Cotton seed

Texas Cottonseed and Cottonseed Products

And the changes that have taken place in the Industry

Products Per Ton of Texas Cottonseed Crushed

In Per Cent

1899-1900

Linters 1% Waste 2%

Oil
13%

Hulls
47%

Cake &
Meal
37%

Value of Products
$16.63

1962-1963

Waste 4%

Linters 8%

Oil
16%

Hulls
26%

Cake &
Meal
46%

Value of Products
$83.59
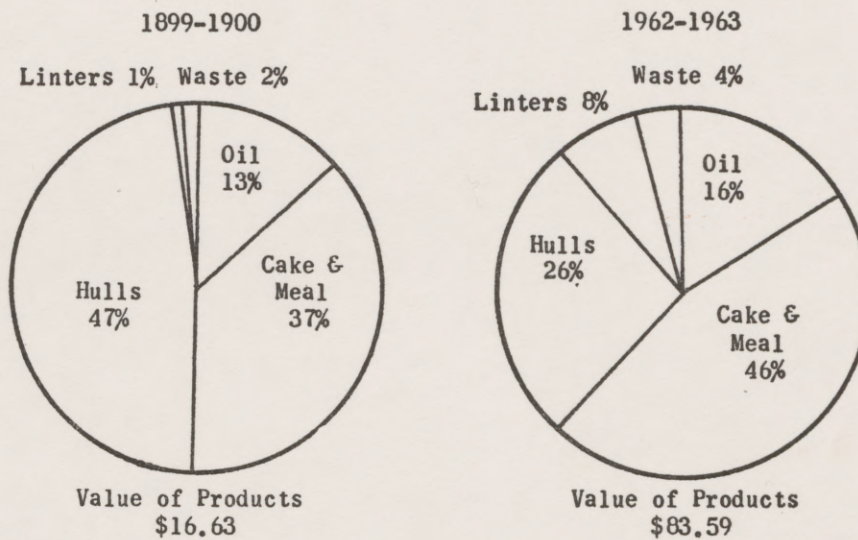
COTTON ECONOMIC RESEARCH

The University of Texas • Austin

TEXAS COTTONSEED AND COTTONSEED PRODUCTS

AND THE CHANGES THAT HAVE TAKEN PLACE IN THE INDUSTRY

Cotton Economic Research

The University of Texas

A Part of

The Cotton Research Committee of Texas

Austin, Texas

1965

PREFACE

This Research Report was prepared by the staff of Cotton Economic
Research as a source of condensed reference material relating to the Texas
cottonseed industry and its by-products. An effort has also been made to
show the changes that this industry has gone through, along with its pro-
ducts. Work on this report was accomplished under one of the current
research projects for the fiscal year.

This publication also serves as a supplement to Research Report No.
74 entitled Texas Cottonseed and Cottonseed Products and to the original
publication by the Cotton Research Committee of Texas entitled The Cotton-
seed Crushing Industry of Texas and Its National Setting, by Dr. A. B. Cox,
1949.

Appreciation is expressed to the various Texas cottonseed breeders
and Texas cottonseed oil mills who assisted by furnishing this office with
information in relation to their operations.

                                                    COTTON ECONOMIC RESEARCH

April 1965

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INTRODUCTION

The enclosed tables as related to cottonseed and its by-products have been revised and up-dated through data gathered from various publications of the United States Department of Agriculture; United States Department of Commerce, Bureau of the Census; International Cotton Advisory Committee and other sources. The short history of cottonseed; the biology of cottonseed; the effects of planting, harvesting and ginning on cottonseed have been omitted from this publication. Refer to Research Report No. 74 entitled Texas Cottonseed and Cottonseed Products of August 1964 for this information.

Since cottonseed and its by-products are dependent upon the production of cotton lint, their production in the crop reporting districts has followed the lint production over the years. However, the amount of by-products derived per ton of seed crushed has changed along with the quality of the seed and its by-products. These changes will be noted in this publication along with the resultant effect on the state and its economy.

The charts on the cover of this report indicate what has transpired in the 63-year span between the two crop years portrayed. The value of the products has increased over five times during the interval. The amount of the various products obtained per ton of crushed cottonseed has also changed; some products increased as others decreased. These changes, plus others, will be reported in this publication.

Even with the decrease in the amount of cottonseed produced in the state for the 1964-65 season and the reduced price received by the farmer per ton of cottonseed, the estimated value of the season's seed amounted to $7.63 per capita which is a fair size portion of the state's economy.

BREEDERS

One cannot think of cottonseed without realizing that production of cotton lint and seed would be a lost cause without the cottonseed breeders and certified seed growers located in our state who supply the farmer with his pure seed stock. The 1963 Texas Seed Directory lists some 74 cottonseed producers in the state. Fifty-six are certified seed growers, thirteen are certified seed growers and registered seed breeders, four are registered seed breeders, and one is a foundation seed producer. This group reported some 129,000 acres devoted to the production of first quality cottonseed for use by the state's cotton farmers.

This phase of the industry has made great strides in the past quarter of a century in an effort to provide the other segments of the industry with the qualities desired in lint, seed, and plant growth and development. Breeders are currently interested in producing glandless cottonseed which produces a cotton that has good characteristics in staple length, yield, resistance to insects and diseases, germination rate, rapid growth, fineness, strength, harvesting and is stormproof. This has only been possible through the use of modern techniques, research and hard work on the part of the breeders. The value of the products they produced during the 1963-64 season amounted to over 14.6 million dollars of which over 13.6 million was directly attributable to cottonseed and cotton products.

Table 1 lists the cotton produced by the registered plant breeders and certified seed growers in Texas as shown in the 1964 Texas Seed Directory (Winter Edition). This is not a complete listing of all the varieties produced by Texas breeders and certified seed growers as the absence of some varieties will be noted.

Table 1.   THE VARIETIES OF COTTON PRODUCED BY THE REGISTERED PLANT
BREEDERS AND CERTIFIED SEED GROWERS IN THE STATE

Variety	Number of Breeders and Growers	Acreage		
		Foundation	Registered	Certified
Acala 1517 C	3	120		191
Anton 22	1		10	22
Anton Stormproof 99	1		865	3,702
Austin	2	30		30
Blightmaster	4	95	280	25
Deltapine TPSA	1		300	720
Deltapine STPSA	1		83	530
Deltapine 15	3			1,537
Deltapine Smoothleaf	7			1,348
Gregg 35	18		47	3,407
Lankart Selection 57	2		5,720	24,594
Lankart Selection 611	2			4,086
Lockett 88A	1		131	4,683
Lockett 4789	1		675	8,110
Northern Star 4-11	1		424	350
Northern Star No. 5	5		1,898	4,039
Paymaster 54-B	1			888
Paymaster 101-A	1			10,022
Paymaster 111	1			6,537
Paymaster 202	1			3,177
Rilcot 90	1		316	2,838
Rex Smooth Leaf	5			472
Stardel	1			66
Stoneville No. 7A	10			5,898
Stoneville 213	10			1,825
Storm King TPSA No. 1	1		460	2,240
Stuffelbeme Stormproof	1		1,543	
Texacala 5455	1		375	
Tideland	1		300	970
Western Stormproof	1		522	7,522
64 Master Strain	1		27	
Totals		245	13,976	99,829
GRAND TOTAL			114,050	

Number of Seed Breeders - 1964
1   Foundation Breeder
13   Registered Seed Breeders
52   Certified Seed Growers

Source: 1964 Seed Directory (Winter Edition), Texas Department of Agriculture.

COTTON PRODUCTION

Cotton production, which is the limiting factor in the production of cottonseed both in the United States and the world, is found in Table 2. Note that while the United States production has been more or less constant, the production for the rest of the world has been increasing. The increase in the world production is about 12,000,000 bales due to increased production in foreign countries as shown by the averages for the years of 1934-38 and 1954-58. When the 1964-65 crop year estimates are compared with the average for the years of 1954-58, an additional increase in the foreign production of over 6,000,000 bales is noted. When these two increases in foreign production are added, there is an 18,000,000 bale increase in world production in which the United States did not share and which is greater than our 1964-65 crop.

Table 3 shows the cotton production data for the major cotton-growing states in the United States for a six-year period, including the preliminary figures for the 1964-65 season. Texas, the United States' largest producer, again produced about one-third of the nation's cotton during the 1964-65 season. Mississippi, the nation's second largest producer, was ahead of California again for the second year in a row.

The interesting thing about Texas is that in the production of one-third of the nation's cotton and cottonseed, she only uses 3.4 per cent of her total land area. In addition, this 3.4 per cent of the total land area represents only 25.5 per cent of the harvested crop land area. The harvested crop land area of Texas only amounts to 13.3 per cent of the state's total land area. This 3.4 per cent of the state's total land

Table 2. WORLD COTTON PRODUCTION - UNITED STATES AND THE REST OF THE WORLD - YEAR BEGINNING AUGUST 1
(In Thousands of 478-Pound Bales)

Dates	United States**	Rest of the World	World Total
Average			
1934-38	12,389	18,022	30,411
1954-58	12,760	29,892	42,653
1959-60	14,555	32,719	47,274
1960-61	14,453	32,294	46,747
1961-62	14,448	30,900	45,348
1962-63	14,920	33,177	48,097
1963-64	15,340	34,869	50,209
1964-65*	15,200	36,049	51,249

* Preliminary.
** Running bales adjusted for ginnings within season.
Source: Cotton-World Statistics, International Cotton Advisory Committee, January 1965.

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Table 3. COTTON PRODUCED BY YEARS 1960-65 FOR THE UNITED STATES AND PRINCIPLE PRODUCING STATES, YEAR ENDING JULY 31
(In Thousands of Bales)

	1960	1961	1962	1963	1964	*1965
United States	14,515	14,265	14,315	14,864	15,289	15,147
Alabama	715	756	620	696	874	887
Arizona	720	849	824	936	836	793
Arkansas	1,534	1,346	1,459	1,458	1,501	1,584
California	1,954	1,964	1,709	1,935	1,736	1,787
Georgia	521	508	512	535	604	617
Louisiana	487	496	475	540	675	588
Mississippi	1,552	1,528	1,609	1,686	2,111	2,223
North Carolina	336	245	290	284	362	388
Oklahoma	379	454	366	305	325	278
South Carolina	421	419	414	455	464	565
Tennessee	642	571	550	548	644	666
Texas	4,403	4,345	4,797	4,736	4,413	4,080
All Others	851	784	690	750	744	691

* Preliminary   Source: "Cotton Ginnings," USDC
NOTE: Slight revisions in the totals for the U. S. which are not shown for the individual states in some instances in the annual reports result in a slight increase in the figures shown in "All Others."

area used in the production of cotton and cottonseed yields a cash receipt from farming of over 50 per cent of all the cash receipts from farming for all the state's harvested crop land.

It can be seen that cotton and cottonseed are the state's number-one cash crop. The estimated value of these products per harvested acre amounted to $114 per acre for the 1964-65 season, even with the decrease in the lint and cottonseed prices received by the farmer.

Table 4 shows the per cent of cotton produced in the crop reporting districts of Texas for the crop years 1949 through 1964. The percentage figures by crop reporting districts are also valid for the distribution of cottonseed production in the state. The westward movement of cotton and cottonseed production over the years in the United States is also noted in Texas. The increase in the percentage produced in Districts 1 and 6, which are the western districts of the state, since 1949 (refer to Table 4) coupled with decrease in the others, supports the westward trend noted in the nation.

Table 4. PER CENT OF COTTON PRODUCED BY DISTRICTS IN TEXAS

Crop Year	Crop Reporting Districts										
	1-N	1-S	2	3	4	5	6	7	8	9	10
1949	4.6	25.7	18.5	1.0	17.5	5.8	3.2	1.5	8.3	3.5	10.4
1950	3.0	24.5	18.6	0.5	19.0	4.2	4.8	1.6	7.8	4.1	11.9
1951	8.6	23.0	12.0	0.8	15.0	5.0	4.7	0.6	7.0	6.3	17.0
1952	12.3	26.4	6.3	0.3	16.0	5.0	6.3	0.5	11.0	6.1	9.8
1953	12.7	19.3	9.9	0.9	25.5	6.0	5.9	0.9	6.7	5.5	6.7
1954	13.0	27.9	10.2	0.5	11.3	3.8	6.6	0.7	9.1	4.9	12.0
1955	9.4	25.4	13.3	0.6	15.9	5.9	6.6	0.8	5.7	5.9	10.5
1956	13.8	32.8	7.6	0.3	9.9	4.4	8.0	0.3	6.0	4.5	12.4
1957	10.4	32.9	13.2	0.5	11.7	3.9	7.5	0.6	6.3	4.3	8.7
1958	12.3	34.9	12.6	0.4	9.9	2.2	6.7	0.8	6.3	3.6	10.3
1959	10.7	32.2	13.6	0.4	10.8	2.8	6.3	1.3	6.9	3.6	11.4
1960	11.2	33.6	16.7	0.5	10.3	2.7	5.9	1.5	6.1	2.5	9.0
1961	10.9	38.4	16.9	0.5	8.6	2.0	6.0	3.2	3.4	2.1	8.0
1962	12.4	36.6	12.8	0.4	9.4	1.9	5.3	0.8	5.9	4.5	10.0
1963	11.4	36.0	14.1	0.4	11.6	2.5	5.8	0.8	5.1	5.1	7.2
1964*	14.1	32.1	11.9	0.4	10.5	2.3	5.7	0.5	7.4	5.9	9.2

* Preliminary

OIL MILLS

The end use products of cottonseed would indeed be limited if it were not for the oil mills which reduce cottonseed to its by-products and in turn open the door on the whole new vista of end uses. At the turn of the Nineteenth Century, just two years after the United States cotton production had first exceeded the 10-million bale figure with the production of 11.2 million bales and when our exports were 65 per cent of our production and our imports were only a little over one per cent of our production in the United States, there were 357 oil mills in the nation. Texas had 102 of these. During the next ten to fifteen years the number of oil mills in Texas and the United States increased, as did our cotton production.

From the crop year 1920-21, when the number of cottonseed oil mills in the United States and Texas were 675 and 193 respectively, the number of oil mills began to decrease in both the United States and Texas. Table 5, part "A" shows the total number of active cottonseed oil mills in the United States and the average number of mills according to the tons of cottonseed crushed for various selected five-year periods, in addition to the figures for the crop year 1920-21. As the number of oil mills decreased over the years, the volume of seed crushed per mill increased. Similar information for the same periods for Texas cottonseed oil mills is in part "B" of Table 5.

The number of cottonseed oil mills in Texas continued to decline below the 100 reported active during the crop year of 1948-49 to 84 in 1954, to 66 in 1958, and to 61 in 1963-64 crop year, while the volume of seed crushed per mill increased correspondingly. This dropping by-the-wayside of cottonseed oil mills was due to the fact that small oil mill

Table 5. COTTONSEED OIL MILLS ACCORDING TO TONS OF COTTONSEED CRUSHED

A. Active Oil Mills in United States

Years	Total	Less than 1,000	1,001-2,000	2,001-5,000	5,001-10,000	10,001-20,000	Over 20,000
1920-21 (1)	675	67	94	215	181	96	22
1921-26 (5)	542	46	57	163	147	101	28
1926-31 (5)	540	20	36	134	162	140	58
1934-39 (5)	468	27	36	107	140	103	55
1939-44 (5)	424	16	30	106	124	99	49
1944-49 (5)	355	12	23	81	97	86	56

B. Active Oil Mills in Texas

Years	Total	Less than 1,000	1,001-2,000	2,001-5,000	5,001-10,000	10,001-20,000	Over 20,000
1920-21 (1)	193	10	23	61	65	29	5
1921-26 (5)	168	11	14	51	56	28	8
1926-31 (5)	177	4	9	48	61	42	13
1934-39 (5)	151	8	13	44	51	28	7
1939-44 (5)	137	8	12	39	45	28	5
1944-49 (5)	104	3	8	28	31	25	9

Source: Derived from USDA data.

operation was no longer profitable as new equipment and methods were being developed which cost more money than a small oil operation could afford. Table 6 shows the number of oil mills in Texas in the years of 1954, 1958, and 1963, along with the employment, payroll, value of products and the value added by manufacture.

For the 1963-64 season, a survey was made of the Texas cottonseed oil mills which indicated that their payroll amounted to over 14 million dollars which added to the economy of the state. The oil mills reported that they bought their seed for crushing at a distance of from two to over 100 miles from the mill. The average distance at which Texas mills purchased their seed was 58 miles for the 1963-64 season.

Table 6. TEXAS COTTONSEED OIL MILLS ACTIVE IN 1954, 1958, AND 1963

Year	Number of Establish- ments	Total Persons Employed in Manufacture	Total Payroll Dollars	Value of Products Dollars	Value Added By Manufacture Dollars
1963	61	3,200	14,800,000	212,900,000	33,996,000*
1958	66	2,701	9,273,000	160,282,000	21,031,000
1954	84	3,385	10,856,000	164,000,000	25,252,000

* Estimated

Source: U. S. Census of Manufacturers and original data 1963.

The mills reported that they sold the following average percentages of the indicated products within a 75-mile radius of the plant: Meal three per cent, cake 40 per cent, and hulls 80 per cent. A majority of the mills in Texas sell their products within the state and in the surrounding states. Others reported that their products were sold nationally, and some even internationally.

A small percentage of the cottonseed oil mills also reported that they crushed soybeans or peanuts during the season.

The crushing mills offered the following suggestions which they felt would improve the quality of the seed delivered to them, resulting in more revenue from the cottonseed for the ginner and grower: (1) Better and im- proved seed cleaning at the gins with the discontinuance of the practice of returning trash to the seed after ginning; (2) Improved harvesting equip- ment, practices and reduction in the harvesting of immature cotton, along with better defoliation practices; (3) Planting of registered or certified seed by the growers, coupled with the increased use of fertilizers and an increase in the proper use of and amount of irrigation.

COTTONSEED PRODUCTION

United States production for the crop years 1942-43 through the 1963-64 season is in Table 7, along with the United States cottonseed oil mill figures for carryover, received, crushed and average price per ton received. Earlier data of the United States in averages for five-year periods from 1872-76 through 1937-41 showing cottonseed production and amount crushed, along with the percentage that the crushed is of production, will be found in Table A-1 in the Appendix.

In the first five-year period (1872-76) the United States cottonseed production only amounted to 1.7 million tons with just about five per cent of this tonnage being crushed. During the five-year period, 1902-06, the United States production reached 5.1 million tons, of which over 66 per cent was being crushed for its component products. From this five-year period on, the cottonseed production increased only slightly, while the per cent crushed increased to over 85 per cent by the 1937-41 period.

For the ten-year period 1942-51 (from the yearly data in Table 7) the United States cottonseed production averaged slightly over 5.0 million tons with 86 per cent being crushed. The next ten-year periods (1952-61) saw the nation's cottonseed production increased again to an average of 5.7 million tons, with nearly 93 per cent being crushed. During the crop years 1962 and 1963 the United States cottonseed production exceeded 6.0 million tons with 95 and 83 per cent being crushed respectively.

