of increased interest and depreciation on a larger investment and increased power requirements. The estimated increased cost to ginners for pressing cotton to standard density ranges from $.63 per bale at an annual gin volume of 1500 bales to $.08 per bale at a volume of 12,500 bales. For the above gin volumes, the overall savings per bale range from $.77 to $1.32 respectively.

Since less bagging is required on a standard density bale, an additional saving can be realized in the cost of packaging the bale. Estimated net savings for packaging the standard density bale range from $.84 to $1.39 per bale respectively for annual gin volumes ranging from 1500 to 12,500 bales.

Pressing costs were also figured for an assumed case in which the existing low density press is scrapped when half depreciated. In this case the interest and depreciation on half the present market value of a new low density press were added to packaging costs discussed above. Also freight and installation cost were added. These costs were included because they represent an additional expense which would not ordinarily occur until the existing press was normally replaced. Even when these extra costs are included the savings per bale range from $.20 at a 1500 bale volume to $1.25 at a 12,500 bale volume.

With a satisfactory installation pressing time and crew requirements should not be any greater than that required for a low density press.

Although the bagging and ties now commonly used are satisfactory for use with a standard density press, their use does not take advantage of the possible savings that could be made. Specially cut bagging and ties suited to the dimensions of the standard density bale should be used.

Standard density compression at the gin will alter somewhat the need for compress storage. If compress warehouses continue to make a delivery charge, other storage facilities will develop in either gin or mill areas, or both.

The standard density gin press makes possible changes in marketing channels through elimination of extra handling and through more direct marketing methods.

It is difficult to foretell how savings on compression made possible by use of the standard density gin press will be distributed in the short-run. A portion of the savings might be retained by the gins making the improvements with the rest passed on to the farmer. In the long-run, the forces of competition would force the ginners to pass all of the savings on to the cotton grower. The most desirable and logical way to pass this saving on to the grower would be through reduced ginning charges.

At the present time the government loan price is based on "flat" (uncompressed) cotton; therefore, no savings would be paid on cotton going into the government loan if the loan is not redeemed before the loan expiration date. If the cotton is redeemed and moved through regular trade channels, the savings on compression will be reflected back to the grower. A logical solution to this problem is for the government to set up another loan schedule for cotton pressed to standard density at gins which will reflect the prevailing compression charge in the form of a higher loan price.

While the use of standard density gin compression offers an improvement affecting many areas of cotton marketing, other changes are also needed. The two most important ones are an exacting system of bale identification and adoption of a satisfactory mechanical sampling system.

These together with net weight trading and a more adequate system of grading would eliminate most of the inefficiencies in cotton marketing.

APPENDIX A

GENERAL SPECIFICATIONS FOR A STANDARD DENSITY PRESS THAT WOULD MEET THE REQUIREMENTS OF THE UNITED STATES COTTON GINNING INDUSTRY[1]

1. "Foundation -- Concrete with pit 9 feet, 6 inches deep by 18 inches wide by 48 inches long for rams; clearance spaces for column nuts.

2. "Rams -- Three 9 1/2-inch diameter by 90-inch stroke. Maximum working pressure 2,600 pounds per square inch.

3. "Casings -- Extra heavy 10-inch pipe or tubing. Head tapped for 1 1/4-inch pipe thread.
"Frame of press -- Capable of withstanding 275-ton load applied over 54-inch center distance of 84-inch to 92-inch span according to manufacturers standard practices.

4. "Platen beams and bottom sills -- (a) Hot-rolled steel slabs; or (b) 24-inch, 105-pound I-beams; or (c) trussed structural steel framing.

5. "Center column and saddles -- 4 1/2-inch diameter at root of threads, 5-inch nominal diameter, SAE Number 1045 steel, with 4- by 10-inch overhung solid slab or built-in structural saddle. Lock collar to support platen beams.

6. "Outboard members, strain rods, and saddles -- 3-inch diameter SAE Number 1045 steel strain rods with 2- by 8-inch solid slab or built-up structural saddle. Tramper support column and press frame vertical outboard channel, or I-beam to be attached with fitted bolts of adequate number and size.

7. "Cotton and press boxes -- Cross-section 54- by 20-inch horizontal. Depth 10 feet (120 inches). Dogs -- 4 per side located out of line with tie channels. Doors -- side swinging with wheel latch. Press box taper -- 3/4-inch per door, outward at top. Turntable and box assembly trunnioned on ball or roller bearings.

8. "Platen and followers -- Steel, for 8 flat ties or 11 wire ties, spaced to permit sampling. Followers designed to prevent the tearing of bagging at ram heads.
"Gages and controls -- Pressure gage on outboard column of press frame. Valve controls, pump belt shifter or stop buttons located in full view of gage.
"Pump and oil reservoir -- Suitable for delivery of at least 12 gallons of oil per minute and capable of withstanding hydraulic working pressures of 2,600 pounds per square inch. Reservoir capacity 150 gallons.
"Tramper -- Cut-off gate, and follower of tramper adapted to narrowed boxes of press. Tramper strengthened for heavy-duty packing.
"Pump power -- 15 to 25 horsepower."

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1. J. W. Wright *et al.*, *op. cit.*, p. 29.

