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# COSTS OF GINNING COTTON BY COOPERATIVES AT SINGLE-GIN AND TWO-GIN PLANTS, CALIFORNIA AND TEXAS, 1962

By JOHN D. CAMPBELL

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Mark. Res. R. p. # 640



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The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, merchandising, product quality, costs, efficiency, financing, and membership.

The Service publishes the results of such studies; confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

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This study was conducted under authority of the Agricultural Marketing Act of 1946 (RMA, Title II).

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## Highlights

Many cotton-ginning cooperatives, especially those in California and Texas, have added one or more additional gins to their original plants. Among the major reasons for adding additional gins were:

1. To provide faster ginning services needed for machine harvesting, thereby reducing time growers have to wait for trailers;
2. To handle increase production of present members and production of new members;
3. To keep gins modern. Cotton farmers are likely to patronize new, modern gins because they get faster and perhaps better service.

The primary purpose of this study was to determine and compare costs of ginning cotton in single-gin and two-gin multiple plants at the same location in California and Texas. Such comparative costs will assist cotton growers when they are planning expansion of gin facilities and also will help gins improve their operating efficiency.

The major finding of this study is that single gins have somewhat lower costs -- ranging from 13 cents to \$1.07 a bale -- than two gins. This is caused primarily by cooperatives that operate two gins employing more office, supervisory, and skilled personnel on a year-round basis.

Comparative costs in this study were developed by the model approach. This was done to reduce or eliminate factors other than single and multiple characteristics of gins on which costs were compared.

Thirty-six cooperatives in Texas and California, which operated 64 gins, were surveyed personally, and information was obtained on 1961 costs and related data. Representatives of gin machinery manufacturers and utility companies also furnished some cost information. Costs were estimated for 1962 on three sizes of single and multiple gins and on from four to seven volumes for each size gin.

Costs per bale were found to be lowest when gins operated at or near capacity, and highest when minimum volumes were ginned. Costs varied more than \$10 a bale between lowest and highest volumes at some plants.

In the San Joaquin Valley of California, estimated lowest cost for a single gin, with a 12-bale-an-hour capacity, was \$11.06 a bale, when it reached a maximum volume of 9,000 bales a year. Its highest cost was \$22.24 a bale, when only 3,000 bales a year were ginned -- a difference of \$11.18 a bale.

Estimated costs for two-gin multiples in California ranged from 13 to 66 cents a bale more, and averaged 61 cents a bale more, than those of single gins, when

capacities and annual volumes per gin were the same.

In the Lubbock area of Texas, estimated costs of 12-bale-an-hour single gins ranged from \$13.48 a bale, when 9,000 bales a year were ginned, to \$24.36 a bale, when only 3,000 bales a year were ginned -- a difference of \$10.88 a bale.

Costs of two-gin multiples in Texas, ranged from 86 cents to \$1.07 a bale, and averaged 95 cents a bale, more than those of single gins, when capacities and annual volumes per gin were the same.

Major reasons for higher costs at two-gin multiples were that they used more labor and higher priced labor. Single gins in California used 1.1 man-hours of gin labor compared with 1.35 man-hours a bale for two-gin multiples. In the Lubbock area, single gins used 2.51 man-hours and two-gin multiples, 3.0 man-hours a bale. Most multiples in both California and Texas used more office labor a bale than singles. Wage rates were slightly higher at the multiples in both California and Texas.

Major expense items in both California and Texas were gin labor and depreciation. These two expenses combined accounted for about 50 percent of all costs.

Cost of building and equipping single gins were estimated to range from \$250,000 for an 8-bale-an-hour gin to \$350,000 for a 12-bale-an-hour gin. Two-gin multiples were estimated to cost from \$470,000 to \$667,500 for 16-bale-an-hour and 24-bale-an-hour gins, respectively.

Considerations other than operating costs are important when choosing between single and multiple gins. Demand of members for faster service, cost of constructing new plants, availability of capital, and keeping plants modern are major considerations.

In addition, gin margins earned on cottonseed (both at the gins and cooperative cottonseed oil mills), bagging and ties, and possibly farm supplies have effects on whether single or two-gin multiples will best serve cotton farmers.

# COSTS OF GINNING COTTON BY COOPERATIVES AT SINGLE-GIN AND TWO-GIN PLANTS, CALIFORNIA AND TEXAS, 1962

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**T**his report gives estimated costs of ginning cotton by cooperatives in high-capacity single-gin and two-gin plants in California and Texas. Estimates of costs are based on survey data. A brief report is also included on costs for more than two gins at one location. Cost and other information in this report will provide a guide for groups who plan to build or modernize single gins or add new gins at existing plants.

The major purpose of this study was to determine the extent of advantage or disadvantage in cost of ginning that cooperatives can expect from operating two gins as compared to single gins. Grower members and others can then use this information when considering expanding gin facilities or modernizing present gins. Another use of the information is to help gins improve their efficiency. Higher costs than those estimated in this study probably indicate inefficiencies.

Primarily to provide faster service, many cooperatives have added one or more gins to their original plants. The

first gin added to a single gin makes a two-gin multiple plant. Other additions make a three-, four-, or five-gin multiple plant, as the terms are used in this report.

Data on cost of constructing gin plants in 1959, or later, and costs of ginning the 1961 cotton crop were collected by personal survey of 36 cooperative ginning plants that operated 64 gins. Of these 36 associations, 13 were located in the San Joaquin Valley of California; 13 in the vicinity of Lubbock, Texas, and the other 10 in the Lower Rio Grande Valley of Texas.

Five associations in each of the three areas operated single gins, five others in each of the three areas operated two-gin multiples. Two associations in California and three in the Lubbock area operated three-gin multiples, and one association in California operated a four-gin multiple.

Some cooperative gins also operate branch plants, or gins at more than one location. But this study was restricted to single gins and to multiple gins at the same location.

Gins included in the survey also were limited to those with high capacity, as

much as possible. This was done because practically all new gins being built, or likely to be built during the next several years, are, or will be, high-capacity. All single gins included in the survey in both California and the Lubbock area of Texas were of high capacity, built in 1959, 1960, or 1961. All multiples in those areas had from one to three high-capacity gins built in 1959 or more recently.

Information that provided valuable background data was collected from co-op gins in the Lower Rio Grande Valley of Texas. Capacities of cooperative gins there were near enough in balance with volumes available for ginning so that expansion of new gins was not a problem. Replacements of single gins with new equipment and replacement of two-gin multiples with single high-capacity gins were taking place.

Because of these conditions, separate cost estimates were not made for gins in the Lower Rio Grande Valley. Cost estimates and other relationships for gins in the Valley were similar to those in the Lubbock area.

Information was also obtained from representatives of gin machinery manufacturers and gin managers on cost of constructing modern gins of usual sizes in 1962, in the three areas.

A model approach was used to eliminate or minimize variations in costs not caused by single or multiple gin characteristics. The model approach included estimated cost of land, buildings, machinery, and construction costs of single-gins and two-gin multiples.

Rates used for depreciation, taxes, insurance, wages, salaries, and most other items were developed from survey

data obtained from gins. Power costs were calculated on estimated power consumption and distribution, as determined from survey data, according to the most widely used rate schedules in each area. Interest on investment was calculated at 5 percent on the full cost of land and on one-half the cost estimated for other investments in gins. Handling of bagging and ties was considered a merchandizing operation in this study and was not included in ginning costs.

Costs of gin plants (land, buildings, and equipment) used in the estimates were based on cost of modern gins like those built in the area surveyed in 1962. Items of equipment (make and type) and other technical specifications were omitted. Examples of gin sizes according to gin stands included were as follows:

8-bale-an-hour-gins included 3 stands with 120 saws, 12 inches in diameter.

10-bale-an-hour gins included 4 stands with 120 saws, 12 inches in diameter.

12-bale-an-hour gins included 5 stands with 120 saws, 12 inches in diameter.

Other gin stands with other diameters or number of saws and accompanying equipment were classified as nearly as possible in appropriate sizes. All this was reflected in the cost of gin plants.

The model approach, as used in this report, does not set up a model that is recommended or suggested as a desirable goal. Neither does model refer to a mathematical model. The model approach as used for this study is essentially estimated costs with estimates based on data obtained for this survey.

## Total Estimated Operating Costs Per Bale

Two main factors affecting ginning costs, at both single and multiple gins, are: (1) Size (capacity) of gins, and (2) volumes (bales) ginned per season. The well-known inverse relationship, the larger the volume per gin the lower the cost, was evident in this study.

Larger volumes of two-gin plants might be expected to lower per-bale cost from those for single gins. However, the major finding of this study was that costs were somewhat higher for two-gin plants when volumes per gin were equal. In addition, the volume at plants where a second gin has been added is frequently less than twice the volume of the former single-gin plant, because the second gin, in many cases, has been added mainly to provide faster ginning service.

Total estimated cost of ginning at single-gin plants, for three different sizes and several different annual volumes, ranged from \$11.06 to \$22.24 a bale in the San Joaquin Valley of California in 1962 (table 1). The estimated lowest cost was for a 12-bale-an-hour-capacity gin, when it reached a volume of 9,000 bales a year. The highest cost was for a 12-bale-

an-hour-capacity gin, when only 3,000 bales a year were ginned.

Estimated costs for two-gin multiples in California ranged between \$11.72 and \$22.68 a bale for the three different-capacity plants (table 2). The least cost was for a 24-bale-an-hour gin (two-gin plant), when ginning a combined volume of 18,000 bales a year. The highest cost was for a two-gin, 24-bale-an-hour plant that ginned only 6,000 bales a year.

Estimated costs for two-gin multiples ranged from 13 cents to 66 cents and averaged 61 cents a bale higher than those for single gins with comparable capacities and equal volumes per gin.

Figure 1 shows cost curves for single-gin and two-gin multiple plants with a gin capacity of 10 bales an hour and with volumes between 3,000 and 7,000 bales a year per gin.

Costs decrease rapidly between 3,000 and 5,000 bales a year and then continue to decrease, but less rapidly, until maximum capacity of 7,000 bales a year per gin is reached. For example, costs for

Table 1. - Total estimated costs per bale of single cooperative gins, by size and volume, San Joaquin Valley of Calif., 1962

Size of gins	Costs per bale for bales ginned per year --						
	3,000	4,000	5,000	6,000	7,000	8,000	9,000
Bales an hour	Dollars a bale						
8	\$17.77	\$14.48	\$12.43	\$11.39	(1)	(1)	(1)
10	19.86	16.08	13.73	12.47	\$11.56	(1)	(1)
12	22.24	17.68	15.01	13.55	12.48	\$11.69	\$11.06

<sup>1</sup>Costs omitted because plants of this size would not gin this volume, as explained under capacity in appendix.

