UNITED STATES DEPARTMENT OF AGRICULTURE
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COTTONSEED: MARKETING SPREADS BETWEEN PRICE RECEIVED BY FARMERS AND VALUE OF PRODUCTS AT CRUSHING MILLS

By Kathryn Parr, Assistant Agricultural Economist, and
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THE FARMER'S STAKE IN COTTONSEED

Cottonseed is an important cash crop for the cotton grower. It usually pays for his costs of ginning and leaves a substantial sum in the form of cash received from the seed buyer. Farmers know that prices they receive for cottonseed depend chiefly upon the market values of mill products including oil, cake and meal, linters, and hulls. A farmer receives the market value of mill products minus the margin charged by seed dealers and crushing mills.

With war time production goals calling for a vastly expanded output of domestic vegetable oils the status of cottonseed and the oil mill industry is of unprecedented concern. Large quantities of vegetable oils formerly imported must be replaced by domestic production. High levels of demand for cottonseed oil, linters, and livestock feeds with relatively stable charges of seed dealers and mills should return higher prices for seed at the gin and improve the economic position of the cotton grower. Facts and figures shown here tell what portion of mill product sales value has been returned to farmers since 1909.

Thanks for assistance are due to Mr. A. M. Dickson, Principal Marketing Specialist, Mr. G. S. Meloy, Senior Marketing Specialist, and Mr. V. R. Fuchs, Marketing Specialist of the Agricultural Marketing Administration.

For every 500-pound bale of lint cotton sold by the farmer the production of cottonseed averages about 888 pounds. Over the 32- year period 1909-41, payments to farmers for the seed produced with a bale of lint cotton averaged about $13 compared with about $76 for the lint.

For the same period the mill sales value of the products per ton of cotton seed averaged $44.30 while the combined margin of seed buyers and mills averaged $14.82, leaving an average return to farmers of $29.48 per ton. The mill sales value was divided roughly into two-thirds representing payments to farmers and one-third to cover charges of seed dealers and mills.

The purpose of this report is to present material showing mill value of cottonseed products, prices paid farmers for seed, and the margin covering marketing charges for local purchase and assembly, transportation, storage, and operation of crushing mills. The data are derived from reports of the Bureau of the Census on cottonseed-crushing mills and from prices received by farmers as estimated by the Bureau of Agricultural Economics. The report covers the period since August 1909, the year when farm prices are first available. Seasonal data are shown for the entire period and estimated monthly data are given for the seasons beginning August 1934.

DEVELOPMENT OF THE INDUSTRY

Before the advent of the oil mill the cottonseed not required for planting was considered a waste and a nuisance. The more enterprising farmers used the surplus seed, or part of it, for fertilizer, but the majority left the seed at the gin for the ginner to dispose of in any way he could. The oil mills made cottonseed a commodity of value.

Many commercial products are now made from cottonseed, and the industry has so developed and improved that the dirt collected on the seed is about the only waste from the processes of manufacture. The industry began with the extraction of oil as the prime object. Apparently the first commercial oil mill of any importance was constructed at Natchez, Miss., in 1834, and in 1860 there were only seven active mills 1/. The cottonseed-crushing industry grew rapidly thereafter. The Census of Manufactures reports 369 establishments in the industry in 1899, 817 in 1909, 711 in 1919, 553 in 1929, and 447 in 1939. There were 446 mills which crushed cottonseed in the year ended July 1941. In addition, 43 mills had the necessary equipment but they did not crush any seed. The industry has been characterized by over-capacity and part-season operation for many years, but all available capacity may now be utilized for crushing the increased volume of other oil-bearing crops, such as peanuts and soybeans, called for under the wartime production goals.

1/ National Cottonseed Products Association, "Cottonseed and Its Products", Feb. 1937.

PRODUCTS OF COTTONSEED CRUSHING

According to the Census reports the average yields of products per ton of cottonseed crushed in the 10-year period 1931-41 were as follows: Crude oil, 313 pounds; cake and meal, 903 pounds; hulls, 525 pounds; and linters, 139 pounds. During this period the yield of linters increased-ranging from 100 pounds in 1931 to 171 pounds in 1940. There was a corresponding decrease in the yield of hulls. There has been less variation in the yields of crude oil and cake.

Cottonseed oil, the most important product in total value, is refined and used for foods such as vegetable shortenings, margarine, cosmetics, and vegetable cooking and salad oils. Off grades and byproducts of refining are used for the manufacture of soaps, coated fabrics, such as artificial leather and linoleum, and for miscellaneous uses as in paints and medicines.

The product rating second in value is cake, which reaches the retail market with little further processing. It is used chiefly for feed for livestock. The cakes are cracked into various sizes or ground into meal.

Cotton linters are converted into many uses. At this time their place in munitions comes first to mind. Official U.S. grades for cotton linters have been developed and are used in trading. The felting grades have long been used for cotton mattresses, batting for cushions and upholstery, and as substitutes for low-grade cotton. The other grades have been processed chemically for the cellulose content and used in the manufacture of explosives, bakelite, lacquers, plastics, rayon, varnishes, and enamels. Since February 1942 the Government has required 80 percent of the linters to be processed chemically for use in munitions; it pays a fixed price of 3.35 cents per pound of linters of 73 percent cellulose content, with additional price allowance according to higher cellulose content. The War Production Board has announced that 100 percent of linters will be taken for chemical uses in 1942-43.

Hulls are the product of least value, as a rule. But before 1915 their value exceeded that of linters and this was true during the seasons 1920-21 and 1930-31. They are used as roughage feed for livestock and to some extent for plastics, synthetic resins, and explosives.

SEASONAL PRICE SPREADS

Ordinarily, cottonseed is bought from the farmers by ginners and in turn is bought from the gins by oil mills. The gross margin between the prices paid growers per ton of cottonseed and the sales value of the products from the seed at crushing mills includes charges for the ginners' services, for transportation and handling of the seed from the gin to the mill, and for processing of the seed at the mills. As there is little carry-over of cottonseed from one season to the next, the seasonal margin can be calculated from seasonal mill-product values as reported by the Bureau of the Census and the average prices received by farmers as reported

by the Bureau of Agricultural Economics. These seasonal margins are shown in table 1, together with the percentages of mill value attributed to each of the four products -- crude oil, cake and meal, hulls, and linters. For the entire period for which farm prices are available, August 1909 to July 1941, the average margin was $14.82, corresponding to an average farm price per ton of seed of $29.48, and an average mill-product value of $44.30. The percentage share of mill-product value going to farmers ranged from 46.5 percent in 1931 to 76.2 percent in 1918, with an average of 67.2 percent for the entire period. For the recent 5-year period, 1936-40, the average price to farmers was $23.53, the mill value of products was $38.99, the margin averaging $15.46 and the percentage share to farmers, 60.3. Figure 1 shows the trend in product value, farm value, actual margins, and farm value as percentage of mill value, by seasons.

As is the case with most farm products, middlemen's charges and marketing margins are relatively stable in comparison with the fluctuation in prices at the farm or at the processing plant. The margin per ton of cottonseed ranged from a low of $8.58 in 1932 to a high of $23.03 in 1922, a range of variation of $14.45, amounting to 97.5 percent of the average margin for the period. In contrast, the farm price of seed varied from a low of $8.96 to a high of $65.79, a range of $56.83, or 193 percent of the farm price average. The mill-sales value ranged from $18.90 to $87.76, a span of $68.86, amounting to 155 percent of the average. The stability of marketing margins results in wider relative fluctuation in farm prices than in mill-sales values. After World War I a slight downward trend in the dollar margin appears to exist. A definite downward trend in the farmer's share of mill-sales value is apparent in the lower section of figure 1. The farmer's share has been relatively more stable than either dollar margins or values over the 32 seasons of record.

The general interrelations of seasonal farm prices of cottonseed mill-sales values, and margins, are shown graphically in figure 2. This illustration is a scatter diagram of seasonal mill-sales values plotted against farm prices per ton of cottonseed for the 32 seasons, 1909-41. The margin corresponding to any observation is given by the vertical distance of the point above the zero margin line (or horizontal distance to the left of the zero margin line). Over the 32 seasons, the margin averaged $14.82, or 33.5 percent of average mill-sales value.