See Table 8 for a comparison of the cottonseed production for the various major cotton producing states for the ten-year periods 1940-49, 1950-59, and for the four-year period 1960-64. During the first ten-year

Table 7. U. S. COTTONSEED PRODUCED, OIL MILL CARRYOVER, RECEIVED, CRUSHED IN TONS AND AVERAGE PRICE PER TON RECEIVED BY FARMERS

| Year | Production 1,000 Tons | Oil Mill Data in Tons | | | Average Price Dollars/Ton |
		Carryover	Received	Crushed	
1942-43	5,717	57,221	4,516,084	4,497,779	45.61
1943-44	4,680	75,526	3,984,002	3,954,542	52.10
1944-45	4,902	105,006	4,362,633	4,254,149	52.70
1945-46	3,663	213,490	3,162,939	3,261,915	51.10
1946-47	3,511	114,514	3,071,412	3,089,590	72.00
1947-48	4,683	96,336	4,071,437	4,081,885	85.90
1948-49	5,923	85,888	5,381,953	5,331,892	67.20
1949-50	6,614	135,941	5,834,304	5,682,302	43.40
1950-51	4,105	287,951	3,501,501	3,723,171	86.60
1951-52	6,302	66,281	5,545,905	5,475,288	69.30
1952-53	6,191	136,898	5,581,180	5,562,706	69.60
1953-54	6,749	155,372	6,329,742	6,255,946	52.70
1954-55	5,709	229,168	5,229,130	5,249,234	60.30
1955-56	6,043	209,064	5,556,200	5,587,795	44.60
1956-57	5,407	177,469	4,935,836	4,949,437	53.40
1957-58	4,609	163,868	4,257,287	4,246,640	51.10
1958-59	4,798	174,515	4,364,964	4,439,160	43.80
1959-60	5,991	100,319	5,495,697	5,491,173	38.80
1960-61	5,886	104,845	5,436,070	5,352,454	42.60
1961-62	5,978	188,461	5,630,927	5,538,902	51.10
1962-63	6,096	280,486	5,736,425	5,783,391	47.90
1963-64	6,197*	233,520	5,071,300*	5,134,720*	50.70
1964-65	6,312*	170,100*			46.00*

* Preliminary
Source: USDC; Cotton Production & Distribution, Fats & Oils Situation

period Texas averaged 24 per cent of the United States production, followed by Mississippi and Arkansas in that order. In the next ten-year period Texas production increased to 30 per cent of the nation followed by Mississippi, California, and Arkansas. Actually, for part of this ten-year period California exceeded Mississippi's production and was in second place. During the last four-year period, 1960-64, Texas production averaged 32 per cent of the nation's total, while California was second, followed by Mississippi and Arkansas. Here again, during the last two years of the four-year period, the reverse is actually true as Mississippi was in second

Table 8.   COTTONSEED PRODUCTION IN 1,000 TONS, FOR TWO TEN-YEAR
PERIODS AND ONE FOUR-YEAR PERIOD BY STATES

	1940-49	1950-59	1960-64
United States	4,874.1	5,652.6	5,987.8
Alabama	369.0	312.6	284.8
Arizona	80.9	322.3	344.0
Arkansas	584.6	546.2	600.3
California	205.6	599.5	746.8
Georgia	324.2	252.7	213.5
Louisiana	226.5	236.4	209.5
Mississippi	693.5	642.8	656.2
North Carolina	246.6	158.9	117.5
Oklahoma	214.8	145.6	153.0
South Carolina	311.2	227.3	173.7
Tennessee	220.5	220.8	240.0
Texas	1,166.6	1,708.9	1,932.5
All Other States	230.1	278.6	316.0

Source: USDC, Cotton Production and Distribution

place; and California was in third, followed by Arkansas and the other
cotton-producing states.

Texas cottonseed production for the crop years 1942-43 through 1963-64
is found in Table 9, along with the oil mill data including cottonseed carry-
over, received, crushed and the average price received by the Texas farmer
per ton of cottonseed. The data in this table can be compared directly
with the United States data for the same period and information in Table 7.

Table 9. TEXAS COTTONSEED PRODUCED, OIL MILL CARRYOVER, RECEIVED, CRUSHED IN TONS AND AVERAGE PRICE PER TON RECEIVED BY FARMERS

Year	Production 1,000 Tons	Oil Mill Data in Tons			Average Price Dollars/Ton
		Carryover	Received	Crushed	
1942-43	1,360	32,205	1,054,964	1,043,250	44.02
1943-44	1,133	43,919	940,815	953,838	51.90
1944-45	1,073	30,896	986,857	933,554	55.10
1945-46	754	84,199	674,898	701,843	53.20
1946-47	699	57,254	629,719	632,545	73.30
1947-48	1,423	54,428	1,217,175	1,207,409	86.00
1948-49	1,311	64,194	1,208,005	1,198,339	72.10
1949-50	2,488	73,860	2,074,532	1,940,601	43.70
1950-51	1,236	207,791	1,037,769	1,195,682	90.90
1951-52	1,718	49,878	1,517,427	1,505,283	72.50
1952-53	1,604	62,022	1,541,723	1,515,614	72.10
1953-54	1,808	88,131	1,789,545	1,733,810	53.40
1954-55	1,655	143,866	1,562,987	1,588,038	62.10
1955-56	1,696	118,815	1,548,978	1,531,420	45.90
1956-57	1,504	136,373	1,359,659	1,389,834	57.40
1957-58	1,557	106,198	1,499,353	1,481,634	51.80
1958-59	1,823	123,917	1,673,435	1,726,564	42.40
1959-60	1,868	70,788	1,749,631	1,756,548	38.20
1960-61	1,830	63,871	1,747,607	1,720,708	41.30
1961-62	2,051	90,770	2,014,708	1,894,451	51.30
1962-63	1,981	211,027	1,852,550	1,922,920	47.70
1963-64	1,811*	140,657	1,764,800*	1,838,757*	52.60
1964-65	1,700*	66,700*			

* Preliminary or estimated.
Source: USDC; Cotton Production & Distribution, Fats & Oils Situation

Taking the yearly data in the table converting it to the average for ten-year periods, it was noticed that the Texas cottonseed production for the period 1942-51 amounted to 1.3 million tons of which 85 per cent was crushed. During the second ten-year period of 1952-61, the state's production increased to 1.7 million tons; and 94 per cent was crushed. The state's production for the 1962 and 1963 seasons was approximately 2.0 and 1.8 million tons respectively, of which about 97 and 99 per cent was crushed.

When the United States average prices received by the farmer shown in Table 7 are compared with the Texas average prices received by the farmer in Table 9, it becomes apparent that the prices received by the Texas farmer were above the national average 16 years out of 22 and were below only six years during the same period. This will be compared and discussed further in another portion of this publication.

To indicate the cottonseed production according to crop reporting districts of the state, Table 10 was constructed showing the estimated production data for the 1964-65 season, preliminary data and the five-year averages for the periods of 1944-48, 1949-53, 1954-58 and 1959-63. Here can be seen the crop reporting areas that are increasing in production, which are decreasing and which have been fluctuating as to the amounts produced. We not only have the influence of the westward movement of the cotton into the western and northwestern parts of the state, but also the varietal changes and the environmental influences affecting production in the various crop reporting areas.

Table 10. COTTONSEED PRODUCTION IN TONS BY CROP
REPORTING DISTRICTS OF TEXAS

District	1944-48A	1949-53A	1954-58A	1959-63A	1963-64*	1964-65E
1	221,206	567,212	700,216	892,634	858,414	792,799
2	182,646	236,917	188,694	282,937	255,351	204,200
3	9,014	13,594	7,510	8,549	7,244	6,864
4	278,280	328,709	193,579	192,310	210,076	180,178
5	69,529	93,984	66,371	45,240	45,275	39,467
6	42,364	85,339	116,346	111,515	105,038	97,812
7	10,678	18,167	10,549	22,449	14,488	8,580
8	103,073	144,277	110,438	110,952	92,721	126,984
9	45,684	88,606	76,258	67,518	92,001	101,244
10	95,926	194,594	177,038	174,095	130,392	157,872
Total	1,058,400	1,771,399	1,646,999	1,908,199	1,811,000	1,716,000

* Preliminary   E - Estimated   A - Average for five-year period
Source: Texas Cotton Statistics, USDA, SRS

PRODUCTS PER TON OF SEED

When an oil mill crushes cottonseed it is very interested in the turn-
out (the number of pounds of the product produced per ton of seed crushed)
for the various products derived. This information for the United States
is in Table 11 for the crop years 1942-43 through 1963-64, along with a
twenty-year average for the period 1942-62. The same table contains equi-
valent data for Texas on the same products and period of time. Data on the
number of pounds of oil, cake and meal, hulls and linters produced per ton
of cottonseed crushed in the United States according to five-year averages
will be found in Table A-1 of the Appendix. Some of the information in
this Appendix table only goes back to about 1897, while the remainder goes
back to 1872. Also shown on Table A-1 is the average total tons produced
for the products during the same selected five-year periods.

Although Table 11 indicates a trend of change in the number of pounds
of a product derived per ton of seed crushed for two of the products in the
twenty-two years of data shown in the table, an incomplete picture is pre-
sented if the earlier data in Table A-1 is not considered. Let us examine
the number of pounds of oil produced per ton of seed crushed based on the
United States average figures. The crude oil average yearly United States
production for the five-year period of 1872-76 was just 13,000 tons with an
average turnout of 298 pounds of oil per ton of seed (Table A-1). Since
the oil is the product which brings the greatest return per ton of seed
crushed, breeders and oil mills have been constantly trying to increase
the amount of oil obtained per ton of seed crushed since this period. As
can be seen from the five-year average data in Table A-1, some early pro-
gress was made. Table 11 shows that oil production per ton of seed has

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Table 11. AVERAGE NUMBER OF POUNDS OF PRODUCTS OBTAINED PER TON OF COTTONSEED CRUSHED FOR TEXAS AND THE UNITED STATES

Crop Year	Crude Oil U.S.	Crude Oil Texas	Cake & Meal U.S.	Cake & Meal Texas	Hulls U.S.	Hulls Texas	Linters U.S.	Linters Texas	Total U.S.	Total Texas	Waste U.S.	Waste Texas
1942-43	311	288	887	895	482	496	190	183	1870	1862	130	138
1943-44	313	301	928	946	469	474	185	181	1895	1902	105	98
1944-45	311	307	919	947	463	462	182	184	1875	1900	125	100
1945-46	312	302	879	926	480	465	182	186	1853	1879	147	121
1946-47	315	303	882	941	471	444	191	199	1859	1887	141	113
1947-48	312	311	930	943	452	456	186	194	1880	1904	120	96
1948-49	320	309	897	951	463	459	183	185	1863	1904	137	96
1949-50	323	312	895	939	469	465	176	164	1863	1880	137	120
1950-51	321	323	896	935	461	477	185	167	1863	1902	137	98
1951-52	320	325	930	960	451	458	185	171	1886	1914	114	86
1952-53	328	332	961	967	431	465	184	161	1904	1925	96	75
1953-54	332	330	946	940	444	460	184	166	1906	1896	94	104
1954-55	331	341	976	952	434	470	187	163	1928	1926	72	74
1955-56	339	340	942	914	447	479	180	163	1908	1896	92	104
1956-57	340	346	964	941	433	477	181	175	1918	1939	82	61
1957-58	339	331	922	910	455	506	176	163	1892	1910	108	90
1958-59	342	339	928	938	463	507	181	167	1914	1951	86	49
1959-60	339	337	928	914	458	509	181	165	1906	1925	94	75
1960-61	338	338	936	904	455	530	177	163	1906	1935	94	65
1961-62	337	324	905	860	478	550	176	161	1896	1895	104	105
1962-63	332	327	937	915	464	527	171	151	1904	1920	96	80
1963-64E	338	322	952	930	457	500	171	150	1918	1902	82	98
20 Year Average 1942-62	326	322	923	931	458	480	183	173	1890	1906	110	94

E – Estimated from U. S. Department of Commerce data.

Source: Cotton Production and Distribution, USDC.

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continued to increase in recent years. The crude oil production trends during the 1942-62 period (Table 11) represent a change of +1.67 pounds per year for the United States and +2.18 pounds per year for Texas as determined by the method of least squares. Thus, it is evident that the amount of oil produced per ton of seed is increasing, and that the amount produced in Texas is increasing at a faster rate than the nation as a whole; but Table 11 shows that Texas is still slightly behind the national average.

The United States production of cake and meal was 30,000 tons yearly for the five-year period 1872-76, with a turnout figure of 710 pounds of cake and meal per ton of seed crushed. This amount derived per ton of seed crushed increased with variations until the two five-year periods of 1912-16 and 1917-21, when the figures stabilized at 923 and 925 respectively. Since that time, as can be seen from both Table 11 and Table A-1, there has been no significant trend in this product insofar as the number of pounds of cake and meal produced per ton of seed, particularly as related to the 20-year average seen in Table 11.

The by-product hulls produced per ton of seed crushed in the United States was reported at 943 pounds for the three-year average (1899-1901). As seen in the five-year averages shown in Table A-1, this amount decreases until about 1944 (Table 11), when it reached 463 pounds of hulls per ton. Since 1944 the United States figure has been varying about the twenty-year average of 458 pounds of hulls shown in the table. When the Texas figures for this by-product are checked in Table 11, it is apparent that during the period 1942-43 through 1963-64 the amount produced per ton of seed crushed has increased about 56 pounds. Also to be noted is the fact that the Texas

figure for the 20-year average is 22 pounds greater than the United States figure for the same 20-year period average.

The United States linters production per ton of seed was an average of 21 pounds per year for the period 1899-1901 (Table A-1). This figure had increased eight times by the period of 1937-41, when the average of 163 pounds per ton of seed crushed was produced. The United States figure reached nine times the 1899-1901 figure by the crop year 1942-43 and again in the 1946-47 crop year. The pounds of linters derived per ton of cotton-seed crushed for both the nation and Texas show a decline in the amount produced for the interval from 1942-43 through 1962-63. When the trend figures are derived by the method of least squares, we find that the national yearly change amounted to -.46 pounds per year, while in Texas it amounted to -1.58 pounds per year for this period. Thus, the decline in Texas was greater than in the nation as a whole. This is substantiated by the small difference between Texas and the national figure at the top of the table (earlier years) and that this difference has increased to a much larger one for those figures shown at the bottom of the table (more recent years). The production of linters is dependent on the price that they will bring in the market, and the amount of lint left on the seed after ginning. The variety and the amount of any particular variety grown also affects the production as the seed of some varieties have less lint retention ability than others.

These facts relating to the number of pounds of the various by-products produced per ton of cottonseed crushed will be discussed further as each of these individual products is discussed separately. The amount of products produced per ton of seed will also be related to price in a later section of this report.

COTTONSEED OIL

The extraction of oil from cottonseed was prompted through the invention of the hydraulic press in England by Joseph Bramah in the year 1795 and by the screw-press which was patented four years later by Whiting. The first oil mill established in the United States was in 1801, and it was unsuccessful as a business undertaking. It has been reported that there were seven active oil mills in the United States by the year 1860 which produced oil for use in lamps, soap, painting, and lubrication.

During the crop year of 1875, the United States produced 18,000 tons of cottonseed oil, while just twenty years later in 1895 the amount produced had increased nearly 12 times to a figure of 215,000 tons. Much of these early United States cottonseed oil production data are in Table A-1 in the Appendix and are averages for five-year periods. The nation's cottonseed oil production by crop years beginning with 1942-43 through 1963-64 is shown in Table 12, along with the Texas production and the volume carried over and shipped by the nation's oil mills. Oil prices per pound for the crop years listed are also included in the material shown on Table 12 for both crude and bleached cottonseed oils. For the crop years included in this table, the Texas production represented from 20 to over 38 per cent of the nation's total cottonseed oil production with an average for the entire period of a little more than 30 per cent.

Cottonseed oil faces several competitive oils and products on its way from the oil mill to the final consumer. Some of its competitors are also vegetable in origin, while others are animal in origin. This competition may be direct, as in the case of oils used in cooking and salad oil manufacture; or it may be indirect, such as butter and lard. Most of

Table 12. U. S. CRUDE OIL CARRYOVER, PRODUCTION, SHIPPED; TEXAS PRODUCTION AND U. S. PRICES CRUDE AND REFINED

Crop Year Beginning Aug. 1	1,000 of Pounds				Oil Prices Cents Per Pound	
	Carry-over	Production	Consumed or Shipped	Texas Production	Crude[1]	Bleached[2]
1942-43	7,858	1,400,534	1,402,085	300,135	12.75	13.93
1943-44	6,307	1,235,829	1,233,500	287,475	12.75	14.05
1944-45	8,636	1,324,039	1,321,352	286,811	12.75	14.31
1945-46	11,323	1,017,546	1,018,480	211,784	12.75	14.58
1946-47	10,389	973,083	976,250	191,795	24.78	28.47
1947-48	7,222	1,275,603	1,277,140	375,514	26.25	27.75
1948-49	5,685	1,703,762	1,695,434	370,841	15.42	17.23
1949-50	14,013	1,847,205	1,838,996	606,379	12.51	14.66
1950-51	22,222	1,196,893	1,211,135	386,169	20.39	22.87
1951-52	7,980	1,751,143	1,740,688	489,429	12.98	15.38
1952-53	18,435	1,825,411	1,820,680	502,899	14.25	16.24
1953-54	23,166	2,073,981	2,083,569	572,571	13.56	15.61
1954-55	13,578	1,735,273	1,724,063	541,841	13.39	15.26
1955-56	24,788	1,894,418	1,904,011	520,565	13.13	15.15
1956-57	15,195	1,685,262	1,687,152	481,203	13.39	15.54
1957-58	13,305	1,437,631	1,433,862	490,765	13.58	15.49
1958-59	17,074	1,517,765	1,525,783	585,157	11.67	13.36
1959-60	9,056	1,861,473	1,857,600	592,706	10.03	11.86
1960-61	12,929	1,807,713	1,812,479	582,140	11.79	13.64
1961-62	8,163	1,865,644	1,859,929	613,508	12.52	14.09
1962-63	13,878	1,922,497	1,926,646	628,377	10.48	12.24
1963-64	9,729[3]	1,804,500[3]	1,788,829[3]	592,900[3]	9.95	11.58
1964-65	25,400[3]				11.54	13.53

[1] Tanks F.O.B. Southeast mills.
[2] Prime summer yellow bleached, tank car, deliverd N. Y.
[3] Preliminary

Source: USDC, Cotton Production & Distribution and Fats & Oils Situation

cottonseed oil's primary competition comes from the category of edible fats and oils whose United States production figures are shown in Table 13 for the period beginning in 1933 and going through 1964. This table also shows the civilian consumption of the major edible fats and oils as the total amount consumed as food products along with the total United States consumption and the per capita figure for the years shown, based on all products.