Figure 1. Estimated ginning costs per bale for cooperative gins of 10-bales-an-hour capacity. San Joaquin Valley, California, 1962

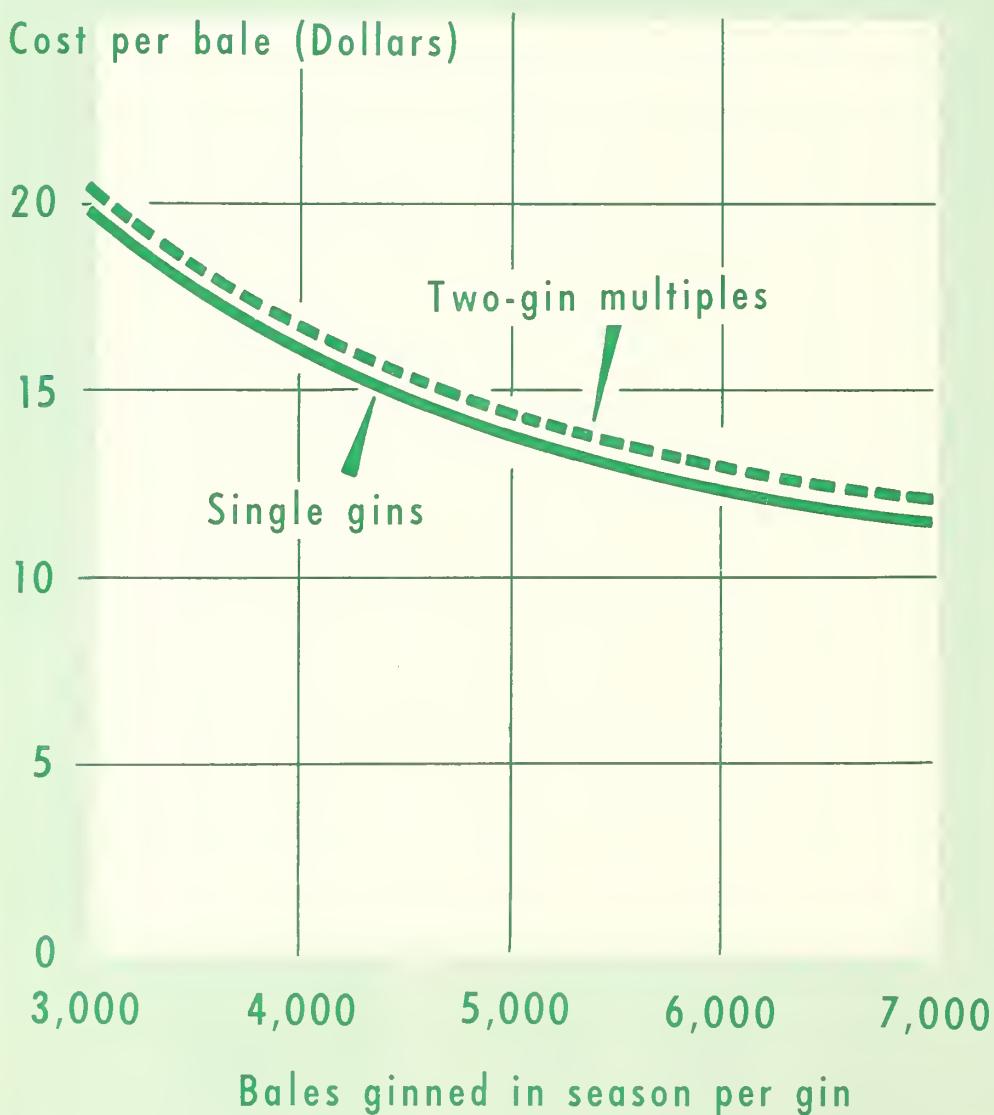


Table 2. - Total estimated costs per bale for two-gin multiple cooperative plants, by size and volume, San Joaquin Valley, Calif., 1962

Size of gins	Costs per bale for bales ginned per year --							
	6,000	8,000	10,000	12,000	14,000	16,000	18,000	
<i>Bales an hour on 2 gins</i>		<i>Dollars a bale</i>						
16	\$18.43	\$15.12	\$13.04	\$12.02	(1)	(1)	(1)	
20	20.52	16.71	14.31	13.09	\$12.21	(1)	(1)	
24	22.68	18.27	15.57	14.14	13.11	\$12.34	\$11.72	

<sup>1</sup>Costs omitted because plants of this size would not gin this volume, as explained under capacity in appendix.

a single gin with a 10-bale-an-hour capacity ranged from \$11.56 a bale, when 7,000 bales were ginned, to \$19.86 a bale, when only 3,000 bales a year were ginned--a difference of \$8.30 a bale.

In the Lubbock area of Texas in 1962, total estimated costs at single gins ranged from \$13.48 to \$24.36 a bale for the three sizes of plants (table 3). Those for two-gin multiples ranged from \$14.43 to \$25.35 a bale (table 4).

Cost at two-gin multiples ranged from 86 cents to \$1.07 a bale, and averaged 95 cents a bale, more than those of single gins when capacities and annual volumes per plant were the same (tables 3 and 4).

Figure 2 shows cost curves for a single gin and two-gin multiples with a capacity

per gin of 10 bales an hour. Estimated costs for single gins ranged from \$13.95 a bale when operating at 7,000 bales a year to \$22.32 a bale when ginning only 3,000 bales a year--a difference of \$8.37 a bale.

Cost curves for the Lubbock area were similar to those in California in that costs were the highest for the smallest volumes, and they decreased rapidly for volumes between 3,000 and 5,000 bales a year.

### Itemized Costs

As mentioned earlier, costs of ginning cotton were obtained from 36 cooperatives. Cost data were collected for items generally used in gin audits. Additional information was obtained on some items,

Table 3. - Total estimated costs per bale for single cooperative gins of three sizes on selected volumes, Lubbock area of Tex., 1962

Size of gins	Costs per bale for bales ginned per year --							
	3,000	4,000	5,000	6,000	7,000	8,000	9,000	
<i>Bales an hour</i>		<i>Dollars a bale</i>						
8	\$20.25	\$16.90	\$14.79	\$13.80	(1)	(1)	(1)	
10	22.32	18.44	16.02	14.82	\$13.95	(1)	(1)	
12	24.36	19.99	17.27	15.85	14.84	\$14.08	\$13.48	

<sup>1</sup>Costs omitted because plants of this size would not gin this volume, as explained under capacity in appendix.

Table 4. - Total estimated costs per bale for two-gin multiple cooperative plants of three sizes on selected volumes, Lubbock area of Tex., 1962

Size of gins	Costs per bale for bales ginned per year --							
	6,000	8,000	10,000	12,000	14,000	16,000	18,000	
<i>Bales an hour on 2 gins</i>		<i>Dollars a bale</i>						
16	\$21.32	\$17.88	\$15.70	\$14.73	(1)	(1)	(1)	
20	23.34	19.38	16.92	15.76	\$14.86	(1)	(1)	
24	25.35	20.90	18.13	16.76	15.78	\$15.03	\$14.43	

<sup>1</sup>Costs omitted because plants of this size would not gin this volume, as explained under capacity in appendix.

such as breakdowns on insurance, taxes, depreciation, and on hours of labor used in offices and in gins. From these data, estimated costs were built up for various-sized plants and for various annual volumes ginned. Methods used for estimating individual cost items are explained in the appendix.

Estimated costs per bale, by items, for the three sizes of single-gin plants and multiple-gin plants, by various volumes, are shown in tables 5 through 10. Itemized costs for 8- 10- and 12-bales-an-hour per gin in the San Joaquin Valley of California are shown in tables 5, 6, and 7, respectively. Tables 8, 9, and 10 give the same type of information for co-op gins in the Lubbock area of Texas.

Itemized costs are classified into two groups, variable and fixed. Costs of manager's salary and office salaries have been classified as variable costs, since they were found in this study to vary closely with volumes on 5,000 bales and over. In other words, as volumes ginned per plant became larger, actual salaries paid likewise were larger and about in proportion.

Variable costs for both single and multiple gins declined substantially as

volumes increased from 3,000 to 5,000 bales, but were nearly constant on volumes of 5,000 bales and over. Fixed costs, on the other hand, decreased substantially as volume increased -- showing a range of from 50 to 67 percent from lowest to highest volume.

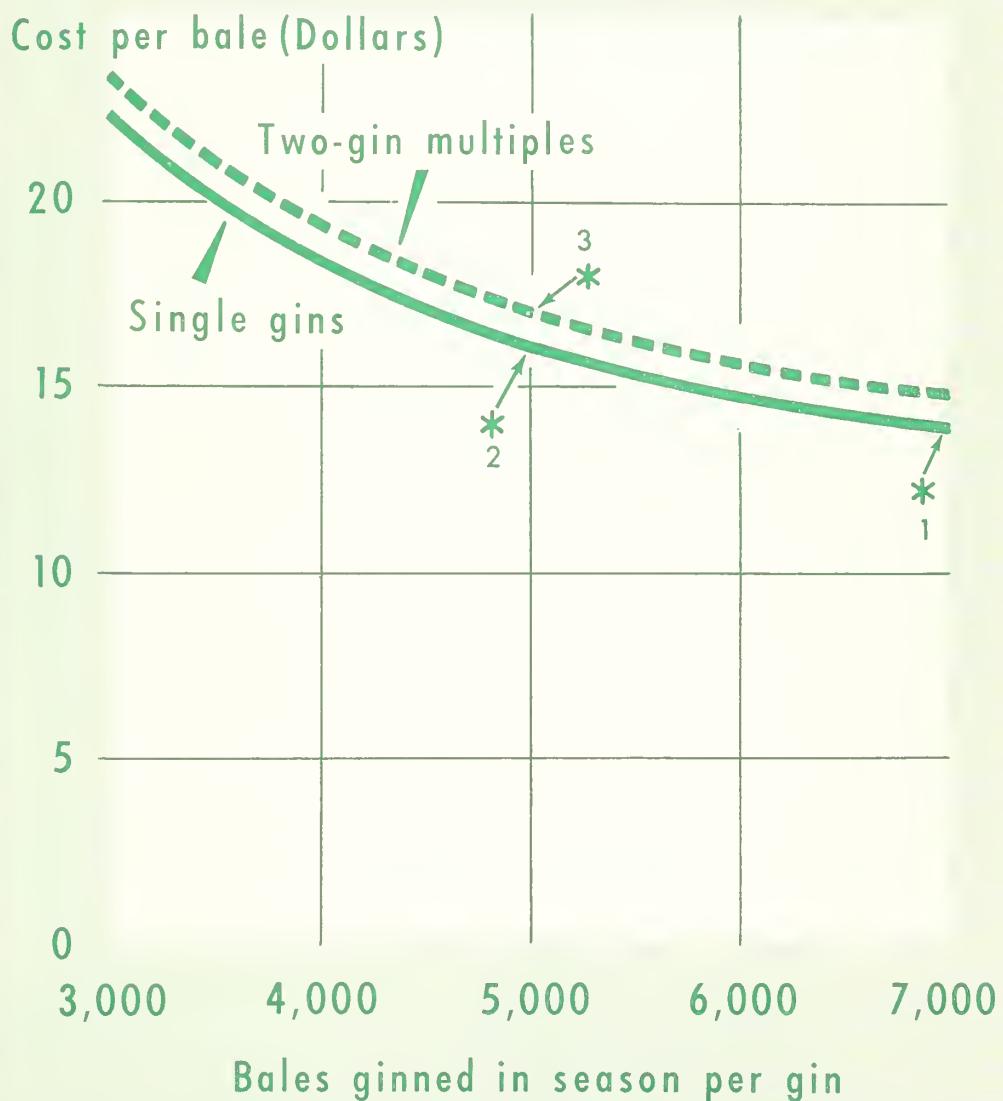
The two highest expense items were gin labor and depreciation. These two expenses combined accounted for about 50 percent of all costs.