All possible combinations of farm price and mill-sales value for which the margin would be average fall on the line labeled "Margin = $14.82". Similarly, all combinations for which the margin bears the average percentage relationship to mill-sales value would be on the line labeled "Margins = 33.5 percent of mill sales value."

The general scatter of observed points determines a line of relationship between margins and values which lies between the constant dollar margin line and the constant percentage margin line as $8.50 plus 21.5 percent of farm price. This type of relationship, defining the margin in terms of a fixed dollar component, plus a component proportional to price, is also typical of margins for other commodities.

Table.1. - Seasonal average value of cottonseed products produced per ton of seed crushed, percentage of value attributed to each of the four products, farm price of cottonseed, and margin between farm price and product value, 1909-40

Year beginning Aug. 1	Value of products per ton of seed 1/	Farm price per ton 2/	Actual margin 3/	Farm price as percentage of product value	Percentage of product value attributed to			
					Crude oil	Cake and meal	Hulls	Linters
	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent	Percent
1909	32.34	24.35	7.99	75.3	52.2	34.0	9.3	4.5
1910	34.76	26.11	8.65	75.1	56.3	31.3	8.0	4.4
1911	26.69	17.18	9.51	64.4	50.7	37.9	7.5	3.9
1912	28.87	18.36	10.51	63.6	52.3	34.8	7.3	5.6
1913	32.94	21.96	10.98	66.7	50.7	37.5	7.0	4.8
1914	26.45	15.51	10.94	58.6	52.7	37.8	5.5	4.0
1915	42.90	30.15	12.75	70.3	48.8	29.9	6.8	14.5
1916	64.12	45.63	18.49	71.2	53.4	26.0	4.9	15.7
1917	84.85	64.28	20.57	75.8	60.4	27.0	5.2	7.4
1918	85.65	65.23	20.42	76.2	59.2	30.3	4.7	5.8
1919	87.76	65.79	21.97	75.0	59.5	33.8	3.2	3.5
1920	38.46	25.65	12.81	66.7	54.1	37.3	6.4	2.2
1921	45.54	29.14	16.40	64.0	52.2	36.4	6.5	4.8
1922	53.45	30.42	23.03	56.9	49.0	34.1	7.0	9.9
1923	55.07	41.23	13.84	74.9	48.4	32.6	7.0	12.1
1924	52.30	33.25	19.05	63.6	52.6	32.9	5.7	8.8
1925	46.06	31.59	14.47	68.6	54.2	31.8	4.9	9.1
1926	38.11	22.04	16.07	57.8	59.2	30.2	3.7	6.9
1927	53.25	34.83	18.42	65.4	53.4	32.5	4.0	10.0
1928	52.41	34.13	18.28	65.1	50.5	34.2	4.8	10.5
1929	45.74	30.95	14.79	67.7	50.1	35.9	5.3	8.8
1930	35.99	22.05	13.94	61.3	54.0	34.5	6.2	5.3
1931	19.25	8.96	10.29	46.5	56.1	32.3	5.1	6.5
1932	18.90	10.32	8.58	54.6	54.1	33.8	5.4	6.8
1933	26.93	12.89	14.04	47.9	43.3	35.3	6.7	14.7
1934	50.07	33.09	16.98	66.1	51.7	30.4	5.8	12.2
1935	43.94	30.54	13.40	69.5	60.5	23.1	3.9	12.5
1936	50.95	33.41	17.54	65.6	53.8	28.7	4.6	13.0
1937	33.55	19.52	14.03	58.2	57.3	29.6	4.2	8.9
1938	34.27	21.80	12.47	63.6	56.5	30.8	4.6	8.0
1939	38.36	21.20	17.16	55.3	48.7	33.9	5.5	11.9
1940	37.80	21.72	16.08	57.5	46.6	31.6	5.3	16.5
1909-40 av.	44.30	29.48	14.82	66.5	53.2	32.6	5.7	8.7
1935-39 av.	40.21	25.29	14.92	62.9	55.4	29.2	4.6	10.8

1/ Sales value at the mill. Compiled from Bureau of the Census, "Cotton Production and Distribution Bulletin 178", and other publications.

2/ July to June crop year. Farm price--Agricultural Marketing Service "Average Farm Prices Received by Farmers", Aug. 1941.

3/ Includes mill margin, transportation to mill, and ginner's charges for selling seed.

COTTONSEED: AVERAGE VALUE OF PRODUCTS PER TON OF SEED CRUSHED, PRICE RECEIVED BY FARMERS, AND MARGINS, UNITED STATES, ANNUALLY, 1909-40

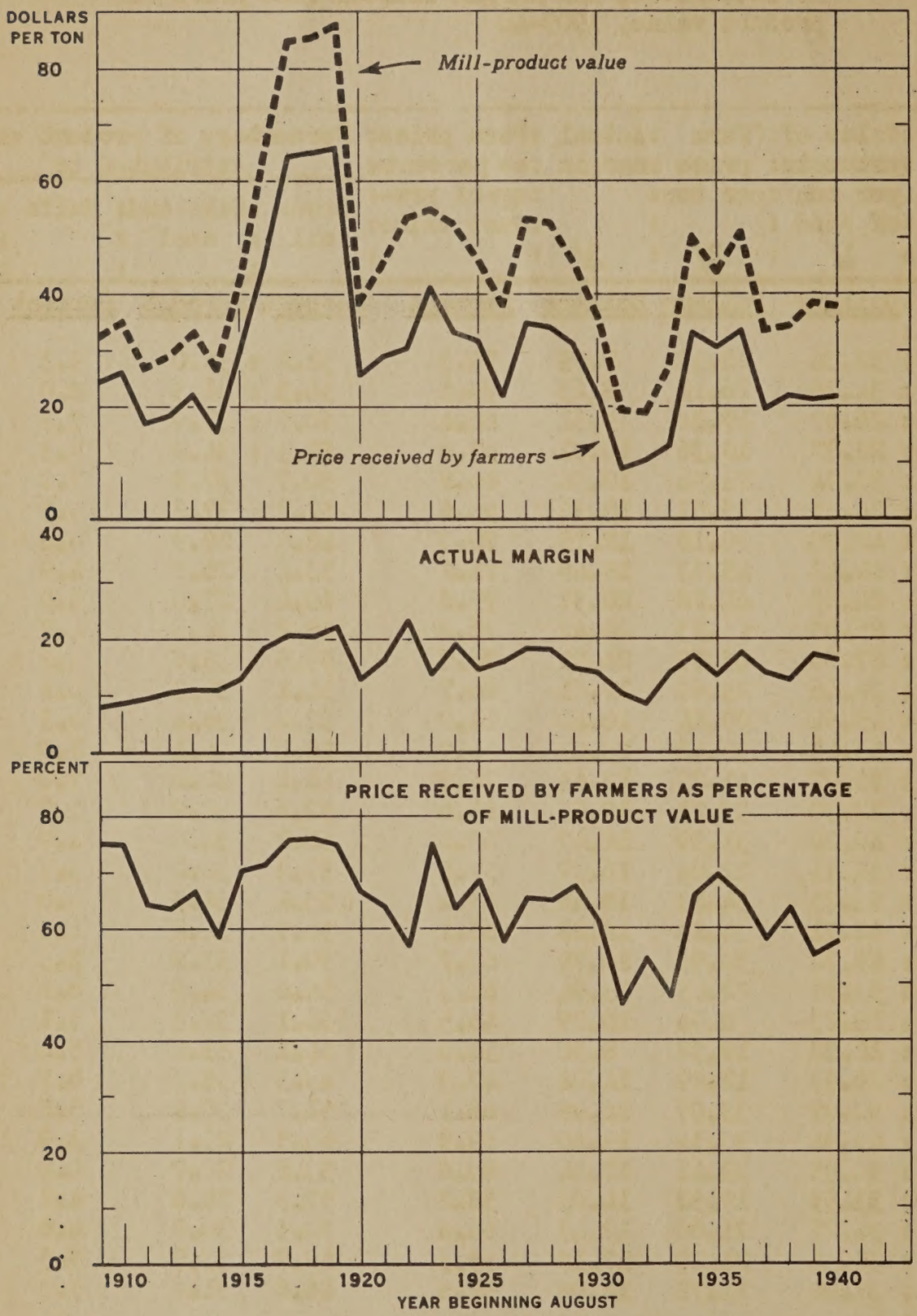

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Figure 1.- Values of mill products and farm prices of cottonseed have fluctuated widely over the seasons since 1909; actual margin covering charges for seed assembly, shipping, and crushing has been more stable, averaging near $15. The farmer's share in mill-product value shows a general downward trend throughout the period.