APPENDIX B

TABLE I

NUMBER OF ACTIVE COTTON GINS AND THE NUMBER OF BALES OF COTTON GINNED CLASSIFIED BY ANNUAL VOLUME OF GINNINGS, ARIZONA, SEASON 1947-48*

Bales ginned per season	Number of gins	Bales ginned		
		Total number	Percent of total	Per gin
0 - 999	2	1,329	0.57	664
1,000 - 1,999	3	4,513	1.92	1,504
2,000 - 2,999	8	20,098	8.55	2,512
3,000 - 3,999	4	14,193	6.04	3,548
4,000 - 4,999	3	13,757	5.85	4,586
5,000 - 5,999	6	32,351	13.76	5,392
6,000 - 6,999	4	26.632	11.33	6,658
7,000 - 7,999	6	44,732	19.02	7,455
8,000 - 8,999	0	-	-	-
9,000 - 9,999	3	27,354	11.63	9,118
10,000 - 10,999	1	10,282	4.37	10,282
11,000 - 11,999	1	11,096	4.72	11,096
12,000 - 12,999	1	12,139	5.16	12,139
13,000 and over	1	16,674	7.09	16,674
Total	43	235,150	100.0	5,469

*Source: Scott Hathorn, Jr., unpublished data on the economics of standard density gin compression, Department of Agricultural Economics, University of Arizona, 1948.

APPENDIX B

TABLE II

SCHEDULE OF DEPRECIATION FOR LOW DENSITY AND STANDARD DENSITY GIN PRESSES*

At end of year	Low density			Standard density	
	Book Value[1]	Depreciation[2] (annual)	Interest[3] at 5%	Book value[4]	Depreciation[2] (annual)
0	$ 7,032	$ 0	$	$15,324	$ 0
1	6,446	586		14,047	1,277
2	5,860	1,172		12,770	2,554
3	5,274	1,758		11,493	3,831
4	4,688	2,344		10,216	5,108
5	4,102	2,930		8,939	6,385
6	3,516	3,516	175.80	7,662	7,662
7	2,930	4,102	146.50	6,385	8,939
8	2,344	4,688	117.20	5,108	10,216
9	1,758	5,274	87.90	3,831	11,493
10	1,172	5,860	58.60	2,554	12,770
11	586	6,446	29.30	1,277	14,047
12	0	7,032	-	0	15,324
		Total	$ 615.30		

1. Cost of new low density press including tramper - $7,032 f.o.b. Dallas, Texas. (Quoted in November, 1948)

2. It is estimated that these gin presses will last 12 years.

3. Interest on remaining investment if a low density press were scrapped at the end of one-half of its life.

4. Cost of new standard density press is $14,140 and $968 for pump, both f.o.b. Dallas, Texas. The cost of a 15 h.p., 3 phase, ball bearing, 220-440 Volt, 1750 RPM (5/8" shaft) electric motor is $215, f.o.b. Tucson, Arizona. Total cost of standard density equipment is $15,323.

Annual interest on average investment at 5% in:

Low density - $3,516 x .05 x 1 = $175.80
Standard density - 7,662 x .05 x 1 = 383.10

*Source: Scott Hathorn, Jr., unpublished data on the economics of standard density gin compression, Department of Agricultural Economics, University of Arizona, 1948.

APPENDIX B

TABLE III

AMORTIZATION SCHEDULE FOR FREIGHT AND INSTALLATION COSTS FOR USE WITH TABLE IV[1]

At end of year	Principle outstanding	Annual installment on principle	Interest at 5%
0	$1,000.00	$166.66	$50.00
1	833.34	166.66	41.67
2	666.68	166.66	33.33
3	500.02	166.66	25.00
4	333.36	166.66	16.67
5	166.70	166.66	8.33
6	0	166.66	-
		Total	$175.00

1. Total principle and interest equals $1,175. This amount spread over a period of 6 years equals $195.83 per year, which is added to the other costs in Table IV, p. 25, to cover additional freight and transportation.

APPENDIX B

TABLE IV

COMPARISON OF DIMENSIONS AND WEIGHTS OF BAGGING AND TIES FOR LOW DENSITY WITH STANDARD DENSITY GIN BALES OF COTTON[1]

Item	Unit	Type of bale: Low density gin bale	Type of bale: 20" x 54" standard density gin bale
1. Size of each strip of bagging	Inches	45 x 108	50 x 90
2. Weight of bagging per bale:			
Cotton	Pounds	4.5	4.2
2-pound jute	Pounds	12.0	11.1
3. Ties:			
Number	Number	6	8[a]
Length	Inches	138	114
Weight	Pounds	9.0	9.9
4. Total tare:			
Cotton covered bale	Pounds	13.5	14.1[b]
No. 2 jute bagging	Pounds	21.0	21.0

a. Eleven ties, No. 9 gage wire, can be used instead of 8 flat ties.

b. Stahman of Las Cruces, New Mexico, uses 13 wire ties and cotton bagging instead of jute bagging. The total weight of this tare is 7 3/4 lbs.

1. J. W. Wright *et al.*, "The Packaging of American Cotton and Methods for Improvement", United States Department of Agriculture Circular 736, p. 54.

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