Findings of this study show that single gins had slightly lower operating costs per bale than two-gin multiples when volumes per gin were equal.

The major expense item causing higher costs at two-gin multiples in a given area was gin labor. Office salaries were also slightly higher at the multiples. These higher costs are explained by multiples using more labor and higher-priced labor.

Multiple gins hired more skilled employees on a year-round basis than single gins did. In addition, they had more supervisory employees during the active season. Two-gin multiples commonly had a gin superintendent and two head ginners the year round and two other ginners for part of the season.

Figure 2. Estimated ginning costs per bale for cooperative gins of 10-bales-an-hour capacity. Lubbock area of Texas, 1962



\*SEE DISCUSSION UNDER APPLICATION OF COST INFORMATION

Table 5. - *Estimated costs per bale of ginning cotton at single-gin and two-gin multiple plants with 8-bale-an-hour capacity per gin, for selected annual volumes, San Joaquin Valley of Calif., 1962*

Cost item	Costs per bale for bales ginned annually per gin --			
	3,000	4,000	5,000	6,000
<i>Dollars a bale</i>				
<u>Single gins</u>				
Variable costs:				
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00
Office salaries	<sup>1</sup> .50	<sup>2</sup> .44	.40	.40
Gin labor	<sup>1</sup> 3.50	<sup>2</sup> 3.08	2.80	2.80
Repairs and gin supplies	1.30	1.10	.98	.90
Office supplies	.10	.10	.10	.10
Power	1.02	.92	.84	.79
Fuel and water	.35	.33	.31	.30
Other expenses	<sup>1</sup> .75	<sup>2</sup> .66	.60	.60
Total	8.77	7.73	7.03	6.89
Fixed costs:				
Depreciation	5.60	4.20	3.36	2.80
Interest on investment	2.17	1.63	1.30	1.08
Taxes, ad valorem	1.04	.78	.62	.52
Insurance	.19	.14	.12	.10
Total	9.00	6.75	5.40	4.50
Grand total	17.77	14.48	12.43	11.39
<u>Two-gin multiples<sup>3</sup></u>				
Variable costs:				
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00
Office salaries	<sup>1</sup> .81	<sup>2</sup> .72	.65	.65
Gin labor	<sup>1</sup> 4.37	<sup>2</sup> 3.85	3.50	3.50
Repairs and gin supplies	1.30	1.10	.98	.90
Office supplies	.10	.10	.10	.10
Power	.96	.86	.80	.75
Fuel and water	.30	.27	.24	.21
Other expenses	<sup>1</sup> .81	<sup>2</sup> .72	.65	.65
Total	9.90	8.72	7.92	7.76
Fixed costs:				
Depreciation	5.37	4.03	3.22	2.68
Interest on investment	2.00	1.50	1.20	1.00
Taxes, ad valorem	.98	.73	.59	.49
Insurance	.18	.14	.11	.09
Total	8.53	6.40	5.12	4.26
Grand total	18.43	15.12	13.04	12.02

<sup>1</sup>Increased by 25 percent over costs for volumes of 5,000 bales and larger.

<sup>2</sup>Increased by 10 percent over costs for volumes of 5,000 bales and larger.

<sup>3</sup>Costs for two-gin multiples represent costs per plant. Combined volume would be twice that of single gins.

Table 6. - *Estimated costs per bale of ginning cotton, at single-gin and two-gin multiple plants with 10-bales-an-hour capacity per gin, for selected annual volumes, San Joaquin Valley of Calif., 1962*

Cost item	Costs per bale for bales ginned annually per gin --				
	3,000	4,000	5,000	6,000	7,000
<i>Dollars a bale</i>					
<u>Single gins</u>					
Variable costs:					
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00	\$1.00
Office salaries	<sup>1</sup> .50	<sup>2</sup> .44	.40	.40	.40
Gin labor	<sup>1</sup> 3.50	<sup>2</sup> 3.08	2.80	2.80	2.80
Repairs and gin supplies	1.50	1.25	1.10	1.00	.93
Office supplies	.10	.10	.10	.10	.10
Power	1.08	1.00	.92	.85	.81
Fuel and water	.35	.33	.31	.30	.28
Other expenses	<sup>1</sup> .75	<sup>2</sup> .66	.60	.60	.60
Total	9.03	7.96	7.23	7.05	6.92
Fixed costs:					
Depreciation	6.77	5.07	4.06	3.38	2.90
Interest on investment	2.58	1.94	1.55	1.29	1.11
Taxes, ad valorem	1.25	.94	.75	.63	.53
Insurance	.23	.17	.14	.12	.10
Total	10.82	8.12	6.50	5.42	4.64
Grand total	19.86	16.08	13.73	12.47	11.56
<u>Two-gin multiples<sup>3</sup></u>					
Variable costs:					
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00	1.00
Office salaries	<sup>1</sup> .81	<sup>2</sup> .72	.65	.65	.65
Gin labor	<sup>1</sup> 4.37	<sup>2</sup> 3.85	3.50	3.50	3.50
Repairs and gin supplies	1.50	1.25	1.10	1.00	.93
Office supplies	.10	.10	.10	.10	.10
Power	1.04	.94	.86	.81	.77
Fuel and water	.30	.27	.24	.21	.18
Other expenses	<sup>1</sup> .81	<sup>2</sup> .72	.65	.65	.65
Total	10.18	8.95	8.10	7.92	7.78
Fixed costs:					
Depreciation	6.52	4.89	3.92	3.26	2.79
Interest on investment	2.41	1.81	1.45	1.21	1.03
Taxes, ad valorem	1.19	.89	.71	.59	.51
Insurance	.22	.17	.13	.11	.10
Total	10.34	7.76	6.21	5.17	4.43
Grand total	20.52	16.71	14.31	13.09	12.21

<sup>1</sup>Increased by 25 percent over cost for volumes of 5,000 bales and larger.

<sup>2</sup>Increased by 10 percent over cost for volumes of 5,000 bales and larger.

<sup>3</sup>Costs for two-gin multiples represent costs per gin. Combined volume would be twice that of single gins.

Table 7. - *Estimated costs per bale of ginning cotton at single-gin and two-gin multiple plants with 12-bales-an-hour capacity per gin, for selected volumes, San Joaquin Valley of Calif., 1962*

Cost item	Costs per bale for bales ginned annually per gin --						
	3,000	4,000	5,000	6,000	7,000	8,000	9,000
<i>Dollars a bale</i>							
<u>Single gins:</u>							
Variable costs:							
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Office salaries	.50	.44	.40	.40	.40	.40	.40
Gin labor	<sup>1</sup> 3.50	<sup>2</sup> 3.08	2.80	2.80	2.80	2.80	2.80
Repairs and gin supplies	1.70	1.40	1.22	1.10	1.01	.95	.90
Office supplies	.10	.10	.10	.10	.10	.10	.10
Power	1.43	1.07	.98	.92	.86	.82	.79
Fuel and water	.35	.33	.31	.30	.28	.27	.25
Other expenses	<sup>1</sup> .75	<sup>2</sup> .66	.60	.60	.60	.60	.60
Total	9.58	8.18	7.41	7.22	7.05	6.94	6.84
Fixed costs:							
Depreciation	7.93	5.95	4.76	3.97	3.40	2.98	2.64
Interest on investment	3.00	2.25	1.80	1.50	1.29	1.12	1.00
Taxes, ad valorem	1.46	1.09	.88	.73	.62	.55	.49
Insurance	.27	.21	.16	.13	.12	.10	.09
Total	12.66	9.50	7.60	6.33	5.43	4.75	4.22
Grand total	22.24	17.68	15.01	13.55	12.48	11.69	11.06
<u>Two-gin multiples<sup>3</sup></u>							
Variable costs:							
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00	1.00	1.00	1.00
Office salaries	.81	.72	.65	.65	.65	.65	.65
Gin labor	<sup>1</sup> 4.37	<sup>2</sup> 3.85	3.50	3.50	3.50	3.50	3.50
Repairs and gin supplies	1.70	1.40	1.22	1.10	1.01	.95	.90
Office supplies	.10	.10	.10	.10	.10	.10	.10
Power	1.19	1.00	.92	.86	.81	.78	.75
Fuel and water	.30	.27	.24	.21	.18	.15	.12
Other expenses	<sup>1</sup> .81	<sup>2</sup> .72	.65	.65	.65	.65	.65
Total	10.53	9.16	8.28	8.07	7.90	7.78	7.67
Fixed costs:							
Depreciation	7.67	5.75	4.60	3.83	3.29	2.88	2.56
Interest on investment	2.82	2.12	1.69	1.41	1.21	1.06	.94
Taxes, ad valorem	1.39	1.04	.84	.70	.60	.52	.46
Insurance	.27	.20	.16	.13	.11	.10	.09
Total	12.15	9.11	7.28	6.07	5.21	4.56	4.05
Grand total	22.68	18.27	15.57	14.14	13.11	12.34	11.72

<sup>1</sup>Increased by 25 percent over cost for volumes of 5,000 bales and larger.

<sup>2</sup>Increased by 10 percent over cost for volumes of 5,000 bales and larger.

<sup>3</sup>Costs for two-gin multiples represent costs per gin. Combined volume would be twice that of single gins.