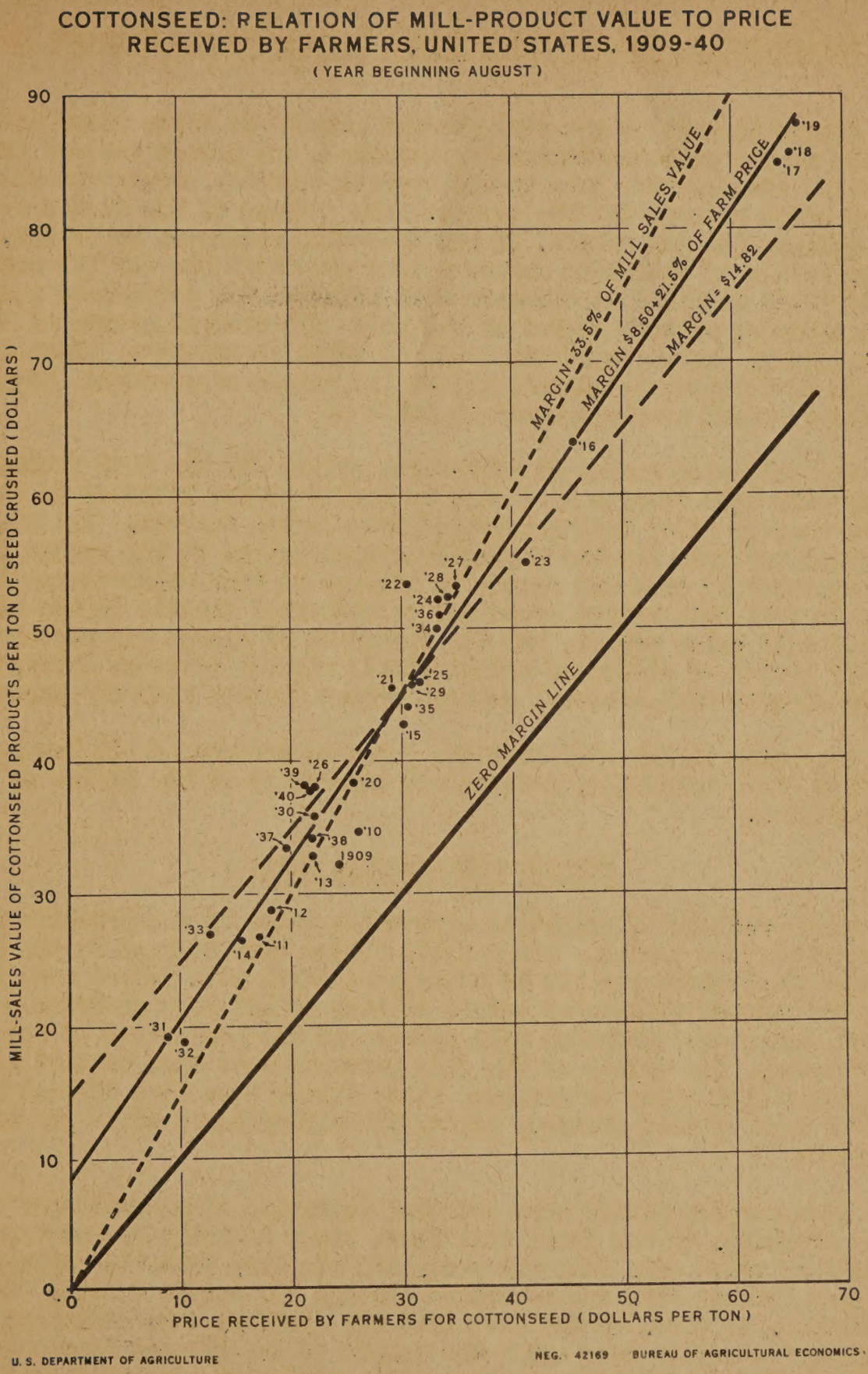

Figure 2.- The margin corresponding to any point on the chart is given by its height above the zero margin line. The scatter of the actual seasonal averages, 1909-41, determines a pattern of relationship falling between the constant dollar margin and constant percentage-margin relations.

MONTHLY PRICE SPREADS

Interpolating Monthly Price Series between Census Seasonal Levels

Census reports of seasonal product output and value cover nearly all mills in the cottonseed-crushing industry, and prices derived from their value and quantity data should represent rather accurately the actual industry price average for the season. The Bureau of the Census reports output volume, but not prices, of the four mill products, by months. However, series of wholesale market prices are available for (1) crude cottonseed oil in tanks at southern mill points; (2) cottonseed meal, 41 percent protein, carlots bagged at Memphis; (3) several grades of linters at mill points, excluding ports; and (4) hulls at Atlanta. These series were used to interpolate monthly mill-sales prices of products comparable to census seasonal averages, shown in table 2.

The estimated series of mill-sales prices for the four products were based chiefly upon changes in wholesale market prices adjusted to the seasonal average price levels computed from census reports. The relation of seasonal averages for the wholesale market prices to the census levels varied appreciably from one season to another so that month-to-month changes in wholesale prices could not be reflected exactly in the estimated series of mill sales prices, but the direction of change was preserved. The final series of estimated prices yield weighted seasonal averages agreeing closely with seasonal average prices derived from the census data.

Beginning in December 1941 the price of cottonseed oil has been controlled under schedules, orders, and amendments of the Office of Price Administration.

Monthly Mill-Product Value

Three methods of computing mill-sales value of the products per ton of cottonseed were tested. The methods differ with respect to the physical yield of products per ton of cottonseed which were valued each month. First, the monthly mill-sales values of each of the four products were computed, using the estimated mill prices and the production as reported by the Census. The values of the four products were then totaled to obtain total mill value by months. These values were then divided by the number of tons of seed crushed, giving the mill-product value per ton of cottonseed.

When monthly yields were computed (quantity of products per ton of seed crushed), it was found that there was a definite upward trend in the yield of crude oil, cake and meal, and linters, from the beginning of the season through May, and sometimes through the entire season. This is explained, in part, by the fact that the smaller, less efficient mills discontinue operation soon after the height of the ginning season because of lack of storage facilities. Therefore, mill values per ton of seed crushed, when computed by the above method reflect changes in yield as well as changes in price.

Table 2. - Estimated mill-sales prices of cottonseed products, by months August 1934 - April 1942.