Table 13. MAJOR EDIBLE FATS AND OILS PRODUCED IN U. S. – U. S. CIVILIAN
CONSUMPTION OF FATS AND OILS IN MILLIONS OF POUNDS

| Year Begin-ning Oct. | Animal Origin | | Vegetable Origin | | | Corn** | Used in Products for Civilian Consumption – Includes Imports | | |
| | Butter All | Lard | Cottonseed Crude | Soybean | Peanut | Crude | Food Products Total* | All Products | |
								Total*	Per Capita*
1933	2,343	2,475	1,303	26	10	129	5,366	7,725	61.2
1934	2,253	2,091	1,109	78	56	115	5,575	8,152	64.1
1935	2,171	1,276	1,164	209	64	100	5,513	8,188	64.0
1936	2,181	1,679	1,364	184	78	127	5,777	8,626	66.9
1937	2,096	1,431	1,961	279	66	127	5,797	8,758	67.6
1938	2,340	1,728	1,409	416	85	137	5,866	8,576	65.6
1939	2,210	2,037	1,325	533	32	151	6,079	9,129	69.3
1940	2,240	2,288	1,425	564	174	158	6,131	9,217	69.8
1941	2,265	2,228	1,250	707	76	203	6,275	10,238	77.7
1942	2,130	2,401	1,401	1,206	130	248	5,900	9,478	72.1
1943	2,015	2,865	1,236	1,219	135	239	5,415	8,871	68.8
1944	1,818	3,054	1,325	1,347	119	211	5,255	8,970	69.8
1945	1,699	2,066	1,018	1,415	107	205	5,049	8,636	66.9
1946	1,502	2,136	973	1,531	149	250	5,537	9,041	65.3
1947	1,640	2,282	1,276	1,534	139	204	5,986	10,113	70.9
1948	1,504	2,480	1,704	1,807	144	225	6,183	10,129	69.8
1949	1,688	2,629	1,847	1,927	184	242	6,287	9,863	66.8
1950	1,648	2,812	1,197	2,454	189	243	6,890	11,030	73.4
1951	1,443	2,918	1,751	2,444	130	223	6,366	10,216	67.6
1952	1,578	2,509	1,825	2,536	55	258	6,765	10,358	67.5
1953	1,648	2,248	2,074	2,350	83	252	6,876	10,507	67.4
1954	1,532	2,564	1,723	2,711	20	268	7,238	10,765	67.7
1955	1,563	2,852	1,893	3,143	81	270	7,447	11,287	69.5
1956	1,527	2,614	1,629	3,431	84	286	7,475	11,437	69.2
1957	1,502	2,423	1,420	3,800	59	291	7,469	11,428	67.9
1958	1,413	2,679	1,589	4,251	103	315	7,770	11,759	68.6
1959	1,435	2,726	1,832	4,338	81	332	8,068	12,303	70.5
1960	1,488	2,484	1,786	4,420	101	331	8,055	12,325	69.2
1961	1,596	2,471	1,952	4,790	67	361	8,176	12,399	68.4
1962	1,491	2,497	1,930	5,097	100	380	8,402	13,117	71.4
1963	1,450	2,482	1,939	4,822	90	400	8,610	13,319	71.4
1964P	1,500	2,375	2,000	5,100	NA	NA	8,946	13,733	72.5

Note: Per Capita in units of pounds.   P – Preliminary and estimated.
* Including only fat content of butter and margarine.   NA – Not available.
** Calendar year prior to 1946   Source: USDA, Agricultural Statistics and Fats & Oils Situation, March 1965

From a production standpoint, consider the two products shown on Table 13 under the classification "Animal Origin." First, note that butter production decreased from 1933 to 1946, and from 1946 through 1964 the amount produced has fluctuated around the 1.5 billion pound mark. Lard, being the other fat of animal origin listed, has simply varied about the 2.4 billion pound level for the entire period from 1933 through 1964. In the vegetable category, cottonseed oil has neither increased nor decreased greatly in production except for the yearly variations due to its dependency on the amount of cotton lint produced; thus, no definite trend has developed for the period shown. Peanut oil, like cottonseed oil, has not developed a definite trend for the entire period in the table.

Corn oil production has an increasing trend which is decernable from the data shown in Table 13 and amounts to a +8.41-million pound yearly increase as determined by the method of least squares. Soybean oil shows a larger yearly increase for the period which amounts to a +173.65-million pound change per year as derived from the least squares method. The total column for consumption of all products also shows an increase which amounts to a +160.92-million pound yearly change as derived by the same method mentioned above. From this we can see that any increase in consumption is more than made up by the increased production in corn and soybean oils. For information on soybean production, tons crushed, and oil production all on one table, see Table A-3 in the Appendix, which covers years 1942-43 through 1964-65.

The United States utilization of cottonseed oil is shown in Table 14 for the years 1932 through 1963 according to the major food and non-food uses. Notice that cottonseed oils are stronger in the food products usage

Table 14. COTTONSEED OIL UTILIZATION
(Millions of Pounds)

Calendar Year * Through 1946	Food Uses			Non-Food Uses		Total Domestic Disappearance
	Margarine	Shortening	Salad, Cooking Oils and Others	Soap Fatty Acid Foots & Loss	Others	
1932	15	834	256	129	5	1,240
1933	18	853	302	113	10	1,295
1934	55	1,059	344	103	6	1,566
1935	100	992	240	104	6	1,441
1936	108	919	215	94	4	1,340
1937	174	1,163	286	113	11	1,746
1938	143	1,051	317	141	6	1,658
1939	99	905	326	81	3	1,414
1940	116	823	361	71	6	1,378
1941	150	889	434	86	7	1,566
1942	166	694	440	93	8	1,401
1943	252	572	398	85	7	1,314
1944	215	490	353	74	6	1,138
1945	254	487	373	110	6	1,230
1946*	223	502	366	90	5	1,185
1947	434	312	477	84	4	1,313
1948	448	470	507	128	5	1,558
1949	451	583	469	158	8	1,670
1950	322	356	399	98	9	1,184
1951	392	412	463	123	6	1,396
1952	283	329	459	125	4	1,200
1953	354	573	629	132	4	1,692
1954	328	547	669	99	6	1,650
1955	286	354	611	115	9	1,375
1956	273	286	689	78	8	1,333
1957	163	247	665	105	7	1,186
1958	124	233	679	89	7	1,132
1959	122	332	690	115	4	1,263
1960	158	380	782	127	7	1,455
1961	110	356	857	101	7	1,430
1962	103	340	819	112	6	1,381
1963P	95	355	815	100	10	1,375

* Crop year beginning in August for years after 1946
P - Preliminary
Source: Fats & Oils Situation, August 1964

and that the major product which uses cottonseed oil increasingly is salad and cooking oil. In the 1930's cottonseed oil's major use was in the manufacture of shortening. From that period on, the amount of cottonseed oil used in the manufacture of shortening has decreased. The utilization of cottonseed oil in the manufacture of margarine increased during the 1930's and 1940's until it reached its peak in 1949. From that year on, its utilization decreased in the manufacture of margarine as it did in shortening. The use of cottonseed oil in non-food uses has fluctuated during the period shown in the table, decreasing and increasing without any definite long-term trends being established. Thus, cottonseed oil utilization in margarine and shortening can be considered as decreasing while its utilization is increasing in the manufacture of salad and cooking oil, plus the increased exportation of the oil to foreign consumers.

Table 15 lists the major fats and oils which go into the manufacture of shortening in the United States for the years 1933 through 1964 to show the competition which cottonseed faces. As stated earlier, the use of cottonseed oil in the manufacture of shortening has decreased over the period shown. The 1964 level of cottonseed oil used in the manufacture of shortening was only 44 per cent of the 1933 total and only the average used for the years 1933 through 1938.

The increased utilization of soybean oil, lard, and beef fats has made up for the decreased utilization of cottonseed oil in the manufacture of shortening, and they have also furnished the amount necessary to cover the increased production of shortening which has taken place during the years shown in Table 15. All other fats and oils shown on the table are of minor importance since no definite trends, either increasing or decreasing, are

Table 15. FATS AND OILS USED IN MANUFACTURE OF SHORTENING
(Millions of Pounds)

Year Beginning Oct.	Cottonseed	Soybean	Corn	Peanut	Coconut	Other	Lard	Beef Fats	Total All
1933	853	*	1	3	7	41	3	64	972
1934	1,059	3	2	9	9	34	3	96	1,215
1935	992	52	3	91	44	220	2	148	1,552
1936	919	114	*	88	38	295	5	155	1,614
1937	1,163	91	2	58	13	181	1	96	1,605
1938	1,051	137	*	52	26	141	3	107	1,517
1939	905	202	1	52	21	135	7	83	1,406
1940	823	212	1	23	18	44	17	58	1,196
1941	889	216	*	82	22	93	51	65	1,418
1942	694	336	4	38	5	82	62	88	1,309
1943	572	568	6	51	*	113	36	112	1,458
1944	490	620	5	61	*	88	39	85	1,388
1945	487	683	2	51	*	104	23	106	1,456
1946	502	744	3	42	18	79	20	58	1,466
1947	300	705	3	65	87	71	101	64	1,396
1948	321	708	4	56	48	107	114	45	1,403
1949	532	713	1	12	20	67	118	31	1,494
1950	549	841	1	12	—	116	177	31	1,727
1951	335	731	1	21	20	73	200	23	1,405
1952	388	851	1	6	33	68	232	34	1,613
1953	376	903	1	4	2	121	227	46	1,681
1954	640	918	1	5	15	158	142	89	1,969
1955	439	930	3	6	4	154	334	118	1,988
1956	323	782	2	6	6	136	459	141	1,855
1957	273	796	4	6	8	135	376	226	1,824
1958	239	1,055	3	5	12	127	318	252	2,011
1959	320	1,143	5	1	20	5	493	257	2,244
1960	365	1,169	4	2	10	3	480	268	2,302
1961	356	1,160	14	3	26	22	530	348	2,459
1962	367	1,362	7	1	27	23	571	338	2,696
1963	330	1,228	3	3	19	22	587	372	2,564
1964P	378	1,373	8	5	18	20	446	404	2,654

* Less than 500,000 pounds   P - Preliminary
Note: Difference between total of the parts and total shown is due to rounding.
Source: Fats and Oils Situation, March 1965

shown for the entire interval; and their utilization is small in comparison to the major fats and oils used in the production of shortening.

Cottonseed oil production is not subject to the influence of demand as are corn and soybean oils since it is a dependent by-product. Cottonseed oil must find another outlet or increased usage elsewhere when it is displaced by another fat or oil. One of the other outlets is the fats and oils export market. The exportation of cottonseed oil is shown in Table 16 for the years 1930 through 1964. Also shown are the total amount of oil exported including cottonseed, the percentage cottonseed oil is of this total, and the amount of cottonseed exported. The total amount of oil exported has increased seven times in the period listed, while the exportation of cottonseed oil has only increased three times during the same interval. The exportation of cottonseed has increased a little over three and a half times since 1941 through 1964.

Further information relative to the supply and distribution of food fats and oils in the United States if found in Table 17 for the more current years of 1954 through 1964. Again, it is noted that production, stocks, exports and food uses of fats and oils have increased in the years listed. This table also contains the per capita consumption in the United States of butter and other food fats.

Providence, Rhode Island had one of the earliest price quotations for cottonseed oil which was reported as being 80 cents per gallon in 1829. This 80 cents a gallon quotation is equivalent to 10.39 cents a pound. Since the caustic alkali method of refining cottonseed oil was not patented until 13 years later, it can be assumed that the oil referred to in the quotation was in crude oil form. Referring to the crude oil prices shown

Table 16.   U. S. EXPORTS IN MILLIONS OF POUNDS FOR COTTONSEED,
COTTONSEED OIL AND TOTAL OIL EXPORTS

Year Beginning July	Cottonseed	Cottonseed Oil	Total Oil Exports**	Cottonseed Oil as % of Total Oil Exports
1930		26	906	2.9
1931		41	819	5.0
1932		44	802	5.5
1933		23	835	2.8
1934		5	621	1.8
1935		4	208	1.9
1936		33	232	14.2
1937		8	251	3.2
1938		4	326	1.2
1939	*	19	554	3.4
1940	*	16	423	3.8
1941	5	8	629	1.3
1942	7	58	889	6.5
1943	5	10	1,441	0.7
1944	7	8	1,511	0.5
1945	8	6	996	0.6
1946	15	7	780	0.9
1947 1/	10	33	884	3.7
1948	13	82	940	8.7
1949	22	147	2,248	6.5
1950	13	61	2,045	3.0
1951	23	120	2,446	4.9
1952	25	55	2,279	2.4
1953	29	351	2,655	13.2
1954	42	684	3,943	17.3
1955	32	634	4,102	15.4
1956	22	434	4,950	8.8
1957	12	286	4,670	6.1
1958	8	342	3,893	8.8
1959	17	522	5,368	9.7
1960	11	390	5,965	6.5
1961	12	470	5,194	9.0
1962	10	374	5,942	6.3
1963	14	483	6,536	7.4
1964F	18	700	7,836	8.9

1/ Year beginning August for year 1947 on.   F - Forecast
* Not separately classified prior to July 1941.
** Calendar year. Includes oil equivalent of cottonseed, soybeans,
   peanuts and flaxseed exported for crushing abroad. Includes com-
   mercial exports, voluntary or civilian relief, re-exports, ship-
   ments to U. S. Territories. In 1942 and 1943, includes shipments
   by USDA.
Source: Agricultural Statistics and Fats & Oils Situation.

Table 17. SUPPLY AND DISPOSITION OF FOOD FATS AND OILS FOR THE UNITED STATES
Year Beginning in October
(In Millions of Pounds)

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963*	1964**
Stocks, October 1	1,608	962	889	807	801	876	987	1,528	1,976	2,435	1,590
Imports	91	59	52	70	74	66	81	91	55	73	75
Production	9,767	10,859	10,857	10,762	11,909	12,654	12,472	13,416	14,049	13,894	14,375
Total Supply	11,466	11,880	11,798	11,639	12,784	13,596	13,540	15,035	16,080	16,402	16,040
Exports	2,359	2,979	2,903	2,593	3,323	3,880	3,168	4,082	4,350	5,015	5,380
Total Use for Food	7,840	7,871	7,886	8,145	8,389	8,438	8,560	8,602	8,902	9,535	--
Total Use for Non-Food	305	282	202	100	196	291	284	375	393	262	--
Per Capita (Civilian and Military) Per Lb.											
Butter	7.5	7.3	6.9	6.8	6.6	6.1	6.1	6.1	5.7	5.9	5.5
Other	38.3	37.9	37.7	38.5	39.4	39.3	39.2	38.7	39.8	42.5	40.6
Total	45.8	45.2	44.6	45.3	46.0	45.4	45.3	44.8	45.5	48.4	46.1

* Preliminary
** Forecast

Source: Fats and Oils Situation, USDA, March 1965

on Table 12 we find that this 1829 price of 10.29 cents a pound is very
close to the crude prices for 1959-60 (10.03 cents) and 1962-63 (10.48
cents). It is also interesting to note that the average difference be-
tween the crude oil prices F.O.B., S.E. mills) and the bleached oil prices
(p.s.y., delivered, N.Y.), both from Table 12, amounts to an average of
1.92 cents for the 22 years in the table. Referring further to this same
table, when multiplying the crude oil price per pound by the production
in pounds for the United States, an estimated production value is obtained.
This value of the crude oil produced for the 22 years then amounts to over
4.8 billion dollars, or an average of 218 million dollars per year.

Prices for refined fats and oils, including cottonseed oil and
several of its major competitors, are shown in Table 18 for the years
1940 through 1964. It is interesting to note that soybean oil price was
always below cottonseed oil for all the years shown on this table, while
some of the other competing oil prices were above and below the cotton-
seed oil price for the same period. The crude oil prices for many of
these same and other competing oils are found in Table A-2 in the Appen-
dix. Referring to Table 18 or A-2 note that soybean oil is on an average
2.23 cents (based on refined) below that of cottonseed oil for the years
concerned.

Table 18.   AVERAGE ANNUAL WHOLESALE PRICES IN CENTS PER POUND
FOR UNITED STATES IN BULK LOTS

Year	Butter[1]	Coconut Oil[2]	Corn Oil[3]	Cottonseed Oil[3]	Lard[4]	Olive Oil[5]	Peanut Oil[2]	Soybean Oil[2]
1940	29.5	7.8	8.3	7.5	6.4	32.0	8.8	7.2
1941	34.3	11.9	13.0	12.8	10.1	62.5	12.8	11.7
1942	40.1	12.8	16.1	16.7	14.5	66.3	16.9	14.9
1943	44.8	12.9	16.2	16.2	15.6	69.4	16.5	14.9
1944	42.4	11.8**	16.4	16.2	15.6	60.9*	16.4	15.1
1945	43.1	11.8**	16.6	16.4	15.6	60.7*	16.4	15.4
1946	62.8	12.9	20.1	20.3	23.6	96.1	19.2	19.0
1947	71.3	25.5	32.4	33.0	25.6	88.7	33.4	29.1
1948	75.8	32.9	33.4	33.5	24.4	62.0	33.5	28.3
1949	61.5	22.5	18.1	18.2	15.1	49.4	19.7	15.8
1950	62.0	23.3	21.3	22.1	15.7	34.8	23.6	18.5
1951	69.6	23.7	25.0	26.4	20.4	38.3	26.6	22.8
1952	73.1	18.7	18.8	19.5	14.5	29.6	23.7	16.0
1953	66.5	24.5	20.0	22.0	16.2	34.5	30.2	19.4
1954	60.6	21.9	20.9	20.9	20.8	30.1	25.6	19.9
1955	58.2	20.1	20.2	20.1	15.2	31.5	24.6	18.4
1956	59.9	19.6	20.8	20.5	15.9	46.0	22.4	18.9
1957	60.6	19.2	20.1	19.7	16.8	41.5	21.7	18.1
1958	59.8	23.3	20.1	19.4	16.2	32.7	22.5	16.2
1959	60.5	25.7	18.5	16.8	12.9	31.3	22.3	14.6
1960	59.9	22.4	16.8	12.9	13.6	30.8	18.4	10.8
1961	61.2	18.7	22.1	16.4	15.1	31.3	19.2	13.7
1962	59.5	16.6	18.2	14.6	14.6	35.5	19.3	11.2
1963	59.1	16.2	15.3	13.1	14.0	50.9	14.5	11.1
1964	59.9	17.3	13.7	13.0	15.0	32.4	15.6	11.4

[1] Creamery, Grade A (92-score) New York
[2] Refined, New York, drums
[3] Refined, New York, tanks
[4] Refined 1-pound cartons, Chicago
[5] Imported edible, New York

* Domestic
** Crude

Source: Fats and Oils Situation, USDA, March 1965

COTTONSEED CAKE AND MEAL

Cottonseed cake and meal has been found to be an excellent source of proteins, carbohydrates, and vitamins; particularly the vitamin B complex necessary for the growth and development of both man and live- stock. The preparation of cottonseed as a cattle food was patanted in the 1819. By 1850, it was realized that the feeding of cottonseed meal could be injurious to non-ruminant animals.

Cottonseed flour for human consumption was prepared by Allison in the year 1876. In 1899, Marchlewski isolated a yellow crystalline com- pound which he called gossypol, but it was not until 1915 that Withers and Carruth showed that the gossypol in cottonseed had toxic properties to non-ruminant animals. Just three years later these same men found that the gossypol disappeared during the cooking process.

Cottonseed cake and meal production in the United States and Texas is found in Table 19, along with the carryover, consumed or shipped, and the price per ton at the Fort Worth and Memphis markets for selected crop years. For information prior to the 1942-43 season see Table A-1 in the Appendix which gives the U. S. production figures in five-year averages. During the five-year period of 1872-76 the average yearly production of cake and meal in the United States was only 30,000 tons, but by 1902 the production figure had exceeded one million tons annually. Table 20 lists the cottonseed cake and meal production for the period 1930 through 1964 for the United States and the States of Texas, Mississippi, California and the category "All Others" for further comparison.