Table 8. - *Estimated costs per bale of ginning cotton, at single-gin and two-gin multiple plants with 8-bales-an-hour capacity per gin for selected volumes, Lubbock area of Tex., 1962*

Cost item	Costs per bale for bales ginned annually per gin --			
	3,000	4,000	5,000	6,000
<i>Dollars a bale</i>				
<b>Single gins</b>				
<b>Variable costs:</b>				
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00
Office salaries	.69	.61	.55	.55
Gin labor	<sup>1</sup> 4.56	<sup>2</sup> 4.02	3.65	3.65
Repairs and gin supplies	1.80	1.60	1.48	1.40
Office supplies	.20	.20	.20	.20
Power	1.83	1.71	1.64	1.59
Fuel and water	.35	.33	.31	.30
Other expenses	<sup>1</sup> 1.06	<sup>2</sup> .94	.85	.85
<b>Total</b>	<b>11.74</b>	<b>10.51</b>	<b>9.68</b>	<b>9.54</b>
<b>Fixed costs:</b>				
Depreciation	5.60	4.20	3.36	2.80
Interest on investment	2.17	1.63	1.30	1.08
Taxes, ad valorem	.45	.34	.28	.23
Insurance	.29	.22	.17	.15
<b>Total</b>	<b>8.51</b>	<b>6.39</b>	<b>5.11</b>	<b>4.26</b>
<b>Grand total</b>	<b>20.25</b>	<b>16.90</b>	<b>14.79</b>	<b>13.80</b>
<b>Two-gin multiples<sup>3</sup></b>				
<b>Variable costs:</b>				
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00
Office salaries	<sup>1</sup> 1.00	<sup>2</sup> .88	.80	.80
Gin labor	<sup>1</sup> 5.75	<sup>2</sup> 5.06	4.60	4.60
Repairs and gin supplies	1.80	1.60	1.48	1.40
Office supplies	.20	.20	.20	.20
Power	1.76	1.65	1.59	1.53
Fuel and water	.30	.27	.24	.21
Other expenses	<sup>1</sup> 1.19	<sup>2</sup> 1.05	.95	.95
<b>Total</b>	<b>13.25</b>	<b>11.81</b>	<b>10.86</b>	<b>10.69</b>
<b>Fixed costs:</b>				
Depreciation	5.36	4.03	3.22	2.68
Interest on investment	2.00	1.50	1.20	1.00
Taxes, ad valorem	.43	.33	.26	.22
Insurance	.28	.21	.16	.14
<b>Total</b>	<b>8.07</b>	<b>6.07</b>	<b>4.84</b>	<b>4.04</b>
<b>Grand total</b>	<b>21.32</b>	<b>17.88</b>	<b>15.70</b>	<b>14.73</b>

<sup>1</sup>Increased by 25 percent over costs for volumes of 5,000 bales and over.

<sup>2</sup>Increased by 10 percent over costs for volumes of 5,000 bales and over.

<sup>3</sup>Costs for two-gin multiples represent costs per gin. Combined volume would be twice that of single gins.

Table 9. - *Estimated costs per bale of ginning cotton, at single-gin and two-gin multiple plants with 10-bales-an-hour capacity per gin, for selected annual volumes, Lubbock area of Tex., 1962*

Cost item	Costs per bale for bales ginned annually per gin --				
	3,000	4,000	5,000	6,000	7,000
<i>Dollars a bale</i>					
<u>Single gins</u>					
Variable costs:					
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00	\$1.00
Office salaries	.69	.61	.55	.55	.55
Gin labor	<sup>1</sup> 4.56	<sup>2</sup> 4.02	3.65	3.65	3.65
Repairs and gin supplies	2.00	1.75	1.60	1.50	1.43
Office supplies	.20	.20	.20	.20	.20
Power	1.96	1.80	1.71	1.65	1.60
Fuel and water	.35	.33	.31	.30	.28
Other expenses	<sup>1</sup> 1.06	<sup>2</sup> .94	.85	.85	.85
Total	12.07	10.75	9.87	9.70	9.56
Fixed costs:					
Depreciation	6.77	5.08	4.06	3.38	2.90
Interest on investment	2.58	1.94	1.55	1.29	1.11
Taxes, ad valorem	.55	.41	.33	.28	.23
Insurance	.35	.26	.21	.17	.15
Total	10.25	7.69	6.15	5.12	4.39
Grand total	22.32	18.44	16.02	14.82	13.95
<u>Two-gin multiples<sup>3</sup></u>					
Variable costs:					
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00	1.00
Office salaries	<sup>1</sup> 1.00	<sup>2</sup> .88	.80	.80	.80
Gin labor	<sup>1</sup> 5.75	<sup>2</sup> 5.06	4.60	4.60	4.60
Repairs and gin supplies	2.00	1.75	1.60	1.50	1.43
Office supplies	.20	.20	.20	.20	.20
Power	1.86	1.73	1.66	1.60	1.50
Fuel and water	.30	.27	.24	.21	.18
Other expenses	<sup>1</sup> 1.19	<sup>2</sup> 1.05	.95	.95	.95
Total	13.55	12.04	11.05	10.86	10.66
Fixed costs:					
Depreciation	6.52	4.89	3.92	3.26	2.79
Interest on investment	2.41	1.81	1.44	1.21	1.03
Taxes, ad valorem	.52	.39	.31	.26	.23
Insurance	.34	.25	.20	.17	.15
Total	9.79	7.34	5.87	4.90	4.20
Grand total	23.34	19.38	16.92	15.76	14.86

<sup>1</sup>Increased by 25 percent over cost for volumes of 5,000 bales and larger.

<sup>2</sup>Increased by 10 percent over cost for volumes of 5,000 bales and larger.

<sup>3</sup>Costs for two-gin multiples represent costs per gin. Combined volume would be twice that of single gins.

Table 10. - *Estimated costs per bale of ginning cotton at single-gin and two-gin multiple plants with 12-bales-an-hour capacity per gin, for selected volumes, Lubbock area of Tex., 1962*

Cost item	Costs per bale for bales ginned annually per gin --						
	3,000	4,000	5,000	6,000	7,000	8,000	9,000
<i>Dollars a bale</i>							
<u>Single gins</u>							
Variable costs:							
Manager's salary	<sup>1</sup> \$1.25	<sup>2</sup> \$1.10	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Office salaries	.69	.61	.55	.55	.55	.55	.55
Gin labor	<sup>1</sup> 4.56	<sup>2</sup> 4.02	3.65	3.65	3.65	3.65	3.65
Repairs and gin supplies	2.20	1.90	1.72	1.60	1.51	1.45	1.40
Office supplies	.20	.20	.20	.20	.20	.20	.20
Power	2.07	1.90	1.80	1.71	1.66	1.62	1.59
Fuel and water	.35	.33	.31	.30	.28	.27	.25
Other expenses	<sup>1</sup> 1.06	<sup>2</sup> .94	.85	.85	.85	.85	.85
Total	12.38	11.00	10.08	9.86	9.70	9.59	9.49
Fixed costs:							
Depreciation	7.93	5.95	4.76	3.97	3.40	2.98	2.64
Interest on investment	3.00	2.25	1.80	1.50	1.29	1.12	1.00
Taxes, ad valorem	.64	.48	.39	.32	.28	.24	.21
Insurance	.41	.31	.24	.20	.17	.15	.14
Total	11.98	8.99	7.19	5.99	5.14	4.49	3.99
Grand total	24.36	19.99	17.27	15.85	14.84	14.08	13.48
<u>Two-gin multiples<sup>3</sup></u>							
Variable costs:							
Manager's salary	<sup>1</sup> 1.25	<sup>2</sup> 1.10	1.00	1.00	1.00	1.00	1.00
Office salaries	<sup>1</sup> 1.00	<sup>2</sup> .88	.80	.80	.80	.80	.80
Gin labor	<sup>1</sup> 5.75	<sup>2</sup> 5.06	4.60	4.60	4.60	4.60	4.60
Repairs and gin supplies	2.20	1.90	1.72	1.60	1.51	1.45	1.40
Office supplies	.20	.20	.20	.20	.20	.20	.20
Power	1.96	1.81	1.72	1.65	1.61	1.57	1.53
Fuel and water	.30	.27	.24	.21	.18	.15	.12
Other expenses	<sup>1</sup> 1.19	<sup>2</sup> 1.05	.95	.95	.95	.95	.95
Total	13.85	12.27	11.23	11.01	10.85	10.72	10.60
Fixed costs:							
Depreciation	7.67	5.75	4.60	3.83	3.29	2.88	2.56
Interest on investment	2.82	2.12	1.69	1.41	1.21	1.06	.94
Taxes, ad valorem	.61	.46	.37	.31	.26	.23	.20
Insurance	.40	.30	.24	.20	.17	.14	.13
Total	11.50	8.63	6.90	5.75	4.93	4.31	3.83
Grand total	25.35	20.90	18.13	16.76	15.78	15.03	14.43

<sup>1</sup>Increased by 25 percent over cost for volumes of 5,000 bales and larger.

<sup>2</sup>Increased by 10 percent over cost for volumes of 5,000 bales and larger.

<sup>3</sup>Costs for two-gin multiples represent costs per gin. Combined volume would be twice that of single gins.

Most single gins had only one head ginner on a year-round basis, who was also head ginner on the day crew during the active season. They usually hired a night ginner on an hourly basis for only part of the active season.

Additional labor used by multiples was the primary cause of their using more man-hours to gin a bale of cotton. Single gins in California used 1.1 man-hours, compared with 1.35 man-hours per bale for two-gin multiples. Single gins in the Lubbock area used an average of 2.51 man-hours a bale, compared with 3.0 man-hours for two-gin multiples.

Wage rates for gin labor at two-gin multiples in California averaged 5 cents an hour higher than that for singles; in the Lubbock area, they averaged 8 cents an hour higher.

In addition to gin labor, most multiples used more office labor per bale than singles. Most of them had full-time bookkeepers, and some had assistants on a full-time basis. Most single gins, on the other hand, hired bookkeepers on a part-time basis. A few single gins had bookkeepers come in once a week during the dormant season.

Two gin multiples had lower fixed costs than single gins. Costs of power, fuel, and water were also lower at multiples. The combination of these lower costs, however, was not sufficient to offset the higher cost of gin labor and office salaries at the multiples.

These data also show that ginning costs in the Lubbock area of Texas were higher than those in California. This was attributed primarily to gins in Texas using considerably more man-hours of labor to gin the cotton. For example,

single gins in Texas used more than twice as much labor per bale as those in California--2.51 compared with 1.1 man-hours. Two plant multiple gins in Texas used an average of 3.0 man-hours per bale compared with 1.35 man-hours per bale in California.

Typical examples of the relation of labor used to volume of cotton ginned in California and Texas are shown in Figures 3 and 4. Figure 3 shows bales ginned by days and average hours of gin labor used per day by weeks for a 10-bale-per-hour single gin in California. Figure 4 shows similar information for a 10-bale-per-hour single gin in Texas. However, hours of labor used in Texas are shown by pay periods rather than by weeks (pay periods ranged from 5 to 9 days).

The California gin in figure 3 averaged 0.83 man-hour a bale during peak week and 0.99 man-hour for the year, while the Texas gin in figure 4 used 0.89 man-hour a bale in a peak week, but an average of 2.41 man-hours a bale for the year. The California gin showed a close adjustment of labor used to bales ginned, while the Texas gin used considerably more labor in proportion to bales ginned especially from September 16 to November 5.

The Texas gin handled very little cotton from December 7 through December 16, although hours of gin labor paid for were at a high level. A rainy period accounted for the low level of bales ginned between those dates. Bad weather conditions also accounted for the low level of bales ginned around November 15.