Year and month	Crude oil per lb.	Cake & meal per ton	Hulls per ton	Linters per lb.
	Cents	Dollars	Dollars	Cents
1934-35				
August	5.64	34.20	11.28	4.15
September	6.54	33.35	11.60	4.17
October	7.19	33.40	11.79	4.26
November	7.90	36.00	12.13	4.37
December	8.93	36.79	12.51	4.46
January	9.56	34.05	11.21	4.40
February	10.02	32.60	10.44	4.33
March	9.81	30.40	10.00	4.34
April	9.30	30.00	9.56	4.33
May	9.37	29.60	8.89	4.37
June	8.96	26.41	8.28	4.28
July	8.45	24.00	7.32	4.13
Weighted Average	8.26	33.46	11.23	4.31
1935-36				
August	8.60	21.80	5.02	4.00
September	8.65	20.60	5.00	3.76
October	8.99	23.60	6.42	3.81
November	8.98	22.80	6.44	3.80
December	9.12	22.75	6.48	3.80
January	8.70	21.65	6.45	3.80
February	8.29	21.20	7.43	3.93
March	8.14	20.53	8.40	3.95
April	8.20	21.87	8.68	4.05
May	7.47	22.01	9.09	4.24
June	7.97	23.00	9.48	4.22
July	8.60	32.50	11.90	4.19
Weighted Average	8.73	22.29	6.66	3.85
1936-37				
August	8.65	33.40	10.19	4.20
September	8.65	30.30	7.74	4.12
October	8.34	29.00	8.60	4.28
November	8.42	31.36	9.32	4.23
December	9.60	33.16	10.24	4.23
January	10.01	33.60	9.85	4.21
February	9.52	33.32	9.24	4.21
March	9.55	34.33	8.83	4.26
April	9.20	39.04	9.67	4.36
May	8.70	39.19	9.69	4.39
June	8.10	33.80	8.37	4.28
July	7.85	31.00	7.31	3.85
Weighted Average	9.03	32.34	9.16	4.23

Continued

Table 2. - Estimated mill-sales prices of cottonseed products, by months August 1923 - April 1942 Continued

Year and month	Crude oil per lb.	Cake & meal per ton	Hulls per ton	Linters per lb.
	Cents	Dollars	Dollars	Cents
1937-38				
August	7.00	26.07	5.47	3.22
September	6.15	21.26	4.64	2.64
October	5.94	21.89	4.57	2.32
November	5.78	22.93	6.30	2.12
December	5.71	21.98	6.33	1.73
January	5.94	23.19	6.10	1.78
February	6.50	22.24	5.81	1.88
March	6.80	21.83	5.38	1.96
April	6.69	21.34	4.99	1.89
May	6.80	20.74	4.57	1.78
June	6.65	21.15	5.46	1.77
July	7.25	23.20	5.17	1.96
Weighted Average	6.19	22.21	5.49	2.09
1938-39				
August	6.91	22.70	4.87	1.94
September	6.49	22.20	4.98	1.83
October	6.32	22.20	5.91	1.81
November	6.48	23.35	6.17	1.84
December	6.44	24.00	6.28	1.86
January	6.02	24.28	6.28	1.80
February	5.62	23.00	6.50	1.73
March	5.80	23.60	7.05	1.66
April	5.54	24.60	7.02	1.65
May	5.57	24.85	6.94	1.62
June	5.46	24.40	6.46	1.61
July	5.03	22.70	6.09	1.60
Weighted Average	6.16	23.32	6.13	1.78
1939-40				
August	4.54	21.60	5.91	1.63
September	5.90	26.50	7.43	2.06
October	5.88	25.80	7.03	2.47
November	5.68	28.99	8.18	2.55
December	6.00	30.40	8.38	2.89
January	6.05	31.00	8.46	3.38
February	6.12	30.75	8.58	3.45
March	5.93	31.15	9.70	3.39
April	5.95	31.70	10.58	3.32
May	5.72	30.00	11.18	3.43
June	5.15	25.40	11.18	3.48
July	5.37	26.00	11.78	3.42
Weighted Average	5.85	28.67	8.26	2.81

Continued

Table 2, - Estimated mill-sales prices of cottonseed products, by months August 1934 - April 1942 Continued

Year and month	Crude oil per lb.	Cake & meal per ton	Hulls per ton	Linters per ton
	Cents	Dollars	Dollars	Cents
1940-41				
August	4.72	27.20	12.00	3.33
September	4.70	25.15	8.22	3.33
October	4.42	25.35	8.10	3.40
November	4.37	29.71	8.74	3.67
December	4.46	29.35	8.91	3.69
January	5.16	28.20	8.20	3.69
February	5.06	24.75	7.30	3.69
March	6.15	24.75	6.52	3.72
April	7.65	25.60	6.87	3.74
May	9.00	25.50	6.17	3.78
June	10.20	26.70	6.14	3.81
July	10.50	31.20	6.90	4.21
Weighted Average	5.44	26.92	7.93	3.63
1941-42, preliminary:				
August	10.46	34.79	7.21	4.10
September	11.70	40.15	7.81	4.28
October	11.67	36.30	6.39	4.39
November	10.92	37.12	6.92	4.41
December	11.52	38.73	6.92	4.42
January	12.09	40.30	7.06	4.44
February	12.12	38.28	6.97	4.45
March	12.12	37.37	7.06	4.46
April	12.12	35.60	7.46	4.46
May				
June				
July				

The average monthly yields for the last months of the season, especially for July, are erratic. An extreme case is July 1937 in which the yields of the four products total more than 2200 pounds per ton of seed crushed. The mills do a certain amount of estimating in reporting the production of cake and hulls to the Bureau of the Census and are not able to give exact figures until the end of the season. Correcting the season total causes the July figure to be in error. Figures for other months that are estimated may also be in error, but the percentage of error in months of greater production is much less than for July, when production is small.

To eliminate the effect of seasonally increasing yields and incorrect estimates upon the mill value and margins, an alternative series was derived by using a constant yield throughout all months of each season; that is, the estimated monthly prices were multiplied by seasonal average yields to obtain the mill value of each product. The values of the four products were then totaled for the mill-product value per ton of cottonseed crushed.

A third series of mill values was obtained by using constant yields for the entire period. The yields used were the simple averages of yields for the 10-year period 1931-40: 313 pounds of crude oil, 903 pounds of cake and meal, 525 pounds of hulls, and 139 pounds of linters. The chief differences between the last two methods are in values of hulls and of linters, but as these products account for a comparatively small part of the total value, the two methods show little difference in final results. The three series of values of mill products by months, 1934-41, are shown in table 3.

The second of these three monthly series, shown in column 2 of table 3 posses advantages over the other two for current use and to adjoin to the series of seasonal averages. The monthly margins between the mill values and the farm price of the cottonseed were computed for this series of mill values only. This series reflects year-to-year trends in yields of the four products while eliminating the effects of variable yields within a season. In maintaining the series during current months before census yield data are available, it is planned to continue average yields of the previous season with adjustment based upon other information.

Monthly Distribution of Farm Sales, Receipts at Mills, and Crushings

When monthly margins are considered, the question arises as to whether concurrent margins should be computed, using farm price and mill-sales values for the same month, or whether the lag between the time the seed leaves the hands of the farmer and the time of crushing should be estimated and allowed for. It is the general practice of cotton farmers to sell their seed at the time the cotton is ginned, keeping only what is needed for planting, for feeding and for fertilizer. The quantity retained on farms has averaged approximately 22 percent of the production during the 10 years, 1931-40. Some of this seed is sold later, after

Table 3.- Mill-sales value of cottonseed products computed by three methods, by months, August 1934 to date, 1/

Year and month	Mill product value computed from		
	Production (Varying monthly yields)	Seasonal yield	Constant 10-year average yield
	Dollars	Dollars	Dollars
1934-35			
August	40.54	41.91	41.82
September	43.34	44.43	44.38
October	45.79	46.67	46.59
November	50.34	50.31	50.23
December	53.96	54.11	54.04
January	54.25	54.40	54.36
February	56.42	54.88	54.84
March	54.67	53.13	53.09
April	54.81	51.24	51.19
May	52.66	51.14	51.09
June	50.53	48.14	48.08
July	45.83	44.98	44.95
Average	50.07	49.97	49.90
1935-36			
August	41.77	43.18	43.64
September	41.20	42.44	42.90
October	44.92	45.28	45.79
November	44.71	44.88	45.37
December	44.21	45.29	45.80
January	43.27	43.50	43.97
February	43.01	42.48	42.93
March	43.43	42.01	42.44
April	45.56	43.01	43.45
May	45.85	41.22	41.60
June	49.82	43.28	43.69
July	52.72	50.10	50.60
Average	43.94	44.00	44.47
1936-37			
August	48.60	50.43	50.65
September	47.35	48.29	48.51
October	46.53	47.23	47.40
November	48.02	48.64	48.84
December	52.43	53.27	53.59
January	54.06	54.58	54.94
February	53.84	52.81	53.12
March	55.53	53.34	53.63
April	58.87	54.77	55.03
May	57.81	53.37	53.56
June	51.72	48.61	48.76
July	52.59	45.66	45.84
Average	50.95	50.89	51.14