Table 19. U. S. CAKE AND MEAL CARRYOVER, PRODUCTION, SHIPPED – TEXAS
PRODUCTION – MEMPHIS AND FORT WORTH AVERAGE PRICES

Crop Year Beginning Aug. 1	Carry-over Tons	Production Tons	Consumed or Shipped Tons	Texas Production Tons	Ft. Worth Price/Ton Dollars[1]	Memphis Price/Ton Dollars[2]
1942-43	190,100	1,994,611	2,166,169	451,339	50.00	37.90
1943-44	18,542	1,834,495	1,824,987	466,717	52.97	48.55
1944-45	28,050	1,954,111	1,929,903	442,183	52.76	48.50
1945-46	58,258	1,434,326	1,454,956	325,123	63.00	55.05
1946-47	31,628	1,362,652	1,347,339	297,746	90.40	74.55
1947-48	46,941	1,898,352	1,851,887	569,391	100.40	86.80
1948-49	83,406	2,390,985	2,408,442	569,567	71.90*	63.30
1949-50	65,949	2,555,451	2,484,295	910,863	63.35	63.20
1950-51	137,105	1,668,899	1,734,359	558,633	82.66	77.70
1951-52	71,645	2,547,725	2,574,266	722,766	90.03	83.85
1952-53	45,104	2,672,420	2,625,975	502,899	87.03	77.70
1953-54	91,549	2,960,618	2,843,666	814,695	68.12	64.90
1954-55	208,501	2,560,777	2,566,188	541,841	73.72	66.50
1955-56	203,090	2,630,562	2,669,465	699,655	63.34	54.80
1956-57	164,187	2,390,324	2,302,071	653,917	63.90	55.60
1957-58	252,440	1,957,957	2,097,922	673,901	60.24	59.10
1958-59	112,475	2,060,825	2,056,958	810,157	67.21	64.05
1959-60	116,342	2,547,277	2,473,836	802,830	66.60	59.15
1960-61	189,883	2,504,528	2,551,813	777,805	63.13	58.60
1961-62	142,598	2,505,890	2,514,607	814,866	68.30	62.75
1962-63	133,881	2,710,499	2,657,085	879,560	75.12	64.60
1963-64	187,295	2,790,200[3]	2,727,295[3]	855,100[3]	75.42[3]	63.33[3]
1964-65	250,200[3]	1,562,300[3]			71.30[3]	62.43[3]

1/ For 43% protein prior to 1948 and 41% afterward. Wholesale prices bagged
carlots supplied by Western Feeders Supply Company, Inc., Fort Worth.
2/ On basis of 41% protein bagged carlots Memphis.
3/ Preliminary
* Estimated

Source: USDC, <u>Statistical Abstract</u> and <u>Fats and Oils Situation.</u>

Cake and meal find usage as livestock feed, fertilizer and in the

form of dietary flour, cooking flour and products such as Incaparina for

human consumption. Incaparina is the food supplement developed by the

Institute of Nutrition of Central America and Panama (INCAP). Its high

protein content is derived from cottonseed flour; and its use helps offset

Table 20. COTTONSEED CAKE AND MEAL PRODUCED IN U. S. FOR SELECTED YEARS

Crop Year Beginning August 1	1000 of Tons				
	U. S. Total	Texas	Mississippi	California	All Others
1930	2,165	603	247	66	1,249
1931	2,401	704	299	35	1,363
1932	2,093	720	227	151	995
1933	1,889	630	191	43	1,025
1934	1,614	390	209	50	965
1935	1,739	461	235	40	1,003
1936	2,031	440	364	79	1,148
1937	2,830	752	424	122	1,532
1938	2,023	566	297	81	1,079
1939	1,882	464	277	80	1,061
1940	1,954	508	207	95	1,144
1941	1,753	426	238	79	1,010
1942	1,995	467	326	71	1,131
1943	1,834	451	327	62	994
1944	1,954	442	318	55	1,139
1945	1,434	325	234	60	815
1946	1,363	398	157	78	730
1947	1,898	569	244	122	963
1948	2,391	570	376	157	1,288
1949	2,543	911	244	195	1,193
1950	1,669	559	203	183	724
1951	2,547	723	273	299	1,252
1952	2,672	733	321	343	1,275
1953	2,961	815	401	320	1,425
1954	2,561	756	299	289	1,217
1955	2,631	700	390	238	1,303
1956	2,386	654	316	248	1,168
1957	1,958	674	183	278	823
1958	2,061	810	145	312	794
1959	2,547	803	260	367	1,117
1960	2,505	778	264	353	1,110
1961	2,506	815	270	336	1,085
1962	2,734	880	304	339	1,211
1963P	2,790	855			
1964E	2,800				

P — Preliminary
E — Estimate

Source: Cotton Production and Distribution and Agricultural Statistics

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the protein deficiency typical of Central and South American diets, especially where taboos exist against eating meat and a low standard of living inhibits the people's purchasing power. The cost of Incaparina is $.04 (U.S.) for a day's supply of seventy-five grams.

The United States supply and distribution of oilseed cake and meal for the current season of 1964-65 and the preceding four seasons is located in Table 21. The five major oilseeds of soybean, cottonseed, linseed, peanut, and copra are shown in this table. Soybean and cottonseed cake and meal production are the two which lead the rest on a production basis. Soybean cake and meal production overtook and exceeded cottonseed cake and meal production in the last part of the four-year period 1938-42 (see Table A-3 for soybean and by-product production) and has been the leader ever since as can be seen for the more recent years in Table 21.

For a better comparison as to the exportation and importation of cottonseed and soybean cake and meal for the period 1947-48 to date, refer to Table 22. In this table we note that the cottonseed cake and meal imports and exports fluctuate back and forth with imports exceeding exports one year and just the opposite being true the next. This is not the case with soybean cake and meal as the amount exported always exceeded the imports for the period shown. Since the 1960-61 season, the amount of soybean cake and meal exported has increased almost as much as the production has during the same time period.

The main usage of cottonseed cake and meal is in the field of livestock feed. Cottonseed cake and meal are designated and sold according to their per cent of protein or nitrogen content. If they have 36 per cent protein or 5.76 per cent nitrogen and fulfill the other quality requirements,

Table 21. OILSEED CAKE AND MEAL: UNITED STATES SUPPLY AND DISTRIBUTION
YEAR BEGINNING IN OCTOBER (1,000 TONS)

	Supply				Distribution		
	Stocks October 1	Production	Imports	Total	Feed	Other Uses[1]	Exports
1960-61							
Soybean	83	9,452	0	9,535	8,837	30	590
Cottonseed	137	2,465	45	2,647	2,498	30	46
Linseed	29	399	2	430	377	--	31
Peanut	2	75	--	77	76	--	--
Copra	6	139	20	165	163	--	--
Total	257	12,530	67	12,854	11,951	60	667
1961-62							
Soybean	78	10,342	0	10,420	9,232	30	1,064
Cottonseed	73	2,629	76	2,778	2,622	30	26
Linseed	22	341	2	365	330	--	28
Peanut	1	54	--	55	54	--	--
Copra	2	121	15	138	138	--	--
Total	176	13,487	93	13,756	12,376	60	1,118
1962-63							
Soybean	94	11,127	0	11,221	9,556	30	1,476
Cottonseed	100	2,718	42	2,860	2,585	30	85
Linseed	7	371	1	379	320	--	52
Peanut	1	68	--	69	68	--	--
Copra	--	101	9	110	110	--	--
Total	202	14,385	52	14,639	12,639	60	1,613
1963-64*							
Soybean	159	10,609	--	10,768	9,132	30	1,484
Cottonseed	160	2,730	30	2,920	2,697	30	54
Linseed	7	400	1	408	328	--	61
Peanut	1	78	--	79	77	--	--
Copra	0	94	--	94	94	--	--
Total	327	13,911	31	14,269	12,328	60	1,599
1964-65**							
Soybean	122	11,050	--	11,172	9,350		1,700
Cottonseed	139	2,730	35	2,904	2,675		
Linseed	19	380	--	399	330		
Peanut	2	80	--	82	80		
Copra	0	90	--	90	90		
Total	282	14,330	35	14,647	12,525		

[1] Estimated quantities of soybean meal used for industrial purposes and cotton-seed meal used for fertilizer on farms of cotton growers.
* Preliminary
** Forecast (except for stocks) - based on indications in October 1964.
Source: The Feed Situation, USDA

Table 22. OILSEED CAKE AND MEAL IMPORTS AND EXPORTS IN 1,000
OF TONS FOR SELECTED YEARS

Crop	Cottonseed		Soybean	
Year	Imports	Exports	Imports	Exports
1947-48	14	10	--	96
1948-49	40	122	3	151
1949-50	105	124	26	47
1950-51	91	13	33	181
1951-52	202	35	24	42
1952-53	136	55	41	47
1953-54	70	63	16	67
1954-55	32	168	--	272
1955-56	59	156	--	400
1956-57	55	30	*	442
1957-58	72	7	1	300
1958-59	128	27	*	512
1959-60	32	140	*	652
1960-61	45	46	--	590
1961-62	76	26	--	1,064
1962-63	42	85	--	1,476
1963-64	30	54	--	1,484
1964-65P	5	50	--	600

P - Preliminary and estimated
* Less than 500 tons

Source: USDA, AMS, Feed Situation

they are then considered as being Prime Quality. If they do not fulfill

the requirements and do not have the necessary per cent of protein or

nitrogen, they are considered as Off Quality. If they have above 36 per

cent protein or 5.76 per cent nitrogen and fulfill the other require-

ments, then higher grades appropriately designated to reflect the guar-

anteed analysis are used. Cottonseed cake and meal are high protein

livestock feed as are the other oilseed cakes and meals listed in Table

21. In addition to competing with these high protein oilseed cakes and

meals, cottonseed must also compete with animal protein feeds and various

miscellaneous other high protein feeds. Table 23 shows the supply of the major high protein feeds used in livestock feeding in the United States including cottonseed cake and meal for the period 1946 to date with selected five-year averages for earlier periods.

In the oilcake and meal group, note that only the soybean has had a continued and increasing trend in relation to supply, while the others have just held their own with only minor variations from year to year. In the animal protein group, tankage and meat scrap livestock feed has increased two and a half times in supply since 1946. During the same period the supply of fish meal has increased four times the 1946 amount, while the 1964 skim milk and products supply has been reduced by half of what it was in 1946. In the miscellaneous feed group only gluten feed has shown a definite increase since 1946. This increase using the 1964 figure amounts to almost a third more than the 1946 amount. The total oil meal equivalent figure for 1964 is almost 83 per cent more than the 1946 total amount shown.

The business of prepared feeds for animal and fowl consumption is one of major importance in Texas and the United States. Cottonseed cake and meal are included in this category of prepared feed along with other oilcakes and meals plus feed preparations composed of grains, tankage, fish meal, etc. Table 24 shows the number of concerns, employment, payroll, value of products, and value added due to manufacture for Texas and the United States covering the years of 1930, 1940, 1954, and 1958. The 1965 Census of Texas Manufactures published by the Bureau of Business Research, The University of Texas, lists some 350 firms in Texas which are in the prepared feed business. These firms range in size from one- and

Table 23. SUPPLY OF VARIOUS HIGH-PROTEIN FEEDS AVAILABLE FOR LIVESTOCK FEEDING IN THE UNITED STATES FOR SELECTED YEARS 1926-64 DATA IN THOUSANDS OF TONS

Year Beginning Oct. 1	Oilcake and Meal				Animal Proteins			Miscellaneous Feeds				Total Oilmeal Equivalent[6]
	Cottonseed[1]	Soybean[2]	Linseed[2]	Peanut[1]	Tankage and Meat Scraps[3]	Fish Meal[3]	Skim Milk and Products[4]	Gluten Feed[5]	Distillers' Grains[5]	Brewers' Grains[5]	Copra Meal[3]	
1926-30	1,975	84	412	21	641	90	1,805	648	85	7	100	6,913
1931-35	1,858	253	203	27	630	152	1,899	542	128	55	105	6,943
1936-40	2,156	1,032	357	77	690	248	1,774	599	180	107	147	8,412
1941-45	1,858	3,063	741	95	854	197	1,611	888	421	117	50	10,936
1946	1,434	3,745	370	98	740	191	1,415	1,040	410	229	190	10,474
1947	1,953	3,383	606	122	823	213	1,350	799	353	228	177	10,733
1948	2,271	4,158	620	96	854	235	1,375	848	334	233	171	11,951
1949	2,382	4,517	670	93	842	264	1,400	926	352	233	204	12,622
1950	1,853	5,718	732	130	882	288	1,370	966	642	241	226	13,696
1951	2,650	5,640	520	99	946	375	1,335	897	339	223	221	14,069
1952	2,700	5,510	478	44	1,032	336	1,365	942	186	224	213	13,927
1953	2,930	4,965	526	63	1,082	356	1,610	929	244	228	196	14,174
1954	2,405	5,428	488	18	1,339	395	1,330	1,034	251	238	182	14,128
1955	2,511	6,042	439	27	1,557	464	1,255	1,072	286	246	160	15,168
1956	2,220	7,093	484	46	1,502	402	1,180	1,010	290	236	181	15,671
1957	2,095	7,962	467	45	1,388	409	1,135	1,030	280	225	187	16,172
1958	2,198	8,938	417	75	1,480	518	1,070	1,046	342	231	146	17,465
1959	2,330	8,450	304	60	1,664	448	1,030	1,142	359	239	133	17,168
1960	2,498	8,837	378	75	1,695	545	893	1,098	352	249	162	17,790
1961	2,622	9,232	330	54	1,760	622	844	1,237	380	266	138	18,492
1962	2,585	9,556	320	68	1,837	655	819	1,285	362	261	110	18,908
1963	2,697	9,132	328	77	1,925	730	778	1,366	380	276	94	18,865
1964*	2,675	9,350	330	80	1,950	775	740	1,425	375	275	90	19,148

1/ Stocks, production beginning October 1, minus cottonseed meal used for fertilizer. 2/ Production minus net exports and soybean meal used for food and industry. 3/ Production plus imports. 4/ Dry-weight equivalent of skim milk, buttermilk, and whey fed on farms; skim milk and buttermilk dried and concentrated for feed (mfg.) and dried whey for feed. 5/ Production. 6/ Converted to oilmeal equivalent as follows: Oilcake and meal, 1; animal proteins, 1.5; miscellaneous feeds, 0.7. * Preliminary and estimated.
Source: USDA, AMS, The Feed Situation, years prior to 1942 compiled by USDA Bureau of Agricultural Economics.

Table 24. TEXAS AND UNITED STATES PREPARED FEEDS (INCLUDING MINERAL) FOR ANIMALS AND FOWLS
1930, 1940, 1954, and 1958

Year	Number of Establish- ments	Total Persons Employed in Manufacturing	Total Salaries and Wages	Value of Products	Value Added by Manufacture
Texas					
1958	164	3,708	$ 14,007,000	$ 156,039,000	$ 37,464,000
1954	131	4,183	14,101,000	148,110,000	31,589,000
1940	59	984	1,020,943	12,601,582	3,027,646
1930	43	540	777,624	13,905,079	2,942,285
U. S.					
1958	—	57,313	—	—	798,892,000
1954	2,292	59,890	225,199,000	2,702,267,000	584,135,000
1940	1,383	24,177	31,803,464	401,880,238	99,240,060
1930	750	14,384	22,400,452	402,752,534	74,832,791

Note: This industry was not given a separate classification prior to 1930.

Source: U. S. Census of Manufactures, 1930, 1940, 1954, and 1958.

and two-man local operations to large firms which do business on a national and international basis. Over 17 per cent of these prepared feed firms listed are cottonseed crushing mills which employ over 3,000 people annually.

The price of cottonseed cake and meal is generally dependent on the supply and demand picture according to the location or area in which the cottonseed is produced. Since Texas produces a large amount of the nation's cotton, it has a goodly amount of cottonseed cake and meal available. This plentiful supply would normally depress the price of the cake and meal, but the large livestock production in the state also requires a large amount of feed which creates a demand for cottonseed cake and meal, thus counter-acting the supply phase of the price picture.

An examination of the cottonseed cake and meal price per ton data for Fort Worth versus Memphis bears this fact out since the Texas price is greater for the selected years shown in Table 19. On the basis of the 22-year period, 1942-43 through 1943-44, the difference amounted to $5.19 per ton in favor of the economy of Texas. Insofar as the cake and meal price per ton for the years shown in Table 19 is concerned, there is no consis-tant trend to be found price-wise for either Fort Worth, Texas of Memphis, Tennessee, but only the usual price fluctuations due to cake and meal sup-ply, demand, and the additional influence of other competitive products involved.

Soybean meal prices per ton at Decatur, Illinois are shown in Table A-3 in the Appendix for the period 1942-43 through 1963-64. Out of the 22 years involved in the two tables (19 and A-3), we find that when the price of soybean meal is compared with cottonseed meal at Memphis, soy-bean meal exceeded cottonseed eight times. Four of the times were for

the crop years 1960-61 to date. Twice during the same 22-year period Decatur soybean meal prices exceeded the Fort Worth cottonseed prices, and this was for the years 1949-50 and 1953-54, which were high cotton production years in the nation. Comparing the Decatur soybean price with Memphis and Fort Worth cottonseed prices, we find that Memphis averaged $1.82 more per ton than Decatur and that Fort Worth averaged $7.01 more per ton than Decatur on an annual basis for the 22-year period compared.

Cottonseed By-Products in Livestock Feeding

The livestock industry in Texas makes good use of the plentiful supply of cottonseed cake, meal, and hulls available in a continuing effort to supplement grazing conditions in an attempt to make profit.

What factors regarding livestock feeding does the feeder consider before deciding if it is feasible to consume home-grown feedstuffs, plus purchasing supplementary feeds and still realize a profit? or can the farmer or livestock feeder realize more profit from feedstuffs if they are sold on the market?

Primary interests of a feeding program include profit/cost ratios:

(1) Cost of 350-550 pound feeder calves.

(2) Cost of supplementary feeds (cottonseed cake and meal).

(3) Availability of feedstuffs (roughage--example, cottonseed hulls) local or home-grown.

(4) Facilities and equipment.

(5) Actual cost of producing a pound of beef.

(6) Market for the quality of beef produced (controls involve market fluctuation of beef poundage and feed costs).

(7) Number of days of feeding program involved.

The types of feeding programs used are:

(1) Drylot—feeding roughage and high concentrate supplementary feeds for an average of 120 days (force feeding).

(2) Grazing on covercrop or pasture grass, plus feeding of high concentrate supplementary feed for approximately 140-150 days. This feeding program is quite prominent in the Southwest with farmers and feeders using available grazing and pasture and supplementing the ration with high protein supplements over a longer feeding period. This practice reduces the cost of feeding through reduced use of high protein feeds even though it means longer feeding periods. This type of long-range feeding program minimizes the cost of feeding enabling the feeder to increase profit in view of the market fluctuations of beef and feed costs which are the two critical variables facing the feeder.

The feeder must decide, through experience, what type operation he is capable of undertaking. He must consider the cost of equipment, market for feed and cattle, available feed supply, and quality of finished beef so that his investment, under normal operation, will return a profit.

In late summer and early fall, 350- to 400-pound calves are purchased, or the farmer feeds the calves he has produced. A general method of feeding calves is to graze them on field stubble and pasture grass fields, and their diet is supplemented by use of high protein feeds, then grazed on permanent pasture grass to utilize spring growth.

Another practice used is the drylot feeding of calves. The calves are grazed on field stubble and annual grazing crops for approximately 60 days, then they go into the feedlot for approximately 140 to 150 days. This feeding program enables the livestock feeder-farmer to complete his feeding program before his early spring crop gets under way. The daily ration of feed under this program consists of nine pounds of ground corn or milo, two pounds of cottonseed meal, and five pounds of hay or equivalent amount of cottonseed hulls. This ration normally gives a two-pound

or more gain per day and utilizes farm produced feedstuffs, requiring
only the purchase of cottonseed meal, hulls, and minerals as needed.
The drylot method proves practical for the average farm-livestock opera-
tions on limited acreage and under typical farm situations.

After a livestock feeding program has begun, what factors determine
if the feeding program is to be completed to the end? or will it be ter-
minated before completion?

The primary factors involved in completion of the feeding program
are:

(1) Steady or increasing market price for finished beef to
make a profit above the feeding cost for producing quality
beef.

(2) Approximate time (in days) essential to produce the de-
sired weight and grade of beef.

(3) Availability of feedstuff in the necessary quantities
and quality of feedstuff at a steady or decreasing
market price.

(4) Constant labor cost, increasing man-hours involved, and
available facilities necessary for this program.

(5) Stress periods at the end of the feeding program, adding
the last pounds to cattle may be hampered by weather and
handling conditions.

If these five conditions exist, the feeder will tend to complete
the feeding program undertaken. Should any one of these ideal conditions
fluctuate as to offset the margin of profit possible under these conditions
as set forth above, the feeder may decide to terminate his feeding program.
If more than one of the conditions goes counter to above, the probability
of the farmer or feeder terminating his feeding program is increased.

Table A-4 in the Appendix shows an explanation of the accounting
method which is acceptable in analyzing a standard record of a cattle
feeding program.

The analysis in Table A-4 expresses the overall cost of feeding pen animals including feed costs, rate of feed conversion, cost cwt. gain, and profit per head in feeding test. This represents the larger scale commercial feed lot operation, but represents the primary evaluation of a feeding operation.

Cottonseed Meal-Beef Ratio

Beef production in Texas consumes vast quantities of cottonseed meal and hulls in the ration for finishing beef cattle. A good nutritional ratio is essential to secure a maximum efficient rate of gain.