### Application of Cost Information

Cost information in this report can be useful to gin plants in several respects. It can help them make better decisions

Figure 3. Bales ginned by days; average hours of gin labor a day, by weeks; and capacity a day of a single gin, in San Joaquin Valley of California. 10-bale-an-hour size, 1961

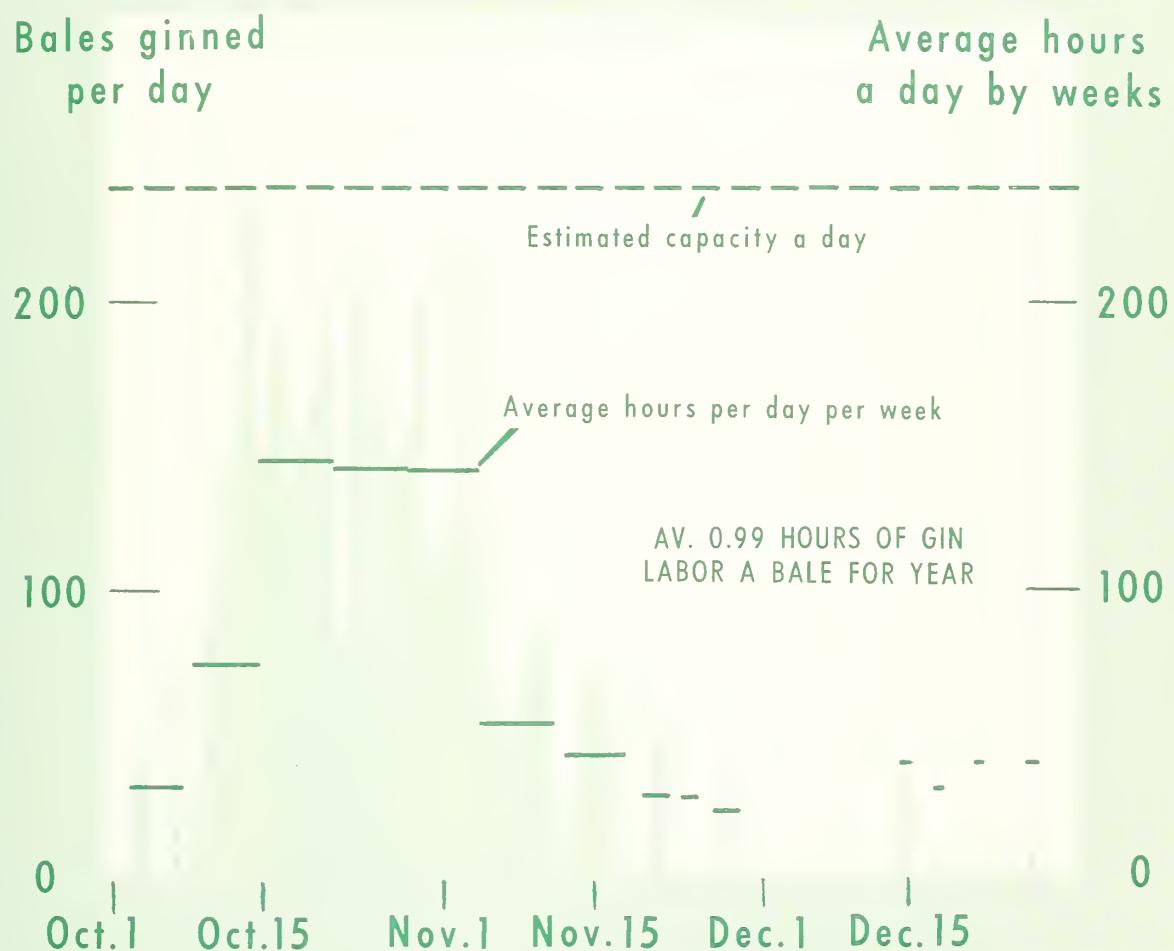
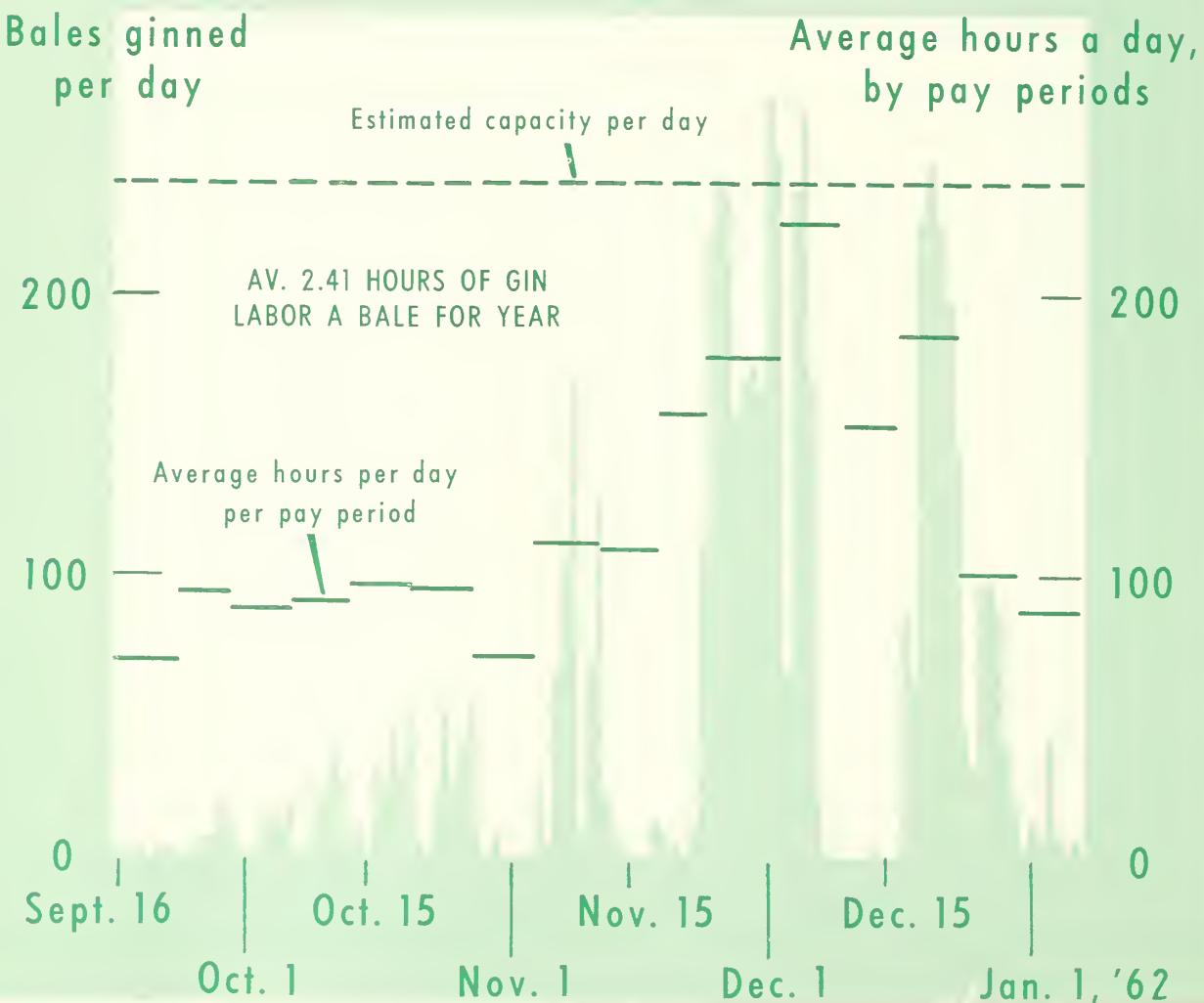


Figure 4. Bales ginned by days; average hours of gin labor a day, by pay periods; and capacity per day of a single gin in Lubbock area of Texas. 10-bale-an-hour size, 1961



when building new gins or expanding facilities. It can also help them analyze overall efficiency and locate or spot inefficient operations. Illustrations to follow are based on cost relationships presently existing in these areas but do not necessarily indicate the lowest-cost operation.

When members of a single gin are considering expanding facilities, they might build another single gin at a different location, or make a two-gin multiple from their single gin. Information in this report will give guidance in making their decision.

Suppose a single-gin plant in the Lubbock area of Texas, having a capacity of 10 bales an hour, is ginning close to capacity, or 7,000 bales a year. Its total cost would be about \$13.95 a bale (see point 1 in figure 2). Then, suppose the group of farmers that own this single-gin plant or another group of farmers built another single, 10-bale-an-hour gin in a nearby location, and each gin handled an average of 5,000 bales a year. Average operating costs for each would approximate \$16.02 a bale (see point 2 in figure 2).

Or, suppose the group of farmers would build another 10-bale-an-hour gin at the same site of the existing gin, making a two-gin multiple, and that the combined volume would be 10,000 bales a year, or 5,000 bales a gin. Total cost for the two-gin operation would approximate \$16.92 a bale (see point 3 in figure 2).

When cotton farmers are planning to build a new gin or to add to an existing gin, another use of the cost information is to assist them in making better decisions on the size of gin to build.

Suppose a group of farmers in California decided to build a gin and

estimated volume at the start at 7,000 bales a year. The group probably would want to build a 12-bale-an-hour gin, especially if volume in future years was expected to increase. As explained in the appendix, an 8-bale-an-hour gin could not gin 65 percent of that volume in 21 days, and a 10-bale-an-hour gin would be operating near capacity at 7,000 bales a year. Thus neither of the two smaller-capacity gins would be large enough to handle expected increases in volume.

Existing gins can use this cost information, also, for checking their current operations. For example, gins can determine how their costs might be affected by changes in volume. Suppose an 8-bale-an-hour gin in California ginned 5,000 bales a year. By increasing its volume to 6,000 bales, its cost would be lowered by about \$1.04 a bale (table 1). Or suppose a 12-bale-an-hour single gin in Lubbock, Texas, was ginning 6,000 bales a year and increased its volume to 8,000 bales. Its cost, then, would be lowered by about \$1.77 a bale (table 3).

Single gins and two-gin multiples can also check their individual or itemized costs with estimated average costs, as found in this study. They could compare such expenses as manager's and office salaries, gin labor, repairs and supplies, and power. Should any of their individual costs exceed those of the average, as shown in table 5 through 10, they might take steps to determine reasons for differences and remedy any inefficiencies.

These examples are among the many comparisons and uses that can be made of cost information in this report. Factors other than costs, however, often dictate whether plants operate at lowest possible costs. These "other considerations" are discussed in a later section.

## Facility Costs

Cost of building and equipping a modern gin ranges from about \$200,000 to over \$400,000. Total facility costs vary, of course, depending upon such factors as ginning capacity, design of buildings and equipment, custom services performed by builders and manufacturers, and cost of land.

Design and prices of gin machines have been changing rapidly in recent years. For many years before 1958, all makes of new gin stands were standardized on 12-inch-diameter saws and with either 80 or 90 saws a stand. At present gin saws in new stands may be 12, 14, 16, or 18 inches in diameter, and the number of saws per stand differs widely and varies among manufacturers. Other items of gin equipment also differ in size and cost. Costs of gin plants of given capacities are more alike than items of equipment.

Because of the complexities and differences just stated, cost of building gins has been estimated in this study for three

different sizes of gins like those being built in the survey areas--8-, 10-, and 12-bale-an-hour capacities. Technical specifications were omitted.

Tables 11 and 12 show these estimates. Table 11 gives costs of single gins that may become the first gin of a multiple, whereas table 12 compares costs of single gins as compared with multiples.

Total facility cost for an 8-bale-an-hour single gin was estimated at \$250,000; a 10-bale-an-hour gin at \$300,000; and a 12-bale-an-hour gin at \$350,000 (table 11). Cost of building and equipping two-gin multiple plants was estimated to vary from \$470,000 for 8-bale-an-hour gins to \$667,500 for 12-bale-an-hour gins.