Continued -

Table 3.- Mill-sales value of cottonseed products computed by three methods, by months, August 1934 to date, 1/ - Continued

Year and month	Mill product value computed from: Production (Varying monthly yields)	Seasonal yield	Constant 10-year average yield
	Dollars	Dollars	Dollars
1937-38			
August	37.46	39.42	39.60
September	32.01	33.56	33.74
October	32.20	32.72	32.89
November	32.64	32.85	33.04
December	31.71	31.66	31.85
January	33.05	32.92	33.13
February	34.33	34.30	34.53
March	36.03	35.05	35.27
April	35.60	34.29	34.52
May	37.16	34.09	34.31
June	36.74	34.03	34.25
July	38.51	37.01	37.24
Average	33.55	35.53	33.73
1938-39			
August	35.06	36.29	35.85
September	33.86	34.60	34.18
October	33.69	34.28	33.87
November	34.92	35.41	35.00
December	35.31	35.64	35.24
January	34.52	34.35	33.95
February	32.91	32.46	32.08
March	34.20	33.34	32.97
April	34.34	32.94	32.58
May	34.73	33.08	32.72
June	34.19	32.40	32.05
July	31.14	30.15	29.81
Average	34.27	34.28	33.88
1939-40			
August	27.17	28.39	27.78
September	34.96	36.03	35.24
October	35.41	36.20	35.33
November	36.90	37.43	36.56
December	39.31	39.68	38.73
January	41.02	40.92	39.84
February	42.24	41.17	40.09
March	42.55	40.93	39.88
April	45.43	41.36	40.32
May	43.65	40.18	39.14
June	38.50	36.36	35.36
July	38.99	37.38	36.39
Average	38.36	38.26	37.33

Continued -

Table 3.- Mill-sales value of cottonseed products computed by three methods, by months, August 1934 to date, 1/ - Continued

Year and month	Mill product value computed from		
	Production (Varying monthly yields)	Seasonal yield	Constant 10-year average yield
	Dollars	Dollars	Dollars
1940-41			
August	34.85	36.08	34.83
September	32.74	34.16	32.86
October	32.55	33.43	32.14
November	35.50	35.83	34.48
December	35.71	36.04	34.68
January	37.48	37.62	36.16
February	35.66	35.54	34.06
March	39.45	38.92	37.30
April	45.33	44.29	42.50
May	51.86	48.49	46.55
June	56.65	52.96	50.90
July	58.88	56.81	54.62
Average	37.80	37.77	36.30

1/ See text, pp. 8 & 12 for methods of computing values.

planting requirements are fulfilled; but no statistical data are available as to the quantity thus sold. After consulting with several persons in the field of cotton marketing and those experienced in the cottonseed industry, it was decided to use the percentages ginned at specified periods to represent the percentages of cottonseed sold by farmers in those periods. However, some adjustment was made on the basis of receipt at the mills, as reported by the Census Bureau each month, to allow for seed sold in the latter part of the season. On these assumptions farmers make about 75 percent of the sales of the typical crop of cottonseed during the 3 months of September, October, and November, and about 10 percent in August. According to these estimates less than 10 percent of the total season's farm sales remains in the hands of farmers after the end of December. Prices paid to farmers during the latter months of the season, therefore, represent sales of small portions of the crop which in location and in quality are not typical of the season's average run of seed. This causes large seasonal variation in farm prices.

Receipts of cottonseed by the oil mills are distributed somewhat more evenly throughout the season than are ginnings, with receipts heaviest during the 4 months, September to December. The ginner usually holds the seed he buys from farmers until he has a carload and some hold seed in storage. Crushings are also heaviest during these 4 months but they taper off more gradually through the remainder of the season. Oil mills that have sufficient storage space spread their crushings over more months of the year. Figure 3 shows percentages of the cotton crop ginned in each month of the season (used as a basis for estimating sales of cottonseed by farmers), of cottonseed received at the crushing mills, and of cottonseed crushed, for a 5-year period, 1934-35 to 1938-39. Cotton ginned during December and January and after February 1 are estimated from a cumulative curve of ginnings because the census reports show only ginnings prior to August 1, September 1, October 1, November 1, December 16, and January 15.

The excess of farm-sales percentages over mill-receipts percentages during September and October (fig. 3) indicates that during these months ginners and other seed dealers are holding stocks of cottonseed for later delivery to crushing mills. The excess of mill receipts over crushings in September, October, and November, shows that crushing mills build up stocks in storage for crushing during later months of the season. Of the total volume of cottonseed sold by farmers during September, for example, less than half is crushed in that month; and portions of the remainder may contribute to the crushings of each of the next 10 months and even to the small seasonal carry-over. The total quantity of seed crushed by mills during April may be made up in varying proportions of seed sold off farms during each of the preceding 8 months of the season.

There is much variation in the buying procedure of the individual mills. A mill may buy the year's supply of seed in 6 or 8 days scattered over the early months of the season, or it may distribute the purchases over the entire season. The condition of the seed when received at the mill partly determines the time of crushing. Seed received in good condition may be held for months, but seed received in a damp and otherwise poor condition must be milled at once.