Primary factors in a beef production ration are the minimum available protein essential to aid in the assimilation and digestion of all feedstuffs in the ration makeup. This essential factor of feed conversion into beef poundage requires a high-level protein feed of about three times the value of small grain feeds, corn, etc., used in the beef ration.

After this desired ratio of feed conversion is obtained, a feeder can substitute grain for cottonseed meal to properly balance the efficient feeding ration. Use of cottonseed meal as the protein source of the ration is one of the better feedstuffs that enables the feeder to use less costly home grown or locally produced grains to complete the bulk of the feeding ration. These factors reduce the feeders costs and at the same time supply a good highly nutritional balance in his feeding ration.

In Table 25 we show the average cost of a ration made up of cottonseed meal and hulls necessary to produce one hundred pounds of live beef. This ration of cottonseed meal-hulls is one often used in the Southwest and is shown here with the average price of beef in Chicago, along with differences

Table 25. THE AVERAGE COST OF COTTONSEED MEAL, PLUS HULLS TO PRODUCE 100
POUNDS OF LIVE BEEF, THE AVERAGE ANNUAL PRICE OF PRIME BEEF STEERS
IN CHICAGO AND THE RATIO OF COST OF FEED TO BEEF FOR THE
YEARS 1930 THROUGH 1962

Year	Average Cost of 612 Lbs. Cottonseed Meal and 578 Lbs. Hulls Estimated to Produce 100 Lbs. Live Prime Beef Steer Wholesale Fort Worth	Average Price of Prime Beef Steers in Chicago Per 100 Lbs.	Differences Between Costs of Feed and Price of 100 Lbs. Beef Steer	Percentage Cost Feed is of Price of 100 Lbs. Beef Steer Column 1 ÷ 2
1930	$ 10.88	$ 12.10	+1.22	89.9
1931	6.88	9.13	+2.25	73.2
1932	5.90	8.21	+2.31	71.9
1933	7.85	6.12	-1.73	128.2
1934	12.24	7.84	-4.40	156.1
1935	10.67	12.32	+1.65	86.6
1936	12.81	9.97	-2.84	128.4
1937	9.26	14.79	+5.53	62.6
1938	9.59	10.71	+1.12	89.5
1939	12.20	10.48	-1.72	116.4
1940	11.55	11.86	+ .31	97.4
1941	14.36	12.23	-2.13	117.4
1942	14.99	15.19	+ .20	98.7
1943	18.87	16.23	-2.64	116.3
1944	19.19	17.05	-2.14	112.5
1945	21.27	17.30	-3.97	122.9
1946	28.30	20.24	-8.06	139.8
1947	37.36	30.64	-6.72	121.9
1948	26.47	35.24	+8.77	75.1
1949	24.04	28.65	+4.61	83.9
1950	39.17	32.43	-6.74	120.8
1951	38.24	38.11	- .13	100.3
1952	37.04	35.17	-1.87	105.3
1953	25.86	26.56	+ .70	97.4
1954	31.23	27.53	-3.70	113.4
1955	29.05	23.62	-5.43	122.9
1956	29.27	25.45	-3.82	115.0
1957	34.19	26.19	-8.00	130.5
1958	30.50	28.92	-1.58	105.5
1959	31.99	29.32	-2.67	109.1
1960	27.31	27.82	+ .51	98.2
1961	27.53	26.08	-1.45	105.6
1962	32.03	29.81	-2.22	107.4

Source: Agricultural Statistics, 1930-62, USDA; Texas Agricultural Prices,
1948-62, USDA; and Western Feeders Supply Company, Inc., Fort Worth.

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of cost between beef prices and ration cost for comparison purposes only. The differences between price received and cost will vary depending on ration feed. During years when cost exceeds the return, a change in ration and length of feeding period will sometimes make it possible for the feeder to break even or make a profit.

Milk-Feed Ratio

Table 26 represents the relationship of wholesale prices of milk received in Fort Worth and the average for Texas markets compared with the prices of cottonseed meal and cottonseed hulls.

The objective of this comparison has not been to work out a proper ration for feeding dairy animals, but rather to show the correlation of price relationship between cottonseed meal, cottonseed hulls and the wholesale price of milk in the years 1925-64. This direct relationship concerns both meal and hull producers and dairymen alike.

Since this Southwest area is in the Cotton Belt, this table is used to illustrate the usage of the locally produced cottonseed meal and hulls in feeding programs.

The amount of protein necessary to acquire a maximum result in production of milk is known as "Nutritive Ratio." The nutritive ratio in young dairy cows amounts to approximately one pound of digestible protein to 6.5 pounds of total digestible nutrients in a balanced ration. This is the distinct ratio between the total amount of digestible protein in the ration and the total digestible nutrients available in the ration. The purpose, age, type, and breed of animal being fed vary considerably. Dairy cows need an extremely high ratio for milk production.

Table 26. RELATION OF WHOLESALE PRICE OF MILK RECEIVED BY TEXAS
FARMERS COMPARED WITH PRICE OF COTTONSEED HULLS AND COTTONSEED
MEAL AT FORT WORTH AND TEXAS FOR THE PERIOD 1925-64

Crop Year Beginning August 1	Average Annual Price of 100 Lbs. Cottonseed Meal, 43% Fort Worth & 41% Texas*	Price Per Ton Cottonseed Hulls Fort Worth	Wholesale Price Per Gallon Milk Received by Texas Farmers In Cents
1925	$ 1.40	$ 6.70	26.07
1926	1.68	2.93	25.64
1927	2.39	7.44	25.21
1928	2.05	9.35	27.11
1929	1.75	10.86	26.50
1930	1.04	10.25	22.15
1931	.71	4.39	15.50
1932	.89	2.23	12.07
1933	1.63	5.25	14.31
1934	1.65	12.68	18.53
1935	1.56	5.29	18.79
1936	1.76	9.18	19.57
1937	1.26	4.80	19.22
1938	1.51	5.01	17.41
1939	1.69	8.00	18.44
1940	1.87	5.87	19.22
1941	2.20	5.02	24.31
1942	2.50	5.95	29.05
1943	2.65	12.72	31.46
1944	2.64	12.00	31.20
1945	3.15	13.00	31.90
1946	4.52	18.35	46.72
1947	5.02*	22.97	50.60
1948	3.91	8.80	49.13
1949	3.49	9.25	46.69
1950	4.60	22.42	50.13
1951	4.86	29.41	56.58
1952	4.74	27.83	55.43
1953	3.40	17.47	48.55
1954	4.06	22.06	48.02
1955	3.55	14.64	49.20
1956	3.62	24.62	48.81
1957	4.83	16.03	43.93
1958	3.73	14.98	45.90
1959	3.73	18.32	45.44
1960	3.56	19.09	45.11
1961	3.77	15.44	42.93
1962	4.08	24.91	42.41
1963	4.21	24.42	44.40
1964	3.91**	23.09**	

* 1947 and prior, Fort Worth average 43% wholesale, 1948 to date Texas 41%
  retail.
** Preliminary.
Source: Texas Agricultural Prices, 1948-64 and Texas Farm Commodity Prices,
         Bulletin No. 700, 1948, TAES.

Most roughages fed to dairy cattle in Texas consist of a minimum quantity and quality of digestible protein. In this area the local abundance of cottonseed meal generally is the most economical source of high quality protein available.

Cottonseed hulls are used predominantly for bulk in milk production. The price of cottonseed hulls generally is determined by the price of other types of roughages produced in the area. Cottonseed hulls in the dairy ration have a nutritive value comparable to cane hay, Johnson grass hay, or sudan; and the cottonseed hulls excell as digestive regulators in the concentrated ration required in milk production. Further information in relation to cottonseed hulls will be found in the next section.

COTTONSEED HULLS

The hulls must be removed from the cottonseed prior to the actual crushing operation. Limeback obtained a patent for hulling the seed in 1814. Follet developed a better huller which he patented in 1827; but it was not until 30 years later in 1857 that a really efficient huller was patented by Wells. This new huller developed by Wells was based on the principle of cutting the hull rather than the cracking or grinding principles used in the earlier models. The lint for the most part was being left on the hulls up until 1869 when the Carver linter was patented by Pratt.

The present-day usage of hulls started in 1885 as a source of roughage in makeup of livestock feeds. Additional uses of cottonseed hulls are: As a packing material, as a raw material source in the chemical industry, as a mulch, as a source of potash and minerals in the rebuilding of soils, and as a source of fuel in earlier periods. In 1929, a rare sugar, Xylose, was extracted from the hulls.

Table 27 lists the United States cottonseed hull carryover, production, shipped or consumed, Texas production for the crop years 1942-43 to date. The same table also lists the price per ton for hulls at Memphis and Fort Worth for selected years. Strangely there is very little surplus of cottonseed hulls as most of them go into the preparation of livestock feed for roughage or bulk. The price paid for cottonseed in the preparation of livestock feed generally precludes their possible usage as a raw material in the chemical and industrial fields. The fairly sharp price fluctuations in the price of hulls from year to year also deters their usage in the chemical and industrial field since these fields need a raw material the supply of which is assured and the price of which does not vary from year to year as does cottonseed hulls.

Table 27.   U. S. HULLS, CARRYOVER, PRODUCTION, SHIPPED OR CONSUMED,
TEXAS PRODUCTION, MEMPHIS AND FORT WORTH PRICES

Crop Year Beginning August 1	Carry- over Tons	Production Tons	Shipped or Consumed	Texas Produc- tion	Price Per Ton	
					Memphis $/Ton[1]	Ft. Worth $/Ton[2]
1942-43	44,118	1,085,034	1,117,188	258,960	10.28	5.95
1943-44	11,964	926,558	923,729	226,217	12.00	12.72
1944-45	14,793	984,218	937,314	215,700	13.00	12.00
1945-46	61,697	783,480	819,252	163,306	13.17	13.00
1946-47	25,925	727,059	717,176	140,452	15.90	18.35
1947-48	35,808	923,279	917,120	275,556	15.60	22.97
1948-49	41,967	1,235,765	1,182,840	275,176	6.55	8.80
1949-50	94,892	1,337,737	1,355,437	451,735	7.00	9.25[4]
1950-51	77,192	856,961	913,996	285,133	18.00	22.42
1951-52	20,157	1,234,462	1,230,004	344,414	17.44	29.41
1952-53	24,615	1,198,759	1,175,056	352,530	17.25	27.83
1953-54	48,318	1,387,580	1,333,941	398,773	11.68	17.47
1954-55	101,957	1,138,995	1,199,298	373,492	14.35	22.06
1955-56	41,654	1,249,078	1,213,568	366,837	5.56	14.64
1956-57	77,164	1,073,125	1,097,707	331,362	5.09	24.62
1957-58	52,582	966,301	921,561	375,184		16.03
1958-59	97,322	1,028,600	1,082,512	437,838		14.98
1959-60	43,410	1,257,325	1,272,068	447,020		18.32
1960-61	28,667	1,217,370	1,150,600	455,957		19.09
1961-62	95,437	1,324,782	1,336,437	520,938		15.44
1962-63	83,782	1,341,087	1,389,696	506,478		24.91
1963-64	35,173[3]	1,339,700[3]	1,281,773[3]	459,500[3]		24.42
1964-65	93,100[3]					20.99[5]

1/ Bulk carlots F.O.B. mills Memphis after September 1944, Atlanta prior to
1944.
2/ Supplied by National Cottonseed Products Association 1947 and prior, 1948
estimated, 1949 partial, 1949 on furnished by Western Feeders Supply Com-
pany, Inc.
3/ Preliminary
4/ Partial March through July 31, 1951.
5/ Through December 1964.

Source: Cotton Production and Distribution, Agricultural Statistics, and
Western Feeders Supply Company, Inc., Fort Worth.

COTTONSEED LINTERS

Linters find usage according to three general classifications which are spinners, felters, and chemical users; but it should be noted that there is some overlapping involved. Spinners are generally interested in the first cut linters for the manufacture of surgical dressings and textiles in the form of wicks, twine, mops, etc. Felters use linters in the manufacture of batting for mattresses, upholstery, padding, etc. Linters are also used in the fiber form in the production of high grade papers. Last, but by no means least, are the chemical users who use linters in the manufacture of rayon, acetate, plastics, explosives, lacquers, film, artificial leather, etc.

The development of nitrocellulose (nitrocotton) explosive, commonly called guncotton, took place in 1845 by a man named Schonbein who used cotton rather than linters, as later became the case. Fifteen years later smokeless powder was developed for guncotton (nitrocellulose). The production or recovery of linters began in earnest after 1869 when Pratt patented the Carver linter machine for their removal from the seed. Their recovery by this method came into general use by 1885 just after the first synthetic fiber of nitrocellulose derivation was introduced by Chardonnet in 1884. The cuprammonium process for synthetic fiber production was described in 1890, and during the period of 1892-94 the viscose and cellulose acetate industry was developed. During the same period and since, many other uses and products were developed which were based on the nitrocellulose idea and through chemical usage of linters. It was not until 1926 that the U. S. Department of Agriculture established the standard grades for marketing of linters in the United States.

The majority of the cottonseed linters are produced by the oil mills. The United States oil mill linter production, carryover and amount shipped, along with the Texas oil mill production of linters and the United States average weighted price per pound, are found in Table 28 for the period 1942-43 to date. Here again, there is no pattern or trend as related to production other than that prescribed by the production of the cotton crop itself since cotton linters are a dependent product. The total or complete picture in the United States linter supply and distribution for the same period as in Table 28 is in Table A-5 in the Appendix.

Imports exceeded exports (Table A-5) during the periods of 1942-47 (Second World War), 1949-51, and 1952-53 (Korean conflict). The reason for this, of course, is due to the need of linters in nitrocellulose form for its many uses in the war efforts. Since 1953-54 there has been an increase in the amount exported over the earlier period.

Linters became a source of cellulose for the manufacture of rayon and acetate over the years. Table A-6 in the Appendix lists the thousands of tons of wood pulp, linters, and total cellulose used in the manufacture of rayon and acetate for the years 1942 to date. The percentage that wood pulp and linters are of the total consumed is also shown for the various years. The total consumption has more than doubled since 1942, but linters have not maintained their share of the increase. In fact, they have dropped to about one per cent of their 1942 consumption figure. Wood pulp has made up for what linters lost and for the increase that has taken place in the total consumption of cellulose in the industry. This gain by wood pulp through 1964 amounts to nearly two and a half times what the 1942 consumption was.

Table 28. OIL MILL PRODUCTION OF LINTERS IN U. S. AND TEXAS,
U. S. CARRYOVER, AND SHIPPED IN BALES, PLUS AVERAGE PRICE

| Year | United States | | | Texas Production | U. S. Weighted Avg. Price/Lb. in Cents |
	Carryover	Production	Shipped		
1942-43	43,295	1,353,720	1,261,088	308,286	5.71*
1943-44	135,927	1,180,035	1,254,042	284,363	4.14*
1944-45	61,920	1,246,998	1,290,342	281,104	3.83*
1945-46	18,576	988,800	972,322	221,803	4.58
1946-47	35,054	991,868	947,178	214,852	9.46
1947-48	79,744	1,281,794	1,262,258	398,973	6.70
1948-49	99,280	1,639,167	1,596,674	378,811	3.94
1949-50	141,773	1,703,084	1,777,058	539,347	5.61
1950-51	67,799	1,225,959	1,255,553	352,934	16.21
1951-52	38,205	1,747,543	1,678,522	445,817	8.68
1952-53	107,226	1,776,645	1,820,770	428,432	5.95
1953-54	63,101	1,984,086	1,893,900	499,312	4.58
1954-55	153,287	1,681,602	1,704,806	441,878	3.94
1955-56	130,083	1,687,571	1,697,696	416,750	3.76
1956-57	119,958	1,498,551	1,435,562	403,064	5.08
1957-58	182,947	1,245,815	1,109,372	401,237	4.36
1958-59	319,390	1,335,160**	1,535,982**	481,012**	3.43
1959-60	127,460**	1,652,310	1,684,187	484,422	3.85
1960-61	95,583	1,582,149	1,536,059	467,147	4.10
1961-62	141,673	1,627,147	1,673,257	507,166	5.25
1962-63	95,563	1,645,503	1,610,125	485,092	4.00
1963-64	130,941 1/	1,596,200 1/	1,630,441 1/	439,700	3.91
1964-65	96,700 1/				

* Estimated.
** 600-pound bale average 1958 through 1963, running bales of varying size
   for prior years.
1/ Preliminary.
Source: Cotton Production and Distribution, USDC, and Agricultural Statistics,
        USDA.

It is interesting to note that the sharp price rise in linters shown

in the Tables 28 and A-5 occurred in 1946-47 at the end of World War II and

again in 1950-51 at the start of the Korean conflict. The highest price

reached by linters for the interval shown occurred in the 1950-51 crop year

when it reached a weighted average of 16.21 cents per pound in the United

States. No sharp or discernible trends are found in relation to the price

of linters when the changes due to the wars and conflicts are deleted.

The change in consumption of linters in the rayon and acetate industry

has been due to the increased availability and supply of wood pulp at

highly competitive prices which have been generally less than linters in

the last ten years. This decreased usage of linters in this industry has

also been due to the limited production of linters since it is a dependent

product, while the industry is seeking and must have a constantly increasing

supply.

Graph I on the following page shows the United States production of

cottonseed linters in thousands of bales, along with their estimated total

value in thousands of dollars, by crop years starting with 1932 and going

through 1962-63. This graph uses two scales—one for production and one

for value. The semilogarithmic scale removes the possibility of the scales

being out of proportion for comparison. Note that the production of linters

has been over 10,000 bales since 1935 except for the crop years of 1945 and

1946. Since linters are a dependent product, as are all other cottonseed

by-products, the supply and demand factors do not normally apply. Two

definite periods can be seen in this graph when the supply and demand

factors appear to have been in operation. The first period was in the

1937, 1938, and 1939 interval when the production was up, while the price

and valuation decreased; and as the production decreased during 1938 and

1939, the price and valuation increased. The second occurrence was in the

period 1950, 1951, 1952, and 1953 when the cycle opposite to the one dis-

cussed earlier prevailed. Often the supply and price of wood pulp and

other competitive products have a greater effect on the price of cotton

linters than the supply and demand factors do.