New cooperative ginning plants generally build office buildings, install truck scales, and buy office furniture and equipment. They prefer about 20 acres of

Table 11. - *Estimated cost of major items for single gins of selected sizes, California and Texas, at 1962 prices*

Cost item	Size of gins (bales per hour) <sup>1</sup>		
	8	10	12
<i>Dollars</i>			
Land, 20 acres @ \$500/acre	\$10,000	\$10,000	\$10,000
Office buildings	10,000	11,000	12,500
Gin buildings	20,000	24,000	27,500
Gin machinery	200,000	245,000	290,000
Scales	5,000	5,000	5,000
Office furniture and fixtures	5,000	5,000	5,000
<hr/>	<hr/>	<hr/>	<hr/>
Total	250,000	300,000	350,000

<sup>1</sup>For explanation, see section in appendix on capacity.

Table 12. - *Estimated cost of investments required for single gins and two-gin multiples of selected sizes, California and Texas, at 1962 prices*

Size of gin (Bales an hour, per gin)	Single gins	Two-gin multiples <sup>1</sup>		
		First gin	Second gin	Both gins
<i>Dollars</i>				
8	\$250,000	\$250,000	\$220,000	\$470,000
10	300,000	300,000	269,000	569,000
12	350,000	350,000	317,500	667,500

<sup>1</sup>Cost of land, office buildings, scales, and office furniture and fixtures were omitted in estimated costs of second gins.

land for buildings, parking, and storage. This acreage is usually large enough for an additional gin to be added on the same site. Consequently, a single cooperative gin, or the first gin of a multiple, would cost more than a later gin that might be added. Expenses that generally would be avoided when adding a second gin are cost of land, office building, scales, and office furniture and fixtures.

Data on cost of facilities, similar to those used in areas surveyed, were obtained from manufacturers of gin machinery. Gin managers furnished data on costs of their gins built in recent years. Estimates based on combinations of these cost data are believed to be reasonable generalizations and valid for use in cost comparisons.

## Considerations Other Than Costs

Although ginning costs are the primary subject of this study, and they are important to cotton growers, other considerations also influence actions of cotton growers. Among the other factors that members of cooperative gins consider besides cost of ginning are, financial requirements, speed in unloading trailers, condition of gin equipment, and competition.

Financing a new gin is often a problem. Members of cooperatives frequently increase their ginning capacity by adding additional gins to existing gins because it is easier to do this than it is for a new

association to finance construction of a wholly new plant.

When members of an existing ginning plant have their facilities paid for or have substantial equity in them, it is relatively easy for them to borrow money to build another gin. It is often difficult, however, for cotton farmers to raise needed capital -- some \$60,000 to \$100,000 -- to get a new cooperative ginning plant started.

New associations sometimes buy used gins and get started for less than these amounts. However, many cotton growers prefer to gin their cotton at new gins.

Cotton growers frequently favor building additional gins to get faster ginning services. Demands for faster ginning service are caused largely by machine harvesting and growers' needs for more trailer space to handle cotton as fast as it is harvested.

Some of the demand has been caused by increased production from irrigation and other improved production practices. Some growers value faster ginning service more than lower cost with slower ginning service. Adding another gin to an existing operation is often one of the easiest ways to get faster ginning service.

Frequent changes in gin machinery cause obsolescence to seem rapid. Consequently, members of some cooperative gins build new gins to keep up with changes, even when volumes ginned do not equal or exceed capacities of their existing gins, and quality of ginning service of the existing plant is satisfactory.

Because of these considerations, a second gin is sometimes added to a single gin even though operating costs per bale (for the two-gin multiple) will be higher, at least during its early years of operation.

## Evaluation of Single and Multiple Gins

On the basis of estimated ginning costs presented earlier, the number of bales available to cooperatives should determine whether they operate a single- or a multiple-gin plant. Number of bales available should also determine the size of gin to be constructed. If cotton available exceeds capacity of a single gin, the extent of the excess is a primary factor in considering whether to add another gin. Volumes or bales available should average close to capacities of all gins to keep operating costs at a minimum.

While this concept of balance between volumes to be ginned and capacities of gin plants appears simple, problems arise in its application. One of the most difficult problems is to estimate rather accurately how many bales will be available for ginning in future years. Changes in number of members and in cotton production and harvesting practices make it difficult to construct accurate estimates.

This study was limited primarily to costs of ginning. But in actual operations,

members, directors, and managers of co-operative gins are also concerned with gin margins on cottonseed, savings on cottonseed made by cooperative oil mills, and margins earned on handling bagging and ties. Sometimes cooperative gins perform other services -- such as the handling of farm supplies -- that provide savings.

In deciding whether to expand the capacity of a co-op ginning plant, members should keep in mind potential net savings available from sources other than ginning, as well as services offered by gins and low ginning costs. It is possible for a single gin to be operating near maximum capacity with low costs and still earn less margins than it would if it were to add an additional gin plant and have higher ginning costs per bale.

For example, a single plant having a capacity of 7,000 bales a year, might not be able to gin all cotton produced by its members. Perhaps 4,000 bales would be ginned elsewhere. By adding a second

gin, ginning costs a bale would be higher in the two-gin multiple, but this additional cost might be more than offset by increased margins earned on the larger volume of cottonseed handled, both at the gin and the cooperative oil-mill level. For proper decisions to be reached on such matters, local managements need to make a thorough study of conditions existing in their areas.

The value of faster ginning service is an important consideration in buying or building additional cooperative gins, whether new single gins or additions to existing plants. Amounts by which ginning costs a bale might be increased by excess capacity depends largely on the extent of the excess capacity. Increases in cost, due to excess capacity, range from over \$10 to less than \$1 a bale, according to estimates in tables 1 through 4.

## Indicated Costs of Larger Multiples

Data were collected from only six plants that had three or more gins each at the same location. As stated before, three of the six were in the San Joaquin Valley of California, and the other three were in the Lubbock area of Texas. The small numbers of gins and the mixedages of some plants, especially those in California, largely restrict the use of those data to indications of probable costs.

The 10 gins owned by 3 large California plants averaged 5,145 bales a gin, and their costs as estimated in the survey averaged \$11.55 a bale. The five two-gin multiples averaged 4,716 bales a gin and their costs as shown in survey data averaged \$12.50 a bale. The two-gin multiples had proportionally more new gins -- 6 of 10 compared to 3 of 10 for larger multiples -- as well as smaller volumes.

Large multiples in California had only one new gin each. In addition, the data were too limited to make definite conclusions. But they indicate only small differences in costs between two-gin plants and larger multiple gins in that area.

Volume ginned by three-gin multiples in the Lubbock area averaged 5,555 bales

a gin and costs averaged \$15.89, compared to an average of 5,167 bales and cost of \$14.23 for two-gin multiples.

Managers' salaries averaged about 30 cents a bale less at three-gin multiples than at two-gin multiples in the Lubbock area. But repair and supply costs were over a \$1 a bale higher at larger multiples and office salaries and gin labor combined averaged 58 cents a bale more. Higher office salaries probably reflect more assistance to managers from office force, and higher gin labor probably reflects retention of more supervisory and skilled men throughout the year.

The limited data from the Lubbock area on larger multiples strongly indicate somewhat higher costs there for three-gin than for two-gin multiples.

Costs given in this section differ from estimated costs in other parts of this report in several respects and consequently are not comparable. Among the differences are: Interest on investments was not included in costs; depreciation costs were those used by gins on old and new plants combined and were calculated at various rates; and average volumes ginned per plant varied.

## Appendix

Gin capacity is a major consideration for about 3 weeks during the peak season. But it is of little concern before or after the 3 peak weeks, because cotton available for ginning then is usually much below capacity of gins.

### Basis of Capacities Used for Gins

In this study, capacities of 8, 10, and 12 bales an hour were used for gins costing estimated amounts. Twenty-four hours were used for basis of ginning capacities, although many gins actually operated 23.0 or 23.5 hours of each 24, during peak periods.

Gins included in the survey of the same sizes as the models used ginned more bales on their highest days than these rates; but these rates were higher than the average of actual ginning rates during their peak weeks. Although capacities of modern gins vary widely, these rates correspond fairly close to what gin managers said they expected on good days.

Mechanical troubles, time lost between bales belonging to different customers, capacity of bale presses or other gin equipment, opinions of managers, and other factors limited actual capacities realized on gins to less than reported potential capacities. Some gin managers said they preferred to gin slowly to avoid injury to fibers.

Eleven of the cooperatives surveyed in California ginned from 53.0 to 71.5 percent of bales for the 1961 season in 21 consecutive days and nights. The average was 63 percent.

Proportions ginned by Lubbock area co-ops in 21 days were higher than those in California. These Texas co-ops ginned from 65.0 to 88.2 percent of annual volume in 21 days, and averaged 75.6 percent. However, the 21 highest days and nights were not consecutive in that area because of rainy spells.

Growers are harvesting higher proportions of their cotton each year with machines. Under these circumstances, volumes of gins were considered limited to 65 percent of bales for the season that were ginned in 21 days and nights. Even a larger proportion of bales may be ginned in 3 weeks as larger proportions of cotton are harvested with machines and harvesting practices become more stable.

An 8-bale-an-hour gin could gin 192 bales in 24 hours and 4,032 bales in 21 days. On the basis of 4,032 bales equaling 65 percent of its annual volume, such a gin would be limited to 6,000 bales a season, since 7,000 bales would exceed its capacity.

A 10-bale-an-hour single gin, on the basis of capacities as calculated above, could gin 7,000 bales a season, and a 12-bale-an-hour single gin could gin 9,000 bales a season.

### Methods Used in Estimating Costs

Methods used to determine each of the various cost items are explained in this section. This information will be useful to gin managers, researchers, and others who are interested in detailed procedures used in the conduct of this study.

Model costs developed and presented in the main part of the text may have general application only. Since conditions at some gins may differ from those included in this survey, their costs likewise might differ. However, explanation of costing and other techniques used might assist them, and all gins, in applying model costs to specific situations.

Costs of bagging and ties are sometimes included in ginning expenses, but they were omitted from costs in this study. Bagging and ties were considered a merchandizing operation and a source of revenue. Margins on bagging and ties are similar to gin margins on cottonseed and many gins include both in the revenue section of operating statements.

Costs of purchasing a pattern of bagging and ties vary little among gins in a given area; and gins usually charge producers about the same for them. If costs or charges for bagging and ties are different among gins in an area, such differences are not caused by single or multiple characteristics of gins, since volume does not affect their cost.

Explanations of costs are grouped under two categories, variable and fixed.

### Variable Costs

Costs classified as variable in this study included the following: Managers' salaries, office salaries, gin labor, gin repairs and supplies, office supplies, power, fuel and water, and other expenses.

Other expenses included the following costs: Auditing and legal, telephone and telegraph, annual meeting expenses, directors' expenses, travel, advertising and donations (but not payments to National Cotton Council or similar organizations),

and expense of handling cotton on gin yard (but not on hauling baled cotton or cottonseed to compress or oil mill).