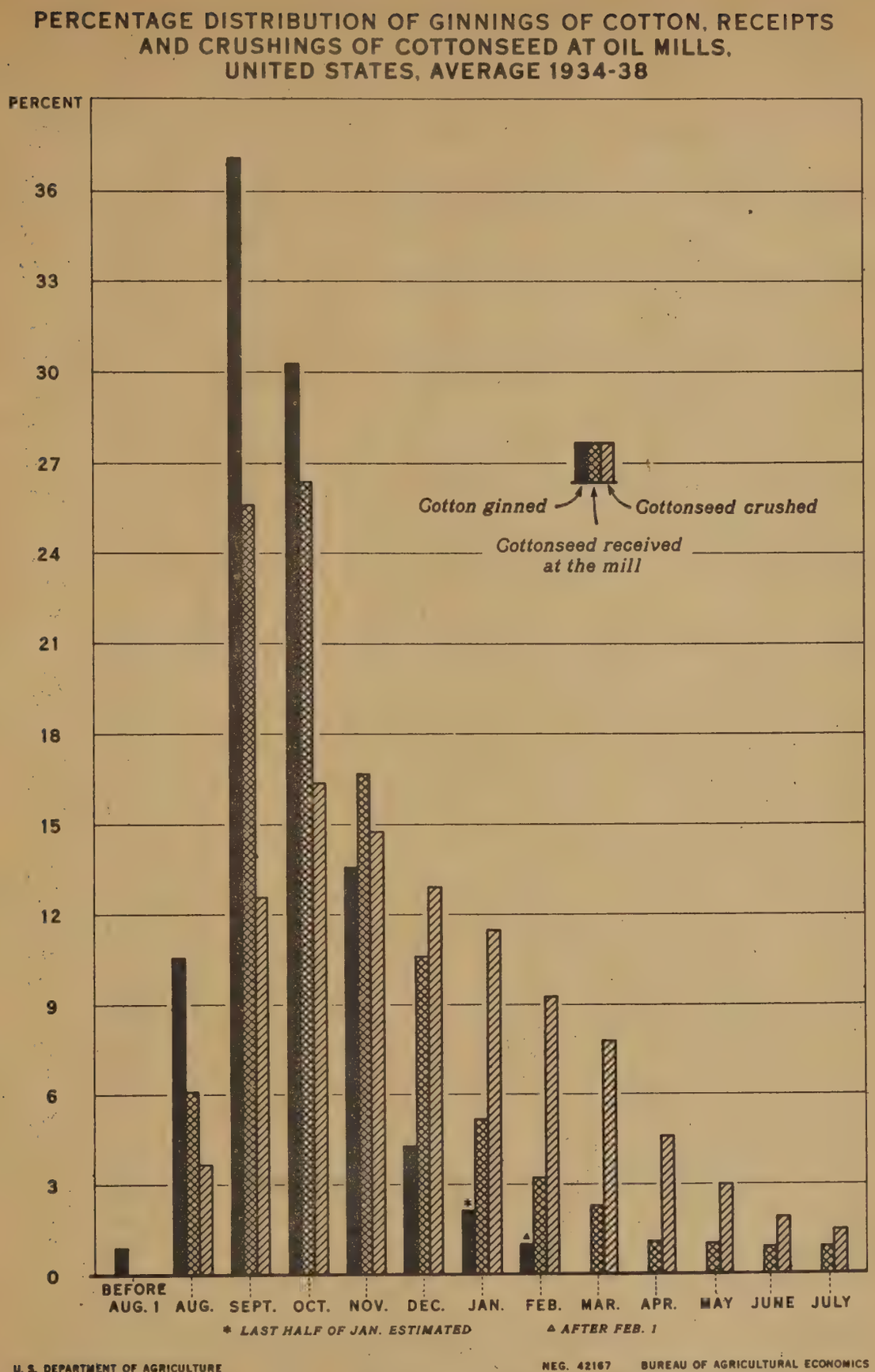

Figure 3.- Farmers sell the bulk of their cottonseed within the first 4 or 5 months of the season. Ginners and other seed dealers hold part of the crop for later sale to mills. Crushings continue in substantial volume throughout the season although many small mills discontinue operations by mid-season.

Prices paid for seed depend in part upon its condition and quality. The United States Department of Agriculture has developed official grades for cottonseed reflecting the quantity and quality of product yield.

Computation of Farm Values, Using Lags

To allow for the lag between the time of farm sales and the crushing of the seed, an attempt was made to evaluate payments to farmers for the seed crushed each month at prices received by farmers at earlier periods, although any computation of lag is more or less arbitrary. The average monthly crushings for the 5-year period, 1934-35 to 1938-39, were distributed to show the months of farm sales from which the seed was drawn. These quantities were reduced to percentages and used in weighting monthly farm prices to estimate the farm value of the seed crushed in each month. For example, it was estimated that of the 672 thousand tons of seed crushed in November, 9 percent were sold by the farmers in August, 30 percent in September, 30 percent in October and 31 percent in November. In computing the farm value of cottonseed for comparison with the product value per ton of seed crushed for November, the August, September, October, and November prices were weighted by these percentages. The 5-year averages were used as a norm for each of the seasons. The percentage distribution of each month's crushings among months of farm sale is shown in table 4.

The estimating of these percentages was necessarily crude and arbitrary. No data were available showing the actual practices of mills and seed dealers in storing each month's farm sales for crushing during later months. Nevertheless, it is believed that the farm value calculated by the use of these weights furnishes a better estimate of actual cost at the farm level of seed crushed each month than does the use of concurrent farm prices. Another argument in favor of the lagged farm-value estimates is the fact that these weight out to approximately the seasonal average farm price when weighted by crushings whereas current farm prices do not. For each month in which volume of crushings exceed sales by farmers, it is obvious that at least the excess of crushings must come from farm sales made during earlier months. In estimating the proportions of monthly crushings sold from the farm during each preceding month, consideration was given to the total volume of monthly farm sales and to the storage time involved, drawing a relatively larger proportion from the current and nearby months.

The effect on farm values of thus estimating and applying the lag is to lessen the fluctuation through the blending of months of high and low prices and, in general, to reduce the upward trend in farm values throughout the season. Monthly margins obtained after using the estimated lag in computing farm values are shown in table 5 and figure 4. Concurrent margins, using the monthly farm prices as reported, are also shown in figure 4 and in table 6. The difference in the two series can be readily observed from the figure. Mill values computed by using seasonal yields of the products varying from season to season, but constant within each season, were used in both tables.

Table 4. - Cottonseed crushings distributed to show estimated lag from farm sales, 5-year period, 1934-35 to 1938-39

Month	Total crushing	Percentage of crushings from farm sales of -														
		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1000 tons	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Aug.	170	12	12	9	67											
Sept.	569	5	5	7	22	61										
Oct.	743			2	18	45	35									
Nov.	672				9	30	30	31								
Dec.	584				4	34	34	23	5							
Jan.	520					32	35	19	11	3						
Feb.	422					27	40	12	12	6	3					
Mar.	353					31	38	9	6	6	5	5				
Apr.	207					29	32	10	4	7	8	7	3			
May	137					26	26	8	7	7	8	8	7	3		
June	88					14	17	12	11	9	11	11	10		5	
July	68					15	18	15	7	7	13	10	9			6
						1000 tons sold by farmers										
	4,533	49	49	70	457	1589	1274	576	191	99	76	60	31	4	4	4

Quantities crushed each month from reports of the Bureau of the Census.
Seasonal distribution of farm sales estimated from census reports on cotton ginning and receipts of cottonseed at crushing mills.
The distribution of each month's crushings among several months of farm sale is estimated arbitrarily, assigning heavier weight to months of large farm-sales volume and to nearby months.

Table 5. - Estimated average value of cottonseed products produced per ton of cottonseed crushed, farm value of seed (lagged estimates) and margin between farm and product value, by months, 1934

Year and month	Mill sales value of cottonseed products 1/	Farm value computed by using lag 2/	Margins	Farm value as percentage of mill value
	Dollars	Dollars	Dollars	Percent
1934-35				
August	41.91	24.61	17.30	58.7
September	44.43	28.87	15.56	65.0
October	46.67	31.89	14.78	68.3
November	50.31	33.83	16.48	67.2
December	54.11	34.21	19.90	63.2
January	54.40	34.91	19.49	64.2
February	54.88	35.20	19.68	64.1
March	53.13	34.94	18.19	65.8
April	51.24	35.15	16.09	68.6
May	51.14	35.46	15.68	69.3
June	48.14	36.30	11.84	75.4
July	44.98	35.99	8.99	80.0
Weighted average	49.97	32.93	17.04	65.9
1935-36				
August	43.18	30.55	12.63	70.8
September	42.44	29.12	13.32	68.6
October	45.28	29.56	15.72	65.3
November	44.88	30.89	13.99	68.8
December	45.29	30.80	14.49	68.0
January	43.50	30.91	12.59	71.1
February	42.48	30.88	11.60	72.7
March	42.01	30.48	11.53	72.6
April	43.01	30.32	12.69	70.5
May	41.22	30.18	11.04	73.2
June	43.28	30.29	12.99	70.0
July	50.10	30.32	19.78	60.5
Weighted average	44.00	30.33	13.67	68.9

Continued

Table 5. - Estimated average value of cottonseed products produced per ton of cottonseed crushed, farm value of seed (lagged estimates) and margin between farm and product value, by months, 1934- Continued

Year and month	Mill sales value of cottonseed products 1/	Farm value computed by using lag 2/	Margins	Farm value as percentage of mill value
	Dollars	Dollars	Dollars	Percent
1936-37				
August	50.43	30.60	19.83	60.7
September	48.29	32.37	15.92	67.0
October	47.23	33.17	14.06	70.2
November	48.64	33.28	15.36	68.4
December	53.27	33.46	19.81	62.8
January	54.58	33.70	20.88	61.7
February	52.81	33.92	18.89	64.2
March	53.34	34.13	19.21	64.0
April	54.77	34.46	20.31	62.9
May	53.37	34.83	18.54	65.3
June	48.61	35.25	13.36	72.5
July	45.66	34.99	10.67	76.6
Weighted average	50.89	33.41	17.48	65.7
1937-38				
August	39.42	28.10	11.32	71.3
September	33.56	23.05	10.51	68.7
October	32.72	20.13	12.59	61.5
November	32.85	19.37	13.48	59.0
December	31.66	19.05	12.61	60.2
January	32.92	18.78	14.14	57.0
February	34.30	18.73	15.57	54.6
March	35.05	18.85	16.20	53.8
April	34.29	18.96	15.33	55.3
May	34.09	19.13	14.96	56.1
June	34.03	19.26	14.77	56.6
July	37.01	19.27	17.74	52.1
Weighted average	33.53	19.95	13.58	59.5