Graph I.
UNITED STATES LINTERS ESTIMATED VALUE IN THOUSANDS OF
DOLLARS AND PRODUCTION IN THOUSANDS OF BALES
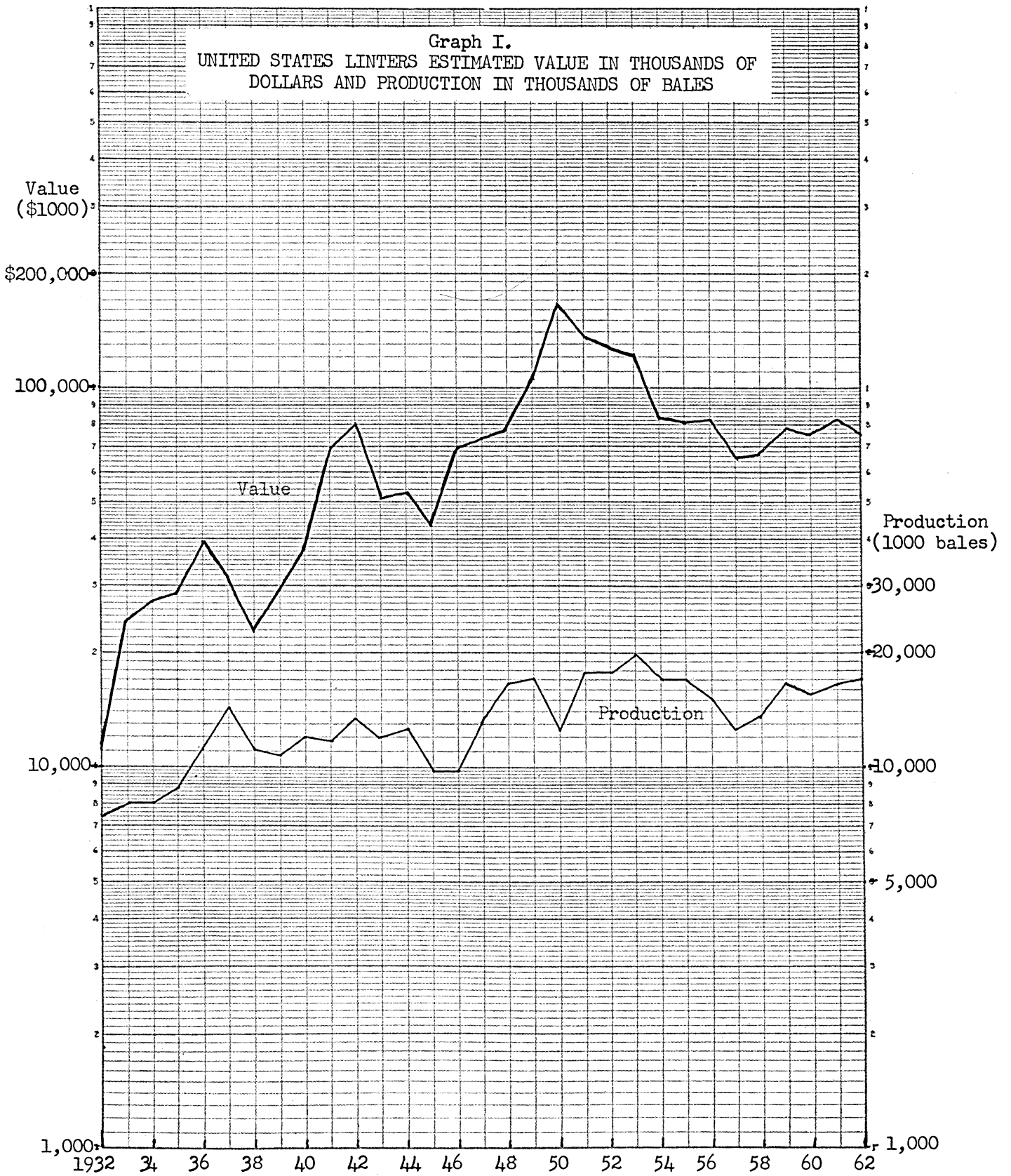
COTTONSEED QUALITY

In 1931, just five years after the U. S. Department of Agriculture established the standards for linters, the department established the official standards for cottonseed which became the basis for the quality of cottonseed in the trade. Multiplying the quality index and the quantity index results in the average grade for cottonseed. The quality index never exceeds 100 and is derived from quality factors of per cent of free fatty acid, foreign matter, and moisture present in the cottonseed.

Prime quality seed, by analysis, must not contain more than 1.0 per cent of foreign matter, or more than 12.0 per cent of moisture, or more than 1.8 per cent of free fatty acid. Those seed with this percentage or less are considered prime quality and have a quality index of 100. Below prime quality seed are those which have an analysis of more than the prescribed percentages necessary to be prime quality but with less than 13.5 per cent of free fatty acid, less than 10.0 per cent of foreign matter, and less than 20.0 per cent of moisture. Off quality seed are those seed which by analysis have 13.5 per cent or more free fatty acid, 10.0 per cent or more of foreign matter or 20.0 per cent or more of moisture.

The quantity index is based on the percentage of oil, ammonia, and linters according to analysis of the seed. The quantity index is derived by the use of the method prescribed in the "Standards for Grades of Cottonseed Sold or Offered for Sale for Crushing Purposes Within the United States," with the use of the percentages of oil, ammonia, and linters determined by analysis.

Trading or marketing of cottonseed or its by-products is accomplished in the United States in accordance with the latest Trading Rules of the

National Cottonseed Products Association. These trading rules encompass every phase of the industry in an effort to assure the orderly and proper marketing of cottonseed and its by-products. The marketing or trading of cottonseed is performed according to the grade of cottonseed shipment. The grade, as stated previously, is equal to the quality index multiplied by the quantity index as determined by prescribed analysis results.

The cottonseed standard grades by crop reporting districts of Texas for the 1964-65 crop according to the weekly reporting periods is found in Table 29. The average prices paid farmers per ton of cottonseed by crop reporting districts for the 1964-65 crop according to the weekly reporting periods are in Table 30. Of course the price paid the farmer depends on the grade of the cottonseed shipment; but the time of the season, the area of growth in the state, and the going price of the by-products also affect the price received.

Cottonseed quality and quantity factors which make up the average grade for the United States covering the crop years 1944 through 1963-64 are located in Table 31. The United States average cottonseed grade for the same years is also shown in the table.

The lower half of Table 31 lists the same information for Texas covering the same time interval. For the twenty crop years shown, Texas had the same average grade as the nation only once, and this occurred in 1955. The United States average grade exceeded the Texas average grade only five times (1952, 1953, 1960, 1961, and 1963). For the remainder of the crop years (14), the Texas average grade exceeded the nation's average grade.

Table 29.   STANDARD GRADES FOR COTTONSEED BY DISTRICTS – AVERAGES FOR 1964-65 CROP

Dates Covered By Reports	Crop Reporting Districts of Texas									
	1	2	3	4	5	6	7	8	9	10
7/23-29/64								90.5		96.5
7/30-8/5/64								92.0		99.5
8/6-12/64								93.5	94.5	100.5
8/13-19/64				92.0	99.0			97.0	97.5	101.0
8/20-26/64				92.0	99.5			97.0	98.0	99.5
8/27-9/2/64				92.0	97.5			96.5	98.0	98.5
9/3-9/64		94.0		93.5	99.0			98.0	99.5	98.5
9/10-16/64	103.5	96.0		93.5	100.0		98.5	98.0	97.5	100.0
9/17-23/64	104.0	98.0		94.0	101.5			99.0	101.0	97.5
9/24-30/64	102.0	98.5		93.0	98.5	99.5		99.0	97.5	99.5
10/1-7/64	99.0	97.0		92.5	97.0				89.0	
10/8-14/64	102.0	98.0		93.5	99.5	106.5	96.0	99.5	79.0	
10/15-21/64	103.5	100.0		95.0	99.0	108.5		96.0	76.0	
10/22-28/64	105.0	101.5		93.5	100.0	109.5	97.0		76.0	
10/29-11/4/64	105.0	101.5		94.5	99.5	108.5	96.0			
11/5-11/64	104.5	101.5		92.5	99.0	108.5				
11/12-18/64	104.0	101.5		93.5	99.0	106.5				
11/19-24/64	103.5	102.0		88.0	96.0	106.5	99.0			
11/25-12/2/64	103.5	102.0		84.0	99.0	106.0				
12/3-9/64	103.0	101.5	101.0	92.0	105.5	104.0	97.0			
12/10-16/64	102.5	101.5	101.5		99.5	101.5	98.5			
12/17-23/64	101.0	101.5	99.0			101.5				
12/31-1/6/65	100.5	100.5	99.0			98.5				
1/7-13/65	98.5	99.5				97.0				
11/14-20/65	97.5	98.5				97.0				
1/28-2/3/65	99.0	98.5				95.0				
Average	102.2	99.7	100.1	92.3	99.3	103.4	97.4	96.3	92.0	99.1

Source: "Cottonseed Reviews – Southwestern Area,"   AMS, USDA.

Table 30. THE AVERAGE PRICES PAID FARMERS PER TON OF COTTONSEED BY DISTRICTS AND PERIODS
INDICATED FOR THE 1964-65 CROP
(Dollars Per Ton)

Date Covered By Reports	Crop Reporting Districts of Texas									
	1	2	3	4	5	6	7	8	9	10
7/23-29/64								43.90		42.80
7/30-8/5/64								43.70		43.00
8/6-12/64								43.90	44.00	44.40
8/13-19/64								44.90	44.70	44.70
8/20-26/64				42.80				44.90	44.60	44.60
8/27-9/2/64				43.20	44.90			45.10	44.70	44.60
9/3-9/64				43.50	44.20		44.00	44.90	44.60	44.70
9/10-16/64		44.20		43.70	44.70		44.20	45.10	44.70	44.80
9/17-23/64	45.90	44.60		43.90	44.90	46.00	44.10	45.20	44.60	45.20
9/24-30/64	45.30	44.90		43.70	44.40	46.70		45.20	44.60	
10/1-7/64	45.60	45.20		44.00	44.30	48.80		44.80	44.60	
10/8-14/64	45.50	45.30		44.00	45.10	49.50	44.70	45.30	44.50	
10/15-21/64	45.70	46.20		44.90	45.50	49.50	44.70	45.20		
10/22-28/64	46.00	46.40		45.70	45.80	49.10	46.20			
10/29-11/4/64	46.40	46.90		45.40	45.50	48.40	46.50			
11/5-11/64	46.50	47.40		45.90	45.60	49.90				
11/2-18/64	46.40	47.60		45.50	46.00	49.60	47.00			
11/19-24/64	47.30	47.70		45.40	45.40	51.70	46.80			
11/25-12/2/64	48.00	47.80		45.60	45.80	50.90	47.70			
12/3-9/64	49.20	48.90	47.00	45.60	46.10	50.80	47.50			
12/10-16/64	50.00	49.70	48.20			50.90				
12/17-23/64	50.00	50.20	48.20			50.20				
12/31-1/6/65	50.10	50.20				49.60				
1/7-13/65	49.80	50.30				48.90				
1/14-20/65	50.10	50.40				48.80				
1/28-2/3/65	49.20	50.10				48.80				
State Average 46.63	47.61	47.58	47.80	44.55	45.21	49.34	45.76	44.78	44.56	44.31

A V E R A G E

Source: "Cottonseed Reviews - Southwestern Area," AMS, USDA.

Table 31. U. S. COTTONSEED QUALITY

Year	% Oil	% Ammonia	% Moisture	% F.F.A.	% Foreign M.	% Linters*	Avg. Grade
1944	18.5	3.88	11.2	1.4	.8		99.0
1945	18.6	3.62	12.2	2.6	1.1		93.5
1946	18.7	3.61	12.4	1.0	.8		99.5
1947	18.3	3.88	11.3	1.4	.8		98.0
1948	18.7	3.72	11.3	1.4	.9		98.5
1949	19.1	3.68	11.6	1.9	1.1		98.0
1950	18.7	3.64	12.8	1.9	1.1		96.0
1951	18.5	3.88	11.0	1.5	1.0		98.0
1952	18.6	4.04	9.5	1.0	.9		101.0
1953	18.7	4.00	9.0	.7	.8		103.0
1954	18.2	4.12	9.2	.7	1.0	11.4	101.5
1955	18.9	3.95	10.4	.7	.9	10.4	102.0
1956	18.9	4.12	9.1	.5	.8	10.2	103.0
1957	19.0	3.80	11.2	1.9	1.6	10.0	96.5
1958	19.3	3.83	10.4	1.2	1.1	10.5	101.5
1959	18.8	3.89	11.4	1.3	.9	10.2	100.0
1960	18.6	3.98	11.7	1.6	1.1	9.7	96.0
1961	18.8	3.83	10.9	.9	1.2	10.1	99.5
1962	18.2	3.96	11.1	1.4	1.1	10.1	96.5
1963P	18.7	4.05	9.3	.7	1.1	10.3	103.0

TEXAS COTTONSEED QUALITY

Year	% Oil	% Ammonia	% Moisture	% F.F.A.	% Foreign M.	% Linters*	Avg. Grade
1944	18.6	4.11	9.5	.6	.8		104.0
1945	18.1	3.96	9.6	1.2	1.0		99.0
1946	18.3	4.06	10.5	.8	.8		101.5
1947	18.9	4.09	8.7	.7	.8		104.0
1948	18.4	4.12	8.0	.5	.8		101.5
1949	18.8	4.04	8.9	.8	2.2		100.4
1950	19.8	3.96	7.9	.7	2.0		103.0
1951	19.3	4.09	8.1	.8	1.5		102.1
1952	18.6	4.12	7.6	.6	1.3		100.4
1953	18.6	4.09	8.3	.8	1.3		100.0
1954	18.8	4.12	7.9	.6	1.4	10.6	102.5
1955	19.0	4.00	8.0	.8	1.6	10.2	102.0
1956	19.5	4.06	6.9	.5	1.1	10.9	106.5
1957	18.7	3.86	9.8	.8	2.1	10.1	99.0
1958	19.2	3.96	9.3	1.0	1.2	10.4	102.5
1959	18.7	3.99	8.6	.9	1.3	10.4	100.5
1960	18.6	3.94	9.0	.8	1.5	10.1	92.5
1961	18.2	3.85	8.8	.5	1.7	10.4	98.5
1962	18.1	3.97	8.8	.7	1.7	10.2	97.5
1963P	18.3	4.11	7.8	.6	1.7	9.9	101.0

* Not available prior to 1954.   P - Preliminary.
Source: Cottonseed Quality, USDA, AMS.

During the same period the state's average moisture content according to crop years has not exceeded the nation's average for the same crop years, nor has it exceeded the 12.0 per cent allowable for prime quality classification. The average per cent of free fatty acid for the state exceeded the United States average for two crop years and was the same only once during the period shown in the table. The Texas average did not exceed the 1.8 per cent allowable for the classification of prime quality. Foreign matter, which is the last factor making up the quality index segment of the average grade, has been a detriment for the quality index for the State of Texas. This is because the state average for foreign matter exceeded the national average 15 times, with three other crop years equaling the national average. Only twice during the twenty years did the Texas average drop below the nation's average, and this happened during the crop years of 1945 and 1948.

Starting with the crop year of 1949, the Texas average for foreign matter content has exceeded the allowable 1.0 per cent permitted for prime quality cottonseed. This has resulted in a decrease in the average Texas cottonseed grade and loss due to the payment of freight charges on the excess foreign matter shipped to the mills.

The quantity factors of oil, ammonia, and linters determine the quantity index which contribute to value obtained for the average grade. For the twenty years portrayed in Table 31, Texas oil content exceeded the national average seven times, was the same twice during the period and was less than the national average eleven times. Based on ammonia content, Texas showed up a little better compared to oil content by exceeding the national average 17 times during the period and was the same once and less for only two crop years for the period. Data on linters are only available

for the crop years beginning in 1954. Texas exceeded the national average

for six of the ten years as to the per cent of linters. These same quality

and quantity factors, along with the average grade for Texas crop reporting

districts for the same selected crop years, are found in Table A-7 in the

Appendix.

For a pictorial presentation of the quality factors making up cotton-

seed grades for Texas and the United States based on the data contained in

Table 31 see Graph II Quality Factors. The per cent of the quality factors

allowable for the classification of prime quality for each of the factors

of foreign matter (1.0%), moisture (12.0%), and free fatty acit (1.8%) are

indicated by a dashed horizontal line on the graph for each of their re-

spective percentages allowable under this classification. The per cent

lint content for Texas and the United States covering the years 1954

through 1963 from data in Table 31 is shown in graph form in Graph III.

The two remaining quantity factors of oil and ammonia content are shown

in Graph IV, along with the average cottonseed grade for Texas and the

United States for the years 1944 through 1963 based on the data in Table

31.

By the use of these three graphs, one can see when the Texas cotton-

seed crop was above the national average and which factors contributed

toward this above average grade resulting in increased income to the grower

from the production of a good grade of cottonseed. It is also obvious

which factors deterred the possibility of higher grade cottonseed. The

improvement in one of these factors improves the average cottonseed grade,

thus increasing the grower's income, and in turn the economy of the state

as a whole. The growers and breeders in the various crop reporting districts

Graph II QUALITY FACTORS

TEXAS AND UNITED STATES PER CENT MOISTURE, FREE FATTY ACID, AND FOREIGN MATTER FOR SELECTED CROP YEARS

Texas ---   United States ——

Foreign Matter

Moisture

Free Fatty Acid
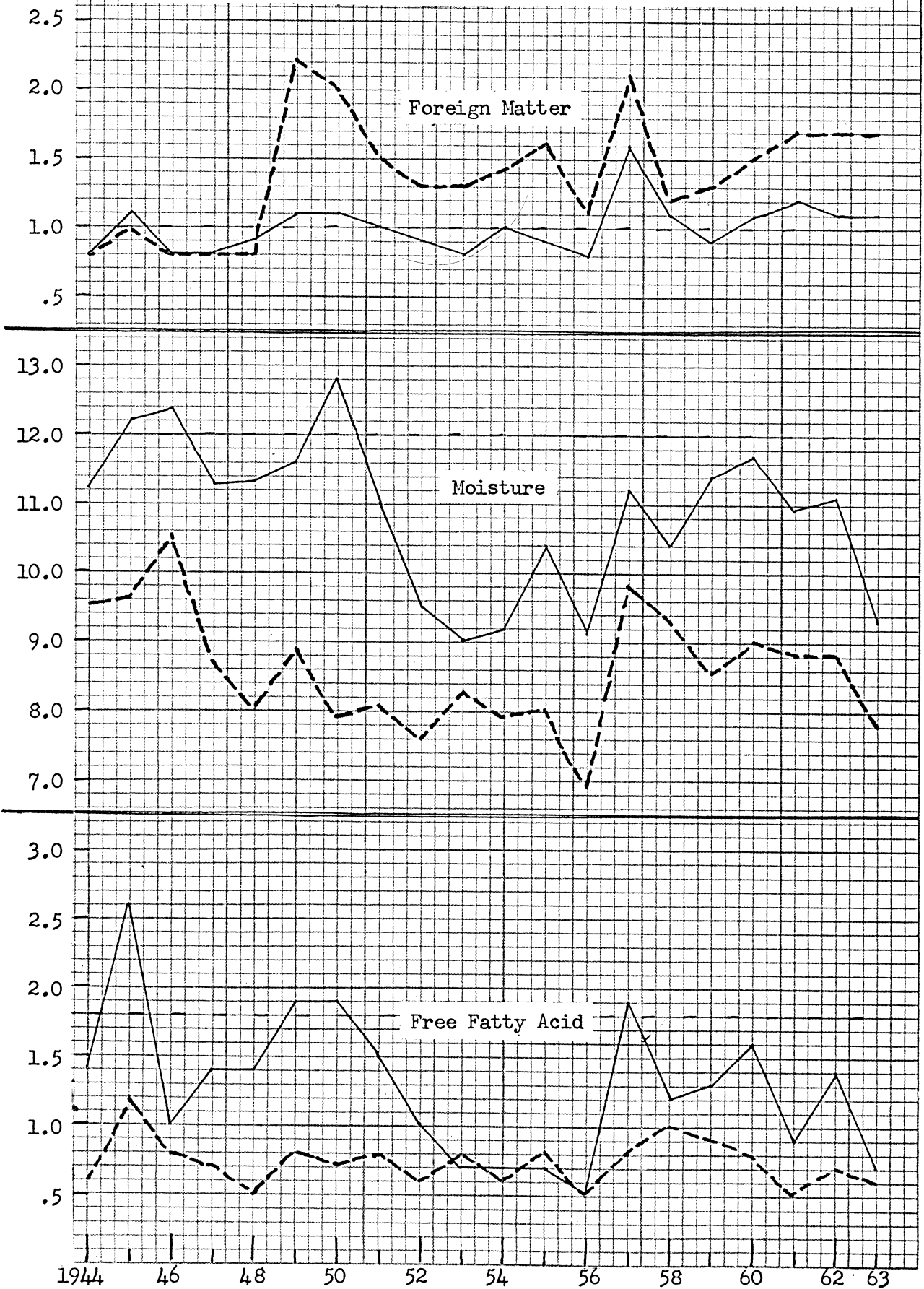
of the state can look at the average grade for their respective districts
and, knowing their own grade or the grade of the cottonseed for the gin
plant at which they gin their cotton, can determine which factors should
be improved to increase their return from cottonseed. The foreign matter
content of cottonseed delivered for crushing is the quality factor which
needs the greatest improvement and which detracts or reduces the quality
index more than any other. Foreign matter content is also the easiest to
control of all the quality and quantity factors.