Items making up total variable costs generally varied closely with, or were the same as, number of bales ginned.

Managers' Salaries. -- One dollar a bale was rather close to average salary of managers in both California and the Lubbock area of Texas, for single gins on 5,000 bales and over and for two-gin multiples on 7,000 bales and over. Managers' salaries, as used in this study, included payments by gins for social security, health and accident or workmen's compensation insurance, life insurance, and bonuses. They also included rental value of residences furnished to managers.

Managers' salaries were increased by 25 percent, or to \$1.25 a bale, on smallest volumes (3,000 bales on single gins and 6,000 bales on multiples); and they were increased to \$1.10 a bale, on next to the smallest volumes. This was done because of the common tendency of costs a bale of managers' salaries to be considerably higher on smaller volumes.

Office Salaries. -- Single gins in California used an average of 0.19 man-hour a bale for office work (bookkeepers, clerks and weighers), and multiple gins used an average of 0.33 man-hour a bale. In calculating cost estimates these amounts were rounded to 0.20 man-hour a bale for single gins and to 0.30 man-hour for two-gin multiples.

Salaries of office employees averaged about \$2.00 an hour for single gins and \$2.20 an hour for multiples. Office work at these rates was estimated to cost 40 cents a bale for single gins and 65 cents, for multiples. These costs were used for

estimates in tables 1 and 2 in the text. They were increased 25 percent on smallest volumes and by 10 percent on next to smallest volumes, as was done on managers' salaries.

Gins in the Lubbock, Texas area used more office help than gins in California. Single gins in the Lubbock area used an average of 0.41 man-hour a bale for office work, which was rounded to 0.40 man-hour a bale in estimated costs. Multiple gins used an average of 0.52 man-hour a bale, which was rounded to 0.50 man-hour in estimates.

Office salaries averaged \$1.38 an hour for single gins and \$1.60 an hour for multiples. At these rates, office salaries were estimated to cost 55 cents a bale for single gins and 80 cents a bale for multiples. These amounts were also increased by 25 and 10 percent, respectively, on the two smallest volumes of both singles and multiples.

Social security, hospitalization, and other payroll expenses paid by gins were included in office salaries in both areas.

Multiple gins usually hired bookkeepers full-time the year around, while single gins generally hired bookkeepers part-time only. This largely accounts for difference in man-hours and costs of office work of single and multiple gins in both areas.

Gin Labor. -- Two-gin multiples used more labor per bale than single gins in both California and the Lubbock area of Texas. Average wage rates were also higher for multiples in both areas.

Single gins in California used an average of 1.1 man-hours of labor a bale. They paid an average wage of \$2.55 an

hour, or \$2.80 a bale. Two-gin multiples used an average of 1.35 man-hours a bale and paid an average wage of \$2.60 an hour, or \$3.50 a bale.

Single gins in the Lubbock area used an average of 2.51 man-hours a bale, at an average rate of \$1.45 an hour, and a cost of \$3.65 a bale. Two-gin multiples averaged 3.0 man-hours a bale at an average wage rate of \$1.53 an hour and a cost of \$4.60 a bale.

Limited data obtained from three- and four-gin multiples also indicated that they used more man-hours of labor a bale than single gins. Most larger multiples used slightly more labor a bale than two-gin multiples.

Rainy periods in the Lubbock area accounted partly for the greater use of labor than in California. Snapped or stripped cotton in the Lubbock area might also account for part of the additional labor used there. Perhaps higher wage rates in California causes management to use less labor.

Gin Repairs and Supplies. -- Labor hired by gins for repairing and maintaining gins was included in gin labor, but outside labor used for repairs was included in gin repairs and supplies. Supplies included oil, grease, and other provisions used in ginning plants except office supplies and bagging and ties.

Cost of repairs and supplies averaged \$0.81 a bale for single gins and \$1.14 for two-gin multiples in California. The singles were all rather new -- built in 1959 or more recently. One of the gins at most two-gin multiples was built before 1959. These older gins would be expected to require more repairs. So, \$1.00 a bale was estimated as the cost of repairs and

supplies for California gins of 10-bale-an-hour size, ginning 6,000 bales a year.

Costs of repairs and supplies were higher in the Lubbock area of Texas. They averaged \$1.54 a bale on both single gins and two-gin multiples surveyed. More dirt and trash in cotton in the Lubbock area probably accounts for higher costs there than in California for repairs and supplies.

Most of the two-gin multiples in the Lubbock area had built both gins in 1959 or more recently. All singles included in the survey had been built in 1959, 1960, or 1961. Costs were rounded to \$1.50 a bale in estimates for both single and two-gin multiples for 10-bale-an-hour size, on 6,000 bales a gin.

A substantial part of expenses for repairs and supplies is largely fixed because it would occur, more or less, regardless of volume ginned. In recognition of that tendency, it was estimated that \$0.50 a bale was fixed cost of maintenance in both California and Texas. This amount was included in repairs and supplies for 10-bale-an-hour sized gins with annual volumes of 6,000 bales. The balance of repair and supply expenses, or \$0.50 a bale in California and \$1.00 a bale in Texas, was assumed to vary as number of bales varied. Fixed expenses on 8- and 12-bale-an-hour gins were assumed to be in proportion to size of gins, or \$0.40 and \$0.60 a bale at 6,000-bale volumes and with variable expenses the same as for 10-bale-an-hour gins.

The above procedure resulted in estimated costs of repairs and supplies varying by size of gin and annual volumes ginned. Examples of these expenses for different size gins on selected volumes are shown in tables 5 through 10 in the text.

Office Supplies. -- Office supplies in California gins averaged 8.5 and 9.5 cents a bale for single and two-plant multiple gins, respectively. These costs were rounded to 10 cents a bale for both kinds of gins on all volumes.

Office supplies in the Lubbock, Texas area averaged 19 cents a bale for single and 23 cents a bale for two-gin multiples. These costs were estimated at 20 cents a bale for all size gins on various volumes.

Power. -- High-capacity gins in California used an average of 49.19 kilowatt-hours a bale and those in Lubbock area averaged 60.01 kilowatt-hours a bale. These averages were rounded to 50 and 60 kilowatt-hours a bale, respectively, for use in calculating power costs.

One of the electric rate schedules applying to many gins in California and another common one in the Lubbock area, were used for calculating cost of power. In both of these schedules kilowatt "demands" as well as kilowatt-hours were used in calculating power bills. Some electric rate schedules use horsepower of connected motors for calculating power bills.

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### Exhibit

#### Electric Rate Schedule--California

The electric rate schedule in California that was used for calculating cost of power, in estimated costs for models, had the following rates and provisions:

On billing demands of 75 kilowatts and over, rates per kwh for monthly consumption are shown on following page.

First 100 kwh per kw . . . . .	2.54¢
Next 100 kwh per kw . . . . .	1.28¢
Next 100 kwh per kw . . . . .	1.07¢
All over 300 kwh per kw . . .	0.88¢

Minimum charge was \$50.00 per month for the first 40 kw or less of the billing demand, plus 90¢ per kw for any excess, accumulative annually.

Kilowatt demand used was the maximum average power taken during any 15-minute interval in the month. Billing demands could not be less than 50 percent of highest actual demand in the preceding 11 months.

#### Electric Rate Schedule--Texas

The rate schedule used in calculating power costs for model gins for Texas had the following rates and provisions:

Energy rate:

5.5¢ per kwh for first 100 kwh used per month
4.0¢ per kwh for next 200 kwh used per month
3.7¢ per kwh for next 800 kwh used per month <sup>1</sup>
1.9¢ per kwh for all additional kwh used per month

Kilowatt demand was determined by company demand meter for 30-minute period of greatest use in month.

Fuel adjustment applied.<sup>2</sup>

Bales of cotton ginned by calendar months were averaged for each area.

Average percentages ginned from highest to lowest months were as follows:

In California: 65; 29; 3; 2; and 1 percent

In Lubbock, Tex., area: 52; 33; 11; 3; and 1 percent

These percentages were used to determine numbers of bales estimated as ginned monthly on model gins. Numbers of bales were multiplied by 50 kilowatt-hours for California and by 60 kilowatt-hours for Texas to determine kilowatt-hours used for calculating power costs.

Some electric-rate schedules use horsepower of connected motors to calculate power bills. Horsepower of motors on 8-, 10-, and 12-bale-an-hour model gins was estimated as 600, 750, and 900 horsepower.

Horsepower of motors for model gins was used to estimate kilowatt demands. For single gins in California, 70 percent of connected horsepower was used and kilowatt demand in 2 months when 65 to 29 percent of cotton was ginned.<sup>3</sup> Seventy-five percent of that kw demand was used for the month in which 3 percent of the bales were ginned, and 50 percent (minimum billing demand) was used for the other 2 months. This procedure resulted in kw demands as follows:

8-bale-an-hour gin: 420; 420; 315; 210; and 210

10-bale-an-hour gin: 525; 525; 394; 213; and 212

12-bale-an-hour gin: 630; 630; 473; 315; and 315

<sup>1</sup>Add to 3.7¢ block 100 kwh for each kw of demand in excess of 10 kw.

<sup>2</sup>A fuel adjustment of 0.06¢ per kwh was used in calculating power costs for model gins. This adjustment varied with fuel prices.

<sup>3</sup>Campbell, John D. Effects of Electric Rates on Power Expenses of Gins - Arkansas - Oklahoma - Texas, Farmer Cooperative Service, U. S. Dept. of Agric., Mkt. Res. Rpt. 470, July, 1961. Pp 7-8 and table 3.

Kilowatt demand for two-gin multiples was estimated at 15 percent of less than twice that of similar-size single gins, for months when most of the cotton was ginned and 50 percent of high month in the other 2 months.

Kilowatt demands for Texas gins was estimated to be 97.5 percent of that in California because of the Texas rate schedule using 30-minute intervals for measuring kw demands instead of 15 minutes.

The kw demand, as found above, for Texas was used for 3 months, 75 percent of that amount was used for the fourth

month, and 50 percent for the lowest month.

This procedure resulted in the following kw demands used for Texas model gins:

8-bale-an-hour single gins: 409;  
409; 409; 307; and 205  
10-bale-an-hour single gins: 512;  
512; 512; 384; and 256  
12-bale-an-hour single gins: 614;  
614; 614; 460; and 307

Kilowatt demands for Texas two-gin multiples were also determined by deduct-

Appendix table 1. - Cost of electric power as calculated on selected rate schedules for estimated ginning costs, single gins and two-gin multiples in California and Texas, 1962

Size of gin (Bales per hour per gin)	Costs per bale for bales ginned annually per gin of --						
	3,000	4,000	5,000	6,000	7,000	8,000	9,000
<i>Dollars a bale</i>							
<u>California</u>							
Single gins:							
8	\$1.02	\$0.92	\$0.84	\$0.79	(1)	(1)	(1)
10	1.08	1.00	.92	.85	\$0.81	(1)	(1)
12	<sup>2</sup> 1.43	<sup>2</sup> 1.07	.98	.92	.86	\$0.82	\$0.79
Two-gin multiples: <sup>3</sup>							
8	.96	.86	.80	.75	(1)	(1)	(1)
10	1.04	.94	.86	.81	.77	(1)	(1)
12	<sup>2</sup> 1.19	1.00	.92	.86	.81	.78	.75
<u>Texas</u>							
Single gins:							
8	1.83	1.71	1.64	1.59	(1)	(1)	(1)
10	1.96	1.80	1.71	1.65	1.60	(1)	(1)
12	2.07	1.90	1.80	1.71	1.66	1.62	1.59
Two-gin multiples: <sup>3</sup>							
8	1.76	1.65	1.59	1.53	(1)	(1)	(1)
10	1.86	1.73	1.66	1.60	1.50	(1)	(1)
12	1.96	1.81	1.72	1.65	1.61	1.57	1.53

<sup>1</sup>Cost omitted because volume exceeds capacity based on 65 percent of season's bales ginned in 21 days.