Continued

Table 5. - Estimated average value of cottonseed procuts produced per ton of cottonseed crushed, farm value of seed (lagged estimates) and margin between farm and product value, by months, 1934-Contined

Year and month	Mill sales value of cottonseed products 1/	Farm value computed by using lag 2/	Margins	Farm value as percentage of mill value
	Dollars	Dollars	Dollars	Percent
1938-39				
August	36.29	21.35	14.94	58.8
September	34.60	21.23	13.37	61.4
October	34.28	21.64	12.64	63.1
November	35.41	22.15	13.26	62.6
December	35.64	22.14	13.50	62.1
January	34.35	22.23	12.12	64.7
February	32.46	22.28	10.18	68.6
March	33.34	22.21	11.13	66.6
April	32.94	22.26	10.68	67.6
May	33.08	22.35	10.73	67.6
June	32.40	22.60	9.80	69.8
July	30.15	22.44	7.71	74.4
Weighted average	34.28	21.97	12.31	64.1
1939-40				
August	28.39	18.21	10.18	64.1
September	36.03	19.84	16.19	55.1
October	36.20	20.60	15.60	56.9
November	37.43	21.86	15.57	58.4
December	39.68	22.12	17.56	55.7
January	40.92	22.60	18.32	55.2
February	41.17	22.88	18.29	55.6
March	40.93	22.92	18.01	56.0
April	41.36	23.29	18.07	56.3
May	40.18	23.73	16.45	59.1
June	36.36	24.56	11.80	67.5
July	37.38	24.27	13.11	64.9
Weighted average	38.26	21.72	16.54	56.8

Continued

Table 5. - Estimated average value of cottonseed products produced per ton of cottonseed crushed, farm value of seed (lagged estimates) and margin between farm and product value, by months, 1934- Continued

Year and month	Mill sales value of cottonseed products 1/	Farm value computed by using lag 2/	Margins	Farm value as percentage of mill value
	Dollars	Dollars	Dollars	Percent
1940-41				
August	36.08	22.48	13.57	62.4
September	34.16	21.24	12.76	62.5
October	33.43	20.95	11.96	63.7
November	35.83	21.63	14.13	60.5
December	36.04	21.60	14.41	60.0
January	37.62	21.82	15.77	58.0
February	35.54	21.98	13.55	61.9
March	38.92	21.95	16.93	56.5
April	44.29	22.26	21.70	50.6
May	48.49	22.73	25.50	47.1
June	52.96	23.64	29.33	44.6
July	56.81	23.96	32.85	42.2
Weighted average	37.77	21.78	15.99	57.7
1941-42 3/				
August	57.43	34.85	22.58	60.7
September	64.17	43.90	20.27	68.4
October	62.20	47.60	14.60	76.5
November	60.40	47.58	12.82	78.8
December	63.00	48.37	14.63	76.8
January	65.55	48.57	16.98	74.1
February	64.77	48.55	16.22	75.0
March	64.41	48.60	15.81	75.5
April	63.74	48.09	15.65	75.4
May				
June				
July				
Weighted average				

1/ Computed by using estimated mill-sales prices and average seasonal yields as explained on page 8.

2/ Computed by using estimated lag between time of farm sales of seed and time of crushing. See page 18 for explanation. Seasonal averages were computed by weighting the monthly farm values by the number of tons of seed crushed. These seasonal averages differ by small amounts from the seasonal average price as reported by the Bureau of Agricultural Economics. (Table 6.)

3/ Preliminary.

COTTONSEED: AVERAGE VALUE OF PRODUCTS PER TON OF SEED CRUSHED, PRICE RECEIVED BY FARMERS, AND MARGINS, UNITED STATES, MONTHLY, 1934-41

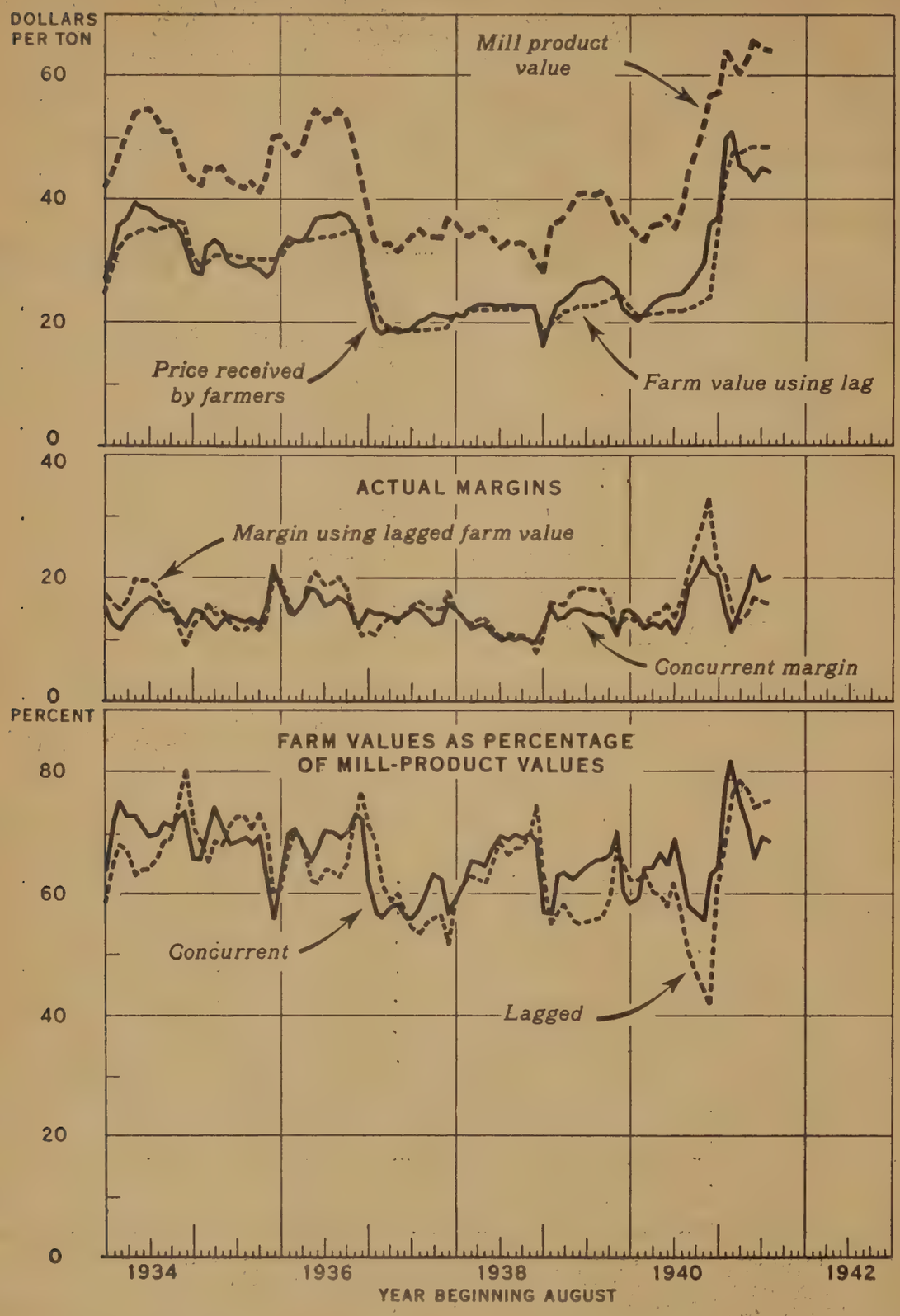

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Figure 4.- Two alternative valuations of payments to farmers for cottonseed are compared with the monthly value of mill products per ton; one based upon concurrent monthly farm prices representing hypothetical replacement cost of seed, the other using lags between month of farm sale and month of crushing to represent actual cost, at the farm level, of seed crushed.