Graph III QUANTITY FACTOR

TEXAS AND UNITED STATES PER CENT LINTERS FOR
SELECTED CROP YEARS

Texas ——   United States ——
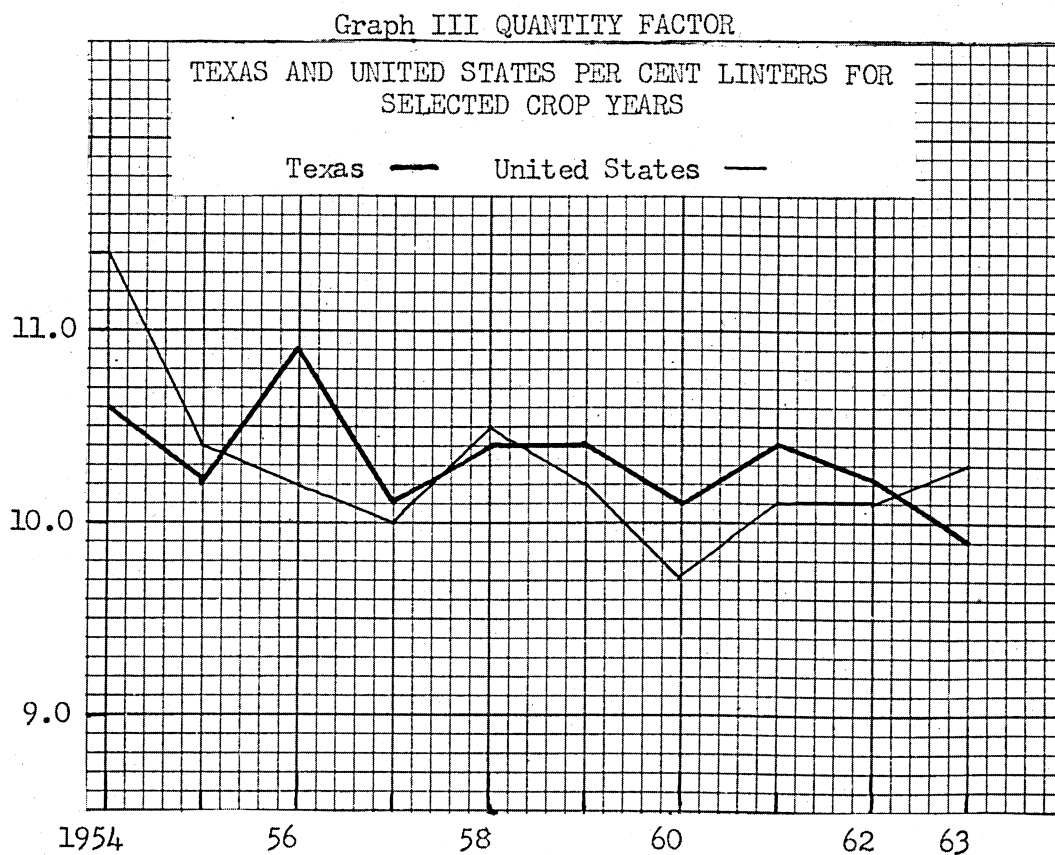
Graph IV QUANTITY FACTORS

TEXAS AND UNITED STATES PER CENT OIL AND AMMONIA AND
AVERAGE GRADE FOR SELECTED CROP YEARS

Texas ▬ ▬   United States ▬

Oil

Ammonia

Average Grade
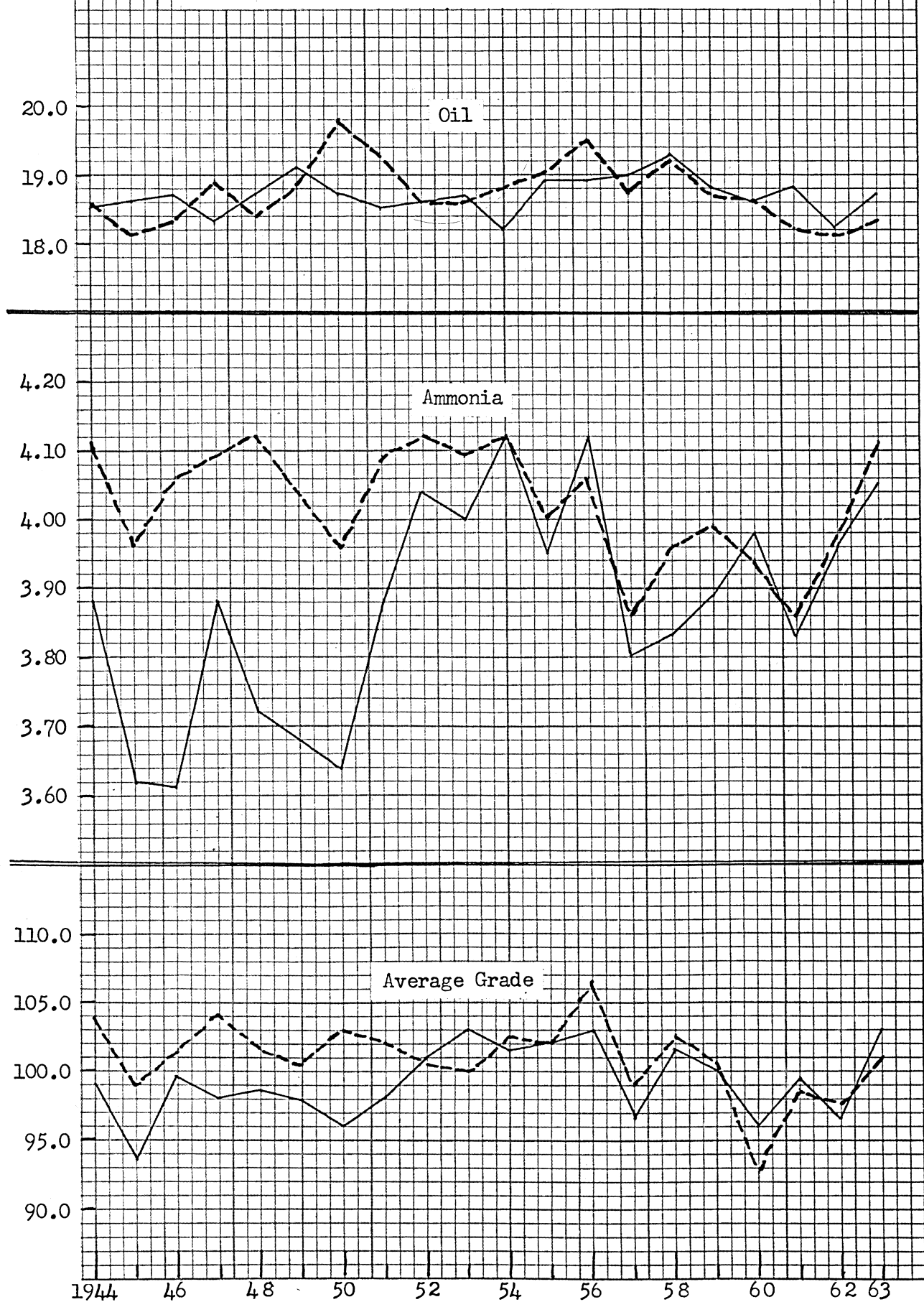
Let's examine the quantity factor of foreign matter and its effect on grade and revenue per ton received by the gin when cottonseed is sold on the basis of grade. Foreign matter was not much of a problem until the 1949 crop, as can be seen in the Texas section of Table 31. The presence of excess foreign matter in the cottonseed has caused the oil mill more trouble than any other item. This increase in the amount of foreign matter has decreased the gins' revenue for the seed when sold on the basis of grade in the following ways: (1) The gin must pay the freight on all excess foreign matter above the 1.0 per cent allowable; (2) the excess foreign matter above the 1.0 per cent allowable reduces the grade of the cottonseed delivered (rule 115 and 116 of Trading Rules for NCPA). Example: A cottonseed shipment having a quantity index of 104.0 and quality index of 100.0 (no excess FM) receives a grade of 104.0; but when an excess of 2.0 per cent foreign matter is present in the same seed, the quality index is lowered to 98.0 (due to 2.0 per cent excess FM) and the grade becomes 101.9 (104.0 x 98.0). This reduced grade means reduced revenue to the gin. Example: Basis grade 100 price is $46.915 per ton. Thus, for seed with grade of 104.0, the price received is $48.792 ($46.915 x 104.0) per ton; while the price received for seed with grade of 101.9 is $47.806 ($46.915 x 101.9) per ton. This amounts to a loss of $.99 a ton due to the 2.0 per cent excess foreign matter. (3) The price received per ton of cottonseed delivered is further reduced by excess foreign matter due to the fact that the weight of the excess foreign matter must be subtracted from the total weight of the shipment before the revenue can be computed (based on clean seed weight), rule 120 of Trading Rules for NCPA. Thus, if a ton of seed has 2.0 per cent excess foreign matter, the clean seed weight is determined

by subtracting the 2.0 per cent foreign matter from the shipment weight (2,000 lbs. - $\underline{/2}$,000 x .02$\underline{7}$ = 1,960 lbs.).

Then the clean seed weight times the actual grade price of the shipment less the cost of the freight for the excess foreign matter is the true revenue received (1,960 lbs. @ $47.806 per ton equals $46.85 per ton less the cost of the freight from the gin to the oil mill for the 40 pounds of excess foreign matter). If the gin had delivered only 1,960 pounds of clean seed (no excess foreign matter) at the original quantity index of 104.0 and a quality index of 100, the grade would have been 104.0; and the revenue would be $47.82 (1,960 pounds at $48.792/ton equals $47.82) for the shipment. Thus, due to the 2.0 per cent excess foreign matter per ton, the gin lost over $.97 (47.82 - 46.85 = .97) when the excess foreign matter is considered.

For further examples of the loss due to the excess foreign matter in seed shipments refer to Table 32. In this table the base grade of 104.0 was assumed for the seed. This grade was due to a quantity index of 104.0 and a quality index of 100.0. All quantity factors and quality factors were held constant except for the amount of foreign matter. Thus, the variation in the foreign matter above the 1.0 per cent allowable changed the quality index and in turn changed the grade, etc., as can be seen from the table. To determine the loss due to freight on the excess foreign matter the oil mill was assumed to be 65 miles from the gin and the motor freight rate of $.16 per hundred weight for minimum cottonseed shipments of 30,000 pounds was used.

Assume a gin produced about 3,200 bales, or 1,331 tons of clean cottonseed (foreign matter not above 1.0 per cent), for a given season.

Table 32.   RESULT OF EXCESS FOREIGN MATTER ON COTTONSEED* GRADE AND REVENUE**

Shipment Grade 1/	Shipment Quality Index 1/	Excess Foreign Matter Above 1.0% for Shipments in Per Cent 1/	Price Per Ton Adjusted by Premiums and Discounts of Grade for Shipment In Dollars 2/	Pounds of Clean Seed Exceeding All Foreign Matter in Excess of 1.0% Per Shipment Ton 3/	Price Received Per Ton Shipped Based on Weight of Clean Seed Times Price Per Ton After Adjustment by Grade for Excess Foreign Matter – Dollars 4/	Cost to Gin for Freight 65 Miles on Excess Foreign Matter at 16¢/Cwt – Cents 3/	Actual Revenue Received by Gin Per Ton Shipped In Dollars	Revenue Which Would Have Been Received if the Gin had Only Shipped the Clean Weight of Seed After the Deduction for Excess Foreign Matter – Dollars 5/	Loss Due to Inclusion of Excess Foreign Matter Per Ton of Total Shipment In Dollars 6/
104.0	100.00	0	48.792	2,000	48.7920	0	48.7920	48.7920	0
103.4	99.45	.55	48.510	1,989	48.2432	.0176	48.2256	48.5236	.2980
102.4	98.45	1.55	48.041	1,969	47.2964	.0496	47.2468	48.0357	.7889
101.4	97.50	2.50	47.572	1,950	46.3827	.0800	46.3027	47.5722	1.2695
100.1	96.25	3.75	46.962	1,925	45.2009	.1200	45.0809	46.9623	1.8814
98.5	94.70	5.30	46.211	1,894	43.7618	.1696	43.5922	46.2060	2.6138
96.9	93.20	6.80	45.461	1,864	42.3696	.2176	42.1520	45.4741	3.3221
95.4	91.70	8.30	44.757	1,834	41.0422	.2656	40.7766	44.7423	3.9657
94.5	90.90	9.10	44.335	1,818	40.3005	.2912	40.0093	44.3519	4.3426

* Assumed base cottonseed grade of 104.0 (average grade of Texas cottonseed crop of 1944) with quality index 100.0—basis 100 grade price of $46.915/ton—all other quality factors and the quantity index are constant.

** The revenues, prices received and losses are applicable if the seed is bought on basis grade with premiums and discounts.

1/ Based on rule 116 of National Cottonseed Products Association Trading Rules. 2/ based on rule 115 of NCPA. 3/ Based on rule 120 of NCPA. 4/ Column 1 times $48.792. 5/ Column 5 times per pound price for seed (104.0 grade $48.792/ton). 6/ Column 9 less column 8.

Then if the foreign matter was increased to an excess of 9.1 per cent, the gin would have a total of 1,464 tons available for shipment to the oil mill. Assume the grade of 104.0 for the 1,331 tons of clean seed and a basis price of $46.915 per ton (basis grade 100). Then the revenue for the clean seed would be 1,331 tons times ($46.915 x 104.0) which amounts to $64,941.62. But if the gin shipped 1,464 tons at 9.1 per cent excess foreign matter (1,331 tons clean + 133 tons excess FM), the revenue due to the seed would be 1,331 (clean seed weight) times $40.3005 (value of seed per ton based on grade of 94.5 due to excess FM) which amounts to $59,009.88 less freight on excess foreign matter (133 tons x $3.20/ton) which amounts to $425.60 for the actual revenue to the gin of $58,584.28. Thus, the loss due to the excess foreign matter amounts to $64,941.62 minus $58,584.28 or $6,357.34 for the season.

Another way to arrive at this loss is by using the loss figure per ton shipped ($4.3426/ton) from Table 32 for the 9.1 per cent excess foreign matter times the total tons shipped (1,464) which gives the total loss in revenue of $6,357.57 (1,464 ton x $4.3426/ton = loss due excess FM) for the season.

The value of the by-products derived from cottonseed is a very important factor to the economy of our state and our nation. Table 33 lists the United States average value for five-year periods according to the by-products in terms of total dollar value and average dollar value per ton for the product. Table A-8 in the Appendix shows the United States figures for selected years by total value of seed crushed and on the basis of average value per oil mill. Also shown is the total value of the products derived and average value of the products per oil mill for the years selected.

Table 33. U. S. VALUE OF PRODUCTS BY FIVE-YEAR AVERAGE
SELECTED PERIODS

| Year | Cottonseed Oil | | Cake and Meal | |
	Total 1,000 Dollars	Avg./Ton Produced	Total 1,000 Dollars	Avg./Ton Produced
1877-1881	3,362	106.12	1,888	25.46
1882-1886	6,964	93.52	3,986	22.93
1887-1891	5,863	86.85	7,116	22.05
1892-1896	12,660	59.21	11,038	21.87
1897-1901	21,294	57.03	16,660	18.79
1902-1906	29,050	73.25	28,862	21.99
1907-1911	27,963	98.95	37,434	23.99
1912-1916	94,404	132.62	58,393	26.62
1917-1921	162,209	260.95	88,141	47.12
1922-1926	93,294	170.29	70,299	34.59
1927-1931	106,071	137.49	69,056	31.19
1932-1936	82,427	132.07	45,508	24.62
1937-1941	102,977	143.11	56,837	27.94

| Year | Hulls | | Linters | |
	Total 1,000 Dollars	Avg./Ton Produced	Total 1,000 Dollars	Avg./Ton Produced
1889-1901	4,500	3.49	1,763	65.97
1902-1906	6,128	4.54	3,712	72.01
1907-1911	8,704	6.67	4,286	24.85
1912-1916	1,611	8.78	18,509	78.21
1917-1921	13,398	12.40	14,269	77.28
1922-1926	12,043	9.95	20,075	100.41
1927-1931	10,130	7.44	17,697	64.62
1932-1936	7,899	7.48	18,947	70.74
1937-1941	8,290	7.16	22,206	61.55

Source: Cotton Production and Distribution

The pounds of the various products derived per ton of seed crushed in Texas and the average price received for these products for the crop years 1942-43 through 1963-64 are found in Table 34. Also in the table, the pounds of products produced per ton of seed crushed are multiplied by the price of the product to obtain the value in dollars for each of the products per ton

Table 34.   TEXAS POUNDS OF PRODUCTS PER TON OF SEED CRUSHED—PRICE OF PRODUCTS—VALUE PER TON OF SEED CRUSHED—PRICE PER TON RECEIVED BY TEXAS FARMERS

Date	Oil Weight Pounds	Oil 1/ ¢/Lb.	Oil Value Dollars	Cake and Meal Weight Pounds	Cake and Meal 2/ $/Ton	Cake and Meal Value Dollars	Hulls Weight Pounds	Hulls 2/ $/Ton	Hulls Value Dollars	Linters Weight Pounds	Linters 3/ $/Ton	Linters Value Dollars	Total Value	Price/ Ton Farmers
1942-43	288	12.75	36.72	895	50.00	22.38	496	5.95	1.48	183	7.07*	12.94	73.52	44.02
1943-44	301	12.75	38.38	946	52.97	22.05	474	12.72	3.02	181	4.83*	8.74	75.19	51.90
1944-45	307	12.75	39.14	947	52.76	24.98	462	12.00	2.79	184	5.01*	9.22	76.13	55.10
1945-46	302	12.75	38.50	926	63.00	29.17	465	13.00	3.02	186	4.58	8.52	79.21	53.20
1946-47	303	24.78	75.08	941	90.40	42.53	444	18.35	4.08	199	9.46	18.82	140.51	73.30
1947-48	311	26.25	81.64	943	100.40	47.34	456	22.97	5.23	194	6.70	13.00	147.21	86.00
1948-49	309	15.42	47.65	951	71.90	34.19	459	8.80	2.02	185	3.94	7.29	91.15	72.10
1949-50	312	12.51	39.03	939	63.35	29.75	465	9.25	2.15	164	5.61	9.20	80.13	43.70
1950-51	323	20.39	65.86	935	82.66	38.64	477	22.42	5.35	167	16.21	27.07	136.92	90.90
1951-52	325	12.98	42.18	960	90.93	43.22	458	29.41	6.73	171	8.68	14.84	106.97	72.50
1952-53	332	14.25	47.31	967	87.03	42.08	465	27.83	6.47	161	5.95	9.58	105.44	72.10
1953-54	330	13.56	44.75	940	68.12	32.02	460	17.47	4.02	166	4.58	7.60	88.39	53.40
1954-55	341	13.39	45.66	952	73.72	35.09	470	22.06	5.18	163	3.94	6.42	92.35	62.10
1955-56	340	13.13	44.64	914	63.34	28.95	479	14.64	3.51	163	3.76	6.13	83.23	45.90
1956-57	346	13.39	46.33	941	63.90	30.06	477	24.62	5.87	175	5.08	8.89	91.15	57.40
1957-58	331	13.58	44.95	910	60.24	27.41	506	16.03	4.06	163	4.36	7.11	83.53	51.80
1958-59	339	11.67	39.56	938	67.21	31.52	507	14.98	3.80	167	3.43	5.73	80.61	42.40
1959-60	337	10.03	33.80	914	66.60	30.44	509	18.32	4.66	165	3.85	6.35	75.25	38.20
1960-61	338	11.79	39.85	904	63.13	28.53	530	19.09	5.06	163	4.10	6.68	80.12	41.30
1961-62	324	12.52	40.56	860	68.30	29.37	550	15.44	4.25	161	5.25	8.45	82.63	51.30
1962-63	327	10.48	34.27	915	75.12	34.37	527	24.91	6.57	151	4.05P	6.12	81.33	47.70
1963-64P	322	9.95	32.04	930	75.42	35.07	500	24.42	6.11	150	4.04	6.06	79.28	52.60

1/ Tanks F.O.B. Southeastern mills.