<sup>2</sup>Minimum rate applied.

<sup>3</sup>Combined volumes of two-gin multiples would be twice that of single gins.

ing 15 percent from twice the kw demand for single gins.

Some multiple gins actually have two meters. In this study, it was assumed they all had only one meter for both gins.

The procedures described here resulted in power costs shown in appendix table 1.

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Fuel and Water. -- The expense shown for fuel and water is primarily drier fuel used in gins. Fuel used to warm offices and water expense are minor items. Natural gas was used by most gins.

Cost for fuel and water averaged about 30 cents a bale at gins surveyed, with higher costs a bale on smaller than average volumes and lower costs on larger volumes. Differences in these costs were estimated, from survey data, to vary 1.5 cents per 1,000 bales.

Using the average cost of 30 cents a bale for 6,000-bale annual volume, cost for 7,000-bale annual volume would be 28.5 cents a bale, rounded to 28 cents;

cost for 4,000-bale annual volume would be 33 cents a bale, and so on. (See tables 5 through 10 of text).

Lower costs per bale on larger volumes generally resulted from sliding scale rate schedules. As larger amounts of gas are used, the rate per unit is smaller.

Other Expenses. -- Other expenses included several small items that totaled less than \$1 a bale. They were rounded to multiples of 5-cent amounts and are shown at bottom of page.

Most other expenses did not seem to be influenced by single or multiple characteristics of gins. Instead, most of them tended to vary with bales ginned. However, multiple gins spent larger amounts per bale for advertising and dues and donations, possibly because of size and efforts to reach more people.

Other expenses were increased by 25 percent in estimates for smallest volumes of both single (3,000 bales) and two-gin multiples (6,000 bales) in both areas, and by 10 percent on next-to-lowest volumes.

Cost item	California		Lubbock, Tex. area	
	Single gins	Two-gin multiples	Single gins	Two-gin multiples
<i>Cents a bale</i>				
Auditing and legal	10	10	20	20
Telephone and telegraph	10	10	10	10
Annual meeting	5	5	5	5
Directors' expense	5	5	5	5
Travel (manager and others)	15	15	15	15
Advertising, dues, donations (not including NCC) <sup>4</sup>	5	10	15	25
Hauling on gin yard	10	10	15	15
Total	60	65	85	95

<sup>4</sup>National Cotton Council.

## Fixed Costs

Items included in fixed costs in this study were depreciation, interest on investment, taxes, and insurance. Rates used in estimating costs of depreciation, property taxes, and fire insurance on model gins were based on rates obtained from the 36 cooperative gins surveyed. A rate of 5 percent was assumed for interest on average investments. Number of bales ginned does not materially affect total fixed costs.

Depreciation. -- Gins included in the survey used the straight-line method of depreciation. Rates of depreciation varied among gins and among various facility items. Ranges in rates of depreciation used on most major items and averages of those rates were as follows:

Average rates just shown were applied to corresponding items in tables 11 and 12 in the text. Depreciation on scales was calculated at the same rate as that on buildings. An average depreciation rate of 7.2 percent resulted in total cost of all facilities except land, at both single and two-gin multiples. The rate of 7.2 percent was rounded to 7.0 percent. This weighted average rate of 7.0 percent was applied to costs of gins, less cost of land in table 12 of the text, to determine depreciation costs shown in appendix table 2.

Taxes. -- Ad valorem, or property, tax assessments and rates varied widely among States, counties, and especially school districts, even in the same county. Tax rates per \$100 of original cost of gin plants were determined from survey data. In California, they ranged from \$0.85

Item	Depreciation rate		Cooperatives responding
	Range	Average	
		Percent	Number
Gin and office buildings	3.33 to 6.67	4.8	29
Gin machinery	4 to 10	7.5	27
Office furniture and equipment	5 to 15	9.7	22

Appendix table 2. -- Cost of depreciation estimated on single gins and two-gin multiples of selected sizes, California, and Texas at 1962 prices

Sizes of gins (capacity per gin)	Depreciation cost <sup>1</sup>	
	Single gins	Two-gin multiples
8 bales an hour	\$16,800	\$32,200
10 bales an hour	20,300	39,130
12 bales an hour	23,800	46,025

<sup>1</sup>Calculated at 7.0 percent on original investment cost of gins shown in table 12 of text, less \$10,000 for cost of land.

Appendix table 3. - *Estimated ad valorem taxes on single gins and two-gin multiples of selected sizes in California and Texas at estimated tax rates on gins in 1962*

Sizes of gins (capacity per gin)	Annual taxes <sup>1</sup>			
	In California		In Texas	
	Single gins	Two-gin multiples	Single gins	Two-gin multiples
8 bales an hour	\$3,125	\$5,875	\$1,375	\$2,585
10 bales an hour	3,750	7,112	1,650	3,129
12 bales an hour	4,375	8,344	1,925	3,671

<sup>1</sup>Rates per \$100 used to calculate taxes were \$1.25 for California and \$0.55 for Texas. These rates were applied to original total costs of gins as shown in table 12 of text.

to \$1.58 and averaged \$1.21. In Texas, they ranged from \$0.15 to \$1.01 and averaged \$0.52 per \$100 of investment.

These average rates were then rounded to \$0.55 per \$100 for Texas and \$1.25 for California to allow for slightly higher tax rates probable in 1962. These rounded rates were then applied to total cost of gin plants to obtain cost of taxes (appendix table 3).

Insurance. -- Fire and comprehensive insurance with 80 percent co-insurance clauses was carried by most gins surveyed. Insurance rates per \$100 coverage were calculated and averaged by States. Rates in California ranged from 18 to 38

cents per \$100, and averaged 28.6 cents. Rates in Texas ranged from 23 to 57 cents and averaged 43.2 cents per \$100.

These averages were rounded to 30 cents per \$100 for California gins, and to 45 cents per \$100 for Texas gins. The rounded rates were then applied to 80 percent of the remaining cost of gins shown in table 12 in the text, after cost of land, or \$10,000, had been deducted. Estimated costs a year for fire and extended coverage insurance, determined in that manner are shown in appendix table 4.

Interest on Investment. -- Interest on investment was included as a fixed cost in recognition of differences in investments

Appendix table 4. - *Estimated cost of fire and extended coverage insurance on single and two-gin multiples of selected sizes, in California and Texas, 1962*

Sizes of gins (capacity per gin)	Annual cost of insurance <sup>1</sup>			
	In California		In Texas	
	Single gins	Two-gin multiples	Single gins	Two-gin multiples
8 bales an hour	\$576	\$1,104	\$864	\$1,656
10 bales an hour	696	1,342	1,044	2,012
12 bales an hour	816	1,578	1,224	2,367

<sup>1</sup>Estimated cost of land, or \$10,000, was deducted from original cost of each gin. Then 80 percent of remaining cost was used with rounded rates of \$0.30/\$100 for California and \$0.45/\$100 for Texas to find cost of insurance as shown in this table.

Appendix table 5. - *Cost of interest on investment of single gins and two-gin multiples of selected sizes in California and Texas at 1962 prices*

Sizes of gins (capacity per gin)	Interest costs <sup>1</sup>	
	Single gins	Two-gin multiples
8 bales an hour	\$6,500	\$12,000
10 bales an hour	7,750	14,475
12 bales an hour	9,000	16,937

<sup>1</sup>Interest rate of 5 percent was used on estimated cost of land, or \$10,000, and on one-half of balance of gin costs.

required for various gins. However, interest on investment is normally considered as income rather than an expense. An example will help clarify why it was treated as a cost in this report.

Assume two gins, A and B, were built in 1962 at a total cost of \$250,000 for gin A and \$300,000 for gin B. Assume also, that gins A and B ginned equal volumes in 1962 and had equal revenues and equal costs, not including interest on investment. Thus, cost and net revenues per bale would be equal for gins A and B. However, if gins A and B were cooperatives, net revenues or savings of equal total amounts would be lower in proportion to investment for gin B than for gin A. And if gins were not cooperatives, the rate of return on investments would be lower on gin B because of its larger investment.

If revenues and ratios of savings to investments for cooperatives, and rate of return for other gins, had been included in this study, interest on investment would have been left out of costs because effects of differences in investments would have shown up in ratios or rates of returns. The inclusion of interest on investment inflates estimated costs by amounts of interest, or estimated costs include returns at interest rate used on investments.

Interest on investment was calculated at 5 percent on estimated cost of land, or \$10,000, and on one-half of the remaining cost of gins shown in table 12 of the text. One-half of the remaining cost was used because that would be approximately the average investment during the life of the gins. Interest on investment determined in this way is shown in appendix table 5.





## Other Publications Available

Effect of Grades and Weights on Cottonseed Margins of Cooperative Gins. General Report 55. William C. Bowser, Jr.

Using Your Co-op Cotton Gin. Educational Circular 15. William C. Bowser, Jr.

Mechanical Sampling of Cotton. Marketing Research Report 412. Maurice R. Cooper, J. D. Campbell, and D. L. Pritchard. (Request copies of this publication from Agricultural Marketing Service, U. S. Department of Agriculture.)

Baling Cotton at Gins -- Practices and Costs, Flat, Standard, High Density Bales. Marketing Research Report 386. J. D. Campbell and R. C. Soxman.

Controlling Protein Level of Meal Production at Cottonseed Oil Mills. Marketing Research Report 437. Elmer J. Perdue and Dale J. Peier.

Using Gin Machinery More Effectively. Bulletin 7. Otis T. Weaver and Daniel H. McVey.

Effects of Electric Rates on Power Expenses of Cotton Gins--Arkansas, Oklahoma, Texas. Marketing Research Report 470. John D. Campbell.

SWIG--Southwestern Irrigated Cotton Growers Association, El Paso, Texas. FCS Circular 29. Otis T. Weaver.

Crushing Cottonseed Cooperatively. FCS Circular 30. Elmer J. Perdue.

Power Expenses of Cotton Gins by Types of Power--Arkansas, Oklahoma, and Texas. Marketing Research Report 520. J. D. Campbell.

Oklahoma Cotton Cooperatives. General Report 108. J. D. Campbell.

A copy of each of these publications may be obtained while a supply is available from--

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