Table 6. - Concurrent margin: estimated average value of cottonseed products produced per ton of seed crushed, current farm price of cottonseed, and concurrent margin between farm and product value, by months, 1934

Year and month	Mill sales value of cottonseed products 1/	Farm price of cottonseed per ton 2/	Margins	Farm price as percentage of mill price
	Dollars	Dollars	Dollars	Percent
1934-35				
August	41.91	26.76	15.15	63.9
September	44.43	31.91	12.52	71.8
October	46.67	35.04	11.63	75.1
November	50.31	36.58	13.73	72.7
December	54.11	39.34	14.77	72.7
January	54.40	38.56	15.84	70.9
February	54.88	38.19	16.69	69.6
March	53.13	37.07	16.06	69.8
April	51.24	36.68	14.56	71.6
May	51.14	36.27	14.87	70.9
June	48.14	34.92	13.22	72.5
July	44.98	33.00	11.98	73.4
Average	49.97	35.83	14.14	71.7
1935-36				
August	43.18	28.41	14.77	65.8
September	42.44	27.87	14.57	65.7
October	45.28	32.14	13.14	71.0
November	44.88	33.32	11.56	74.2
December	45.29	32.02	13.27	70.7
January	43.50	29.75	13.75	68.4
February	42.48	29.20	13.28	68.7
March	42.01	29.15	12.86	69.4
April	43.01	29.39	13.62	68.3
May	41.22	28.72	12.50	69.7
June	43.28	27.31	15.97	63.1
July	50.10	28.00	22.10	55.9
Average	44.00	30.69	13.31	69.7

Continued -

Table 6. - Concurrent margin: estimated average value of cottonseed products produced per ton of seed crushed, current farm price of cottonseed, and concurrent margin between farm and product value, by months, 1934 - Continued

Year and month	Mill sales value of cottonseed products 1/	Farm price of cottonseed per ton 2/	Margins	Farm price as percentage of mill price
	Dollars	Dollars	Dollars	Percent
1936-37				
August	50.43	31.87	18.56	63.2
September	48.29	33.77	14.52	69.9
October	47.23	33.36	13.87	70.6
November	48.64	33.13	15.51	68.1
December	53.27	34.79	18.48	65.3
January	54.58	36.57	18.01	67.0
February	52.81	37.19	15.62	70.4
March	53.34	37.33	16.01	70.0
April	54.77	37.82	16.95	69.1
May	53.37	37.42	15.95	70.1
June	48.61	35.62	12.99	73.3
July	45.66	33.00	12.66	72.3
Average	50.89	34.91	15.98	68.6
1937-38				
August	39.42	24.42	15.00	61.9
September	33.56	19.21	14.35	57.2
October	32.72	18.38	14.34	56.2
November	32.85	19.01	13.84	57.9
December	31.66	18.50	13.16	58.4
January	32.92	18.58	14.34	56.4
February	34.30	19.20	15.10	56.0
March	35.05	20.24	14.81	57.7
April	34.29	20.55	13.74	59.9
May	34.09	21.63	12.46	63.4
June	34.03	21.29	12.74	62.6
July	37.01	21.00	16.01	56.7
Average	33.53	19.37	14.16	57.8

Continued -

Table 6. - Concurrent margin: estimated average value of cottonseed products produced per ton of seed crushed, current farm price of cottonseed, and concurrent margin between farm and product value, by months, 1934 - Continued

Year and month	Mill sales value of cootonseed products 1/	Farm price of cottonseed per ton 2/	Margins	Farm price as percentage of mill price
	Dollars	Dollars	Dollars	Percent
1938-39				
August	36.29	21.36	14.93	58.9
September	34.60	21.17	13.43	61.2
October	34.28	22.42	11.86	65.4
November	35.41	23.08	12.33	65.2
December	35.64	23.04	12.60	64.6
January	34.35	23.09	11.26	67.2
February	32.46	22.58	9.88	69.6
March	33.34	22.98	10.36	68.9
April	32.94	22.95	9.99	69.7
May	33.08	22.87	10.21	69.1
June	32.40	22.72	9.68	70.1
July	30.15	20.70	9.45	68.7
Average	34.28	22.53	11.75	65.7
1939-40				
August	28.39	16.24	12.15	57.2
September	36.03	20.56	15.47	57.1
October	36.20	22.88	13.32	63.2
November	37.43	23.75	13.68	63.5
December	39.68	24.75	14.93	62.4
January	40.92	26.00	14.92	63.5
February	41.17	26.64	14.53	64.7
March	40.93	26.84	14.09	65.6
April	41.36	27.18	14.18	65.7
May	40.18	26.69	13.49	66.4
June	36.36	25.54	10.82	70.2
July	37.38	22.60	14.78	60.5
Average	38.26	24.07	14.19	62.9

Continued -

Table 6. - Concurrent margin: estimated average value of cottonseed products produced per ton of seed crushed, current farm price of cottonseed, and concurrent margin between farm and product value, by months, 1934 - Continued

Year and month	Mill sales value of cottonseed products 1/	Farm price of cottonseed per ton 2/	Margins	Farm price as percentage of mill price
	Dollars	Dollars	Dollars	Percent
1940-41				
August	36.08	21.16	14.92	58.6
September	34.16	20.32	13.84	59.5
October	33.43	21.55	11.88	64.5
November	35.83	23.12	12.71	64.5
December	36.04	24.08	11.96	66.8
January	37.62	24.46	13.16	65.0
February	35.54	24.61	10.93	69.3
March	38.92	24.81	14.11	63.7
April	44.29	25.88	18.41	58.4
May	48.49	27.67	20.82	57.1
June	52.96	29.58	23.38	55.9
July	56.81	35.90	20.91	63.2
Average	37.77	23.99	13.78	63.5
1941-42 3/				
August	57.43	36.94	20.49	64.3
September	64.17	49.83	14.34	77.7
October	62.20	50.89	11.31	81.8
November	60.40	45.28	15.12	75.0
December	63.00	44.65	18.35	70.9
January	65.55	43.24	22.31	66.0
February	64.77	45.04	19.73	69.5
March	64.41	44.18	20.23	68.6
April	63.74	43.93	19.84	68.9
May				
June				
July				

1/ Computed by using estimated mill sales price and average seasonal yields as explained on page 8.
2/ Reported by the Bureau of Agricultural Economics.
3/ Preliminary.

The unit of time used in the lagged farm-value comparisons is the single month of crushing. Similar calculations could be made using the month of farm sale as a unit of time and blending mill-product values from later months in which the same seed is crushed.

Current Margins

The mill-sales prices of the current season (1941-42) cannot be derived in exactly the same manner as those of other seasons until the seasonal census data are available. The mill-door prices have been estimated by adjusting the market series by correction factors determined for the latest complete season (1940-41). The mill-sales values computed from these preliminary prices and estimates of seasonal yields of products have remained comparatively stable since the end of the 1940-41 season, ranging from $56.81 in July 1941 to $64.77 in February 1942; however, the mill values had been increasing all through the 1940-41 season while farm values remained stable. Farm values on the lagged basis, after 10 months of slight change increased sharply from July to October 1941 but have remained relatively stable from that time through April 1942. Farm prices as reported currently rose faster than lagged values during the 10 months, September 1940 to July 1941, then mounted sharply to a high of $50.89 in October 1941 and have since continued at a level near $45 through April 1942.

The margins of table 5 (using lagged farm values) reached a high of $32.85 in July 1941 but decreased at the beginning of the current season becoming fairly stable after December 1941. Concurrent margins have shown less variation during the 1940-41 and current seasons, with recent margins higher than those calculated from lagged farm values.

In April 1942 the mill sales value of products per ton of seed amounted to about $64 -- about the same as for the season 1916-17. This product value is far below the levels of $85, $86 and $88 reached in the three seasons, 1917-20. The lagged margin for April of this year (1942) was about a dollar higher than the 32-season average but was low in relation to the level of product value.

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