2/ 1942-43 through 1948-49 National Cottonseed Products Association, 1949-50 and on Western Feeders Supply Company, Inc. Fort Worth, Texas.

3/ U. S. Department of Agriculture

* Grade 4

P - Preliminary

of seed crushed. In addition, the total value of all the by-products derived per ton of crushed seed is shown, along with the average price per ton in dollars that the Texas farmer received for seed during the crop year shown.

Now let's compare the crop year 1899-1900 to the crop year 1962-63 for both Texas and the United States as to the products derived per ton of seed crushed, along with the value of these products in dollars per ton of crushed seed. This information is in Table 35, along with the price paid per ton for the cottonseed crushed, price in cents per pound for the various products derived and the percentage that the by-products derived are per ton of the seed crushed. See the cover of this report for a graphic presentation of these percentages for the various by-products derived per ton of seed crushed for the two crop years involved.

It can be seen that for every ton of seed crushed, the industry currently gets more oil, linters, cake and meal, plus they have more waste now than back in 1899. In that year the oil mills had a larger production of hulls than they currently do. The value of the products derived per ton of seed crushed in Texas has increased nearly five times, which amounts to an increase in value of almost $65 per ton for the intervening years. The price of cottonseed in Texas has increased nearly four times during the same time period for an increase of almost $36 a ton.

The Texas increase in total value of the products derived per ton of seed crushed has exceeded the United States average figure for the total value of all products for the same period. On the basis of the value of individual products, Texas exceeded the national average or was behind for the products of oil and linters in relation to the amount of increase based on the value derived. The cost of the wages necessary to crush the cottonseed

Table 35. COMPARISON OF UNITED STATES—TEXAS COTTONSEED AND PRODUCTS DATA FOR TWO SELECTED CROP YEARS

	United States			Texas		
	1899–1900	1962–63	Difference	1899–1900	1962–63	Difference
No. Establishments	357			102	61	
Avg. Consumption Per Est. in Tons	6,945			6,790	31,523	
Pounds of Products /Ton Seed Crushed						
Oil	282	332	50	264	327	63
Cake and Meal	713	937	224	731	915	184
Hulls	943	464	479	947	527	-420
Linters	23	171	148	22	151	129
Waste	39	96	57	36	80	44
Value of Products In Dollars/Ton						
All	17.11	81.08	63.97	16.63	81.33	64.70
Oil	8.63	38.18	29.55	8.22	34.27	26.05
Cake and Meal	6.46	30.26	23.80	6.31	34.37	28.06
Hulls	1.29	5.80	4.51	1.41	6.57	5.16
Linters	.73	6.84	6.11	.69	6.12	5.43
Price Paid for Cottonseed Crushed In Dollars/Ton	11.93	47.90	35.97	11.93	47.70	35.77
Price in Cents/Lb. of Products Produced						
All	.0087	.0426		.0085	.0424	
Oil	.0306	.1150		.0311	.1046	
Cake and Meal	.0091	.0323		.0086	.0376	
Hulls	.0014	.0125		.0015	.0125	
Linters	.0317	.0400		.0314	.0405	
Per Cent Products Derived Per Ton Seed Crushed						
Oil	14.1	16.6		13.2	16.4	
Cake and Meal	35.6	43.6		36.6	45.7	
Hulls	47.1	24.4		47.3	26.4	
Linters	1.2	8.9		1.1	7.5	
Waste	2.0	6.5		1.8	4.0	
Total	100.0	100.0		100.0	100.0	

Source: 1900 U. S. Census of Manufactures, Part II on Selected Industries; Cotton Production, 1907, Bureau of the Census; 1962 Cotton Production and Distribution; "Monthly Cotton Linters Review"; Agricultural Statistics.

and the cost of the equipment currently necessary to produce these by-products from the seed has also increased during the interval, with the result that the apparent increases in the total and individual values are not really as large or as important as they first appear.

Cottonseed is one of the most important cash crops to the Texas farmer even though it is actually a by-product of the farmer's number-one cash crop, cotton. During 1964 the cash receipts from all farm marketings in Texas amounted to 2,369 millions of dollars, of which 1,287 million dollars was due to cash receipts from the crops. Of the amount due to crops, cotton lint and seed amounted to 50.6 per cent of the cash receipts due to crop farm marketings, or 650,866 thousand dollars. Seed alone amounted to 6.4 per cent of the cash receipts due to crop marketings or 82,018 thousand dollars. When the cottonseed cash receipts are considered for the United States in 1964, they amount to two per cent of the cash receipts from all crops in the nation, or 285 million dollars.

Thus, cottonseed in Texas contributes greatly to the employment and economic income of the state as a whole even while various of its segments and/or by-products are having adverse problems. If the breeder, farmer, ginner, and oil mill operator would make an effort to improve and maintain the cottonseed quality at their various stages of processing through better cultural, harvesting, and managerial practices the returns from cottonseed and its by-products would mean even greater revenue return for the state and all concerned.

APPENDIX

Table A-1. FIVE YEAR AVERAGES FOR UNITED STATES COTTONSEED PRODUCTION, CRUSHINGS AND COTTONSEED BY-PRODUCTS DERIVED FOR THE YEARS 1872 THROUGH 1941

| 5 Years Begin- ning Aug. 1 | Cottonseed | | | Cottonseed Products-Production and Pounds of Product/ton Seed Crushed | | | | | | | |
| | | | | Cottonseed Oil | | Cake and Meal | | Hulls | | Linters | |
	Prod. 1,000 Short Tons	Crushings 1,000 Short Tons	Crushed as a % Produc- tion	Total 1,000 Short Tons	Avg/ton Seed Crushed in Lbs.	Total 1,000 Short Tons	Avg/ton Seed Crushed in Lbs.	Total 1,000 Short Tons	Avg/ton Seed Crushed in Lbs.	Total 1,000 Short Tons	Avg/ton Seed Crushed in Lbs.
1872-76	1,728	86	4.9	13	298	30	710				
1877-81	2,325	209	9.0	31	301	73	701				
1882-86	2,708	512	19.0	77	301	179	699				
1887-91	3,443	916	26.6	138	300	321	700				
1892-96	3,531	1,444	41.0	217	300	506	700				
1897-01	4,575	2,500	55.4	365	293	882	706	1,264*	943*	27*	21*
1902-06	5,135	3,366	66.2	494	293	1,303	773	1,362	812	53	31
1907-11	5,476	3,706	67.6	563	303	1,561	837	1,313	722	88	46
1912-16	5,915	4,778	81.2	722	303	2,203	923	1,361	569	209	91
1917-21	4,983	3,964	80.3	609	308	1,839	925	1,094	558	168	87
1922-26	6,004	4,604	76.2	690	300	2,114	919	1,323	575	213	97
1927-31	6,364	4,755	78.1	779	314	2,245	903	1,377	556	270	113
1932-36	5,138	4,129	80.6	639	309	1,873	908	1,092	528	260	131
1937-41	5,500	4,671	85.5	737	316	2,088	894	1,188	508	363	163

* Data from 1899 to 1901 only.
Source: Cotton Production and Distribution and other USDC publications.

Table A-2 FATS AND OILS: AVERAGE WHOLESALE PRICE IN CENTS PER POUND,
UNITED STATES, SELECTED YEARS, 1936-1964

Item and Market	1936 1940	1941 1945	1946 1950	1951 1955	1956	1957	1958	1959	1960	1961	1962	1963	1964[1]
Butter, 92-score, Chicago	29.3	40.2	66.2	65.6	59.9	60.6	59.8	60.5	59.9	61.2	59.5	59.1	59.9
Oleomargarine, Chicago domestic white	15.2	18.4	30.3	27.7	26.9	27.4	26.5	24.2	22.2	25.5	24.3	23.2	23.4
Lard, loose, Chicago	8.1	11.7	17.0	12.8	11.1	12.4	11.4	7.9	8.8	9.6	8.7	8.3	9.7
Tallow, edible, Chicago	6.5	9.4	13.8	9.7	10.3	11.9	11.0	7.9	8.5	9.2	8.8	8.0	9.5
Corn oil, crude, tanks, mid-west mills	7.2	12.2	19.0	14.7	14.1	13.8	13.4	11.8	13.1	18.3	14.6	12.1	11.0
Cottonseed oil, crude, tanks, f.o.b., S. E. mills	6.8	12.1	18.9	14.3	13.7	13.5	12.7	11.2	9.9	13.0	11.5	10.4	10.3
Peanut oil, curde, tanks f.o.b, S. E. mills	7.1	12.3	19.8	18.8	15.9	15.1	16.3	12.6	15.1	16.1	16.4	11.7	12.9
Soybean oil, mid-west mills, crude, tank cars	6.1	11.1	17.0	13.0	13.2	12.2	10.5	9.0	8.8	11.5	9.0	8.9	9.2
Coconut oil, edible, drums, New York	8.2*	11.4*	23.4	21.8	19.6	19.2	23.3	25.7	22.4	18.7	16.6	16.2	17.3
Olive oil, imported, drums, edible, New York	28.1	66.1*	66.2	32.8	46.0	41.5	32.7	31.3	30.8	31.3	35.5	51.0	32.4
Linseed oil, Minneapolis, raw, tank cars,	9.3	13.0	23.9	15.5	14.1	13.6	13.8	13.1	13.1	14.2	14.2	12.7	13.4
Tung oil, imported drums, f.o.b., New York	18.5	37.8	29.0	31.9	25.8	24.7	22.8	24.3	24.1	29.4	39.4	38.9	27.0

* Less than five-year average.
1/ Partial and preliminary.

Source: Agricultural Statistics, Bureau of Agricultural Economics, USDA, 1942 to 1945 and Fats and Oils Situation.

Table A-3. SOYBEAN AND BY-PRODUCTS, PRODUCTION AND PRICE DATA

Crop Year Beginning October	Bean Production in Tons	Crushed Tons	Oil Production Million Lbs.	Cake & Meal Production 1,000 Tons	Bean Price in Dollars Per Ton	Oil Price Per Pound		Price 44% Meal/Ton Decatur
						Crude	Edible	
4-Year Avg.							Cents	Dollars
1934-38		639,112	188	513	36.50	7.5	9.9	29.14
1938-42		1,818,892	555	1,450	37.92	7.0	9.9	26.24
1942-43	5,625,720	4,003,620	1,206	3,200	57.33	11.8	14.8	35.75
1943-44	5,703,990	4,269,180	1,219	3,446	63.33	11.8	15.1	45.00
1944-45	5,763,630	4,602,060	1,347	3,698	73.33	11.8	15.3	45.00
1945-46	5,794,010	4,783,800	1,415	3,837	71.00	11.9	16.0	55.25
1946-47	6,101,850	5,107,380	1,531	4,086	101.33	22.9	28.6	72.30
1947-48	5,593,530	4,841,910	1,534	3,833	126.67	23.8	29.5	80.80
1948-49	6,816,510	5,509,920	1,807	4,330	81.67	13.1	18.5	66.10
1949-50	7,025,820	5,857,950	1,937	4,586	76.33	12.3	16.6	64.30
1950-51	8,977,470	7,559,700	2,454	5,897	87.00	17.8	23.6	64.45
1951-52	8,513,310	7,331,370	2,444	5,704	99.33	11.3	16.6	83.35
1952-53	8,965,170	7,032,150	2,536	5,551	96.00	12.1	18.6	67.55
1953-54	8,075,070	6,394,680	2,350	5,051	90.33	13.5	19.0	78.65
1954-55	10,232,250	7,470,270	2,711	5,705	92.33	11.9	18.8	60.70
1955-56	11,210,460	8,793,780	3,143	6,546	80.00	12.5	18.7	52.55
1956-57	13,477,530	9,478,800	3,431	7,509	78.00	12.7	18.3	47.45
1957-58	14,502,750	10,614,180	3,800	8,284	74.67	10.8	16.6	53.40
1958-59	17,407,500	12,036,780	4,251	9,490	71.33	9.5	14.8	55.80
1959-60	15,986,970	11,802,510	4,338	9,152	72.00	8.3	10.1	55.55
1960-61	16,659,210	12,066,510	4,420	9,452	72.33	11.3	13.1	60.60
1961-62	20,386,980	13,165,140	4,790	10,342	81.00	9.5	11.4	63.60
1962-63	20,255,910	14,235,000	5,091	11,127	83.67	8.9	10.4	71.25
1963-64P	21,045,000	13,227,000	4,822	10,609	84.67	8.5	10.7	71.00
1964-65F	23,334,000	15,667,000	5,100	11,200	87.33	11.7	13.7	68.00

Source: Agricultural Statistics, Fats and Oil Situation, USDA   P - Preliminary   F - Forecast

Table A-4. FEEDING TEST CONDUCTED AT SUDAN LIVESTOCK AND
FEEDING COMPANY, SUDAN, TEXAS
October, 1961 – January, 1962

Conventional
Meal and Hulls

Number Head	49
Number Days on Feed	122
Total Weight on Test	27,141
Average Weight Out	861
Average Weight In	554
Average Weight Gain	307
Gain Per Head Daily	2.52
Average Net Gain	15,032
Total Feed	125,920
Feed Per Head Per Day	21.12
Feed Per Cwt. Gain	838
Cost Per Cwt. Gain	$ 16.78
Total Initial Cost on Test	$ 6,705.16
Average Cost Per Head	$ 136.84
Total Feed Cost	$ 2,574.41
Total Cost	$ 9,279.57
Selling Price Per Cwt.	$ 24.50*
Total Sales Price	$10,322.80
Profit Per Lot	$ 1,043.24
Profit Per Head	$ 21.29

Sale Weights, Costs, and Gains are figured with 4 per cent shrink.
* 48 steers sold for $24.50 per Cwt. One salvaged steer sold for $23.10
per Cwt. after 88 days on feed. Average sale price for 49 steers was
$24.48. Profit remains at $21.29 per steer.
Source: "Sudan Livestock and Feeding Experiment," The Cotton Gin and Oil
Mill Press., April 14, 1962.

Table A-5. U. S. LINTERS

| Year | Supply 1000 Bales* | | | | Distribution 1000 Bales* | | | Price Per Pound–Cents | | |
	Stocks Aug. 1	Production	Imports	Total	Consumption	Exports	Destroyed	Felting Linters High Grade	Medium Grade	Cottonseed Grade
1942-43	637	1,355	79	2,071	1,301	28	2	9.74	7.07	3.50
1943-44	739	1,186	74	1,999	1,365	61	3	7.18	4.83	3.02
1944-45	567	1,251	199	2,017	1,481	41	1	7.17	5.01	3.21
1945-46	379	993	215	1,586	1,055	22	1	7.25	5.12	3.78
1946-47	422	997	92	1,511	984	53	1/	11.71	9.30	8.22
1947-48	357	1,288	127	1,772	1,156	235	1/	9.71	7.24	5.73
1948-49	370	1,646	114	2,130	1,406	193	1	7.89	4.65	2.85
1949-50	495	1,710	200	2,395	1,616	189	1	10.49	6.76	3.61
1950-51	452	1,244	103	1,799	1,396	92	1	22.00	17.19	14.19
1951-52	264	1,768	113	2,145	1,306	226	2	12.50	8.93	7.41
1952-53	548	1,799	339	2,686	1,359	107	2	12.00	7.04	4.33
1953-54	1,111	2,003	164	3,278	1,324	237	2	10.30	5.29	3.22
1954-55	1,543	1,699	185	3,427	1,474	256	25	8.17	4.55	2.77
1955-56	1,491	1,703	204	3,398	1,789	396		8.06	4.37	2.71
1956-57	1,025	1,507	135	2,668	1,438	334		9.14	6.38	4.38
1957-58	824	1,256	139	2,219	1,102	185		8.62	6.38	3.31
1958-59	810	1,347	172	2,329	1,210	243		8.29	5.31	2.08
1959-60	544	1,665	164	2,373	1,446	329		7.83	5.86	2.92
1960-61	465	1,596	124	2,185	1,281	339		7.95	5.82	3.30
1961-62	468	1,639	183	2,290	1,338	250		8.30	6.66	4.92
1962-63	576	1,657	113	2,346	1,328	351		7.59	6.30	2.91
1963-64	550	1,603	171	2,324	1,360	322		7.90	6.24	2.58
1964-65	598	1,650	150	2,398	1,375	350		7.25	5.92	2.56

* Bales are running except imports which are 500-pound. Beginning in 1959 "Supply" items are principally in 600-pound gross weight bales and "Distribution" in running bales. Production including gins, oil mills, and delinting plants.

1/ 200 bales

Source: Agricultural Statistics (1963 and earlier), USDA, and Cotton Situation, USDA

Table A-6. CELLULOSE CONSUMPTION BY U. S. RAYON AND ACETATE
INDUSTRY IN SHORT TONS

Year	Total Pulp		Wood Pulp		Linters	
	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent
1942	320,000	100	280,500	88	39,500	12
1943	336,500	100	281,000	84	55,500	16
1944	367,000	100	285,000	78	82,000	22
1945	400,000	100	297,000	74	103,000	26
1946	428,000	100	323,000	75	105,000	25
1947	478,000	100	397,000	83	81,000	17
1948	539,500	100	435,000	81	104,500	19
1949	476,600	100	348,700	73	127,900	27
1950	590,600	100	456,200	77	134,400	23
1951	616,300	100	515,500	84	100,800	16
1952	549,500	100	484,700	88	64,800	12
1953	589,100	100	522,000	89	67,100	11
1954	537,800	100	477,300	89	60,500	11
1955	634,500	100	546,900	86	87,600	14
1956	577,000	100	487,000	84	90,000	16
1957	566,000	100	518,000	92	48,000	8
1958	508,000	100	486,000	96	22,000	4
1959	579,000	100	557,000	96	22,000	4
1960	503,000	100	481,000	96	22,000	4
1961	538,000	100	517,000	96	21,000	4
1962	624,000	100	608,000	97	16,000	3
1963	659,000	100	656,000	99	3,000	1
1964	698,000	100	698,000	100	*	

* Less than 500 tons.

Source: Textile Organon

Table A-7. TEXAS COTTONSEED QUALITY BY DISTRICTS
All Data in Per Cent Except Average Grade

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
				District 1			
1944	19.6	4.15	9.4	.6	1.0		108.0
1945	17.5	4.05	8.8	.8	1.6		95.5
1946	19.3	4.05	10.1	.9	1.1		104.5
1947	19.6	4.05	8.4	.7	.9		106.0
1948	18.7	4.17	8.1	.6	1.1		101.5
1949	19.0	4.07	8.5	.7	3.2		99.5
1950	20.1	3.93	7.6	.7	2.5		102.5
1951	20.2	4.06	7.8	.7	1.9		103.3
1952	19.8	4.06	7.2	.6	2.1		100.3
1953	19.3	4.04	8.3	.6	2.0		99.5
1954	19.5	4.11	7.7	.6	1.9	9.2	102.0
1955	19.4	3.86	7.7	.7	2.0	10.0	102.5
1956	19.7	4.03	6.8	.5	1.2	10.8	106.5
1957	18.6	3.85	9.6	.8	2.5	10.1	98.0
1958	19.5	3.95	8.8	.6	1.3	10.4	104.5
1959	18.9	4.01	7.8	.5	1.4	10.3	102.5
1960	18.6	3.89	8.8	.6	1.7	10.0	89.5
1961	17.9	3.84	8.5	.4	1.9	10.3	97.0
1962	18.2	3.95	8.6	.6	2.0	9.4	96.0
1963P	18.4	4.13	7.6	.5	1.8	9.1	100.5
				District 2			
1944	18.7	4.13	9.5	.6	.8		104.5
1945	17.6	4.11	9.0	.7	1.0		99.5
1946	18.4	4.16	10.5	.7	.7		103.0
1947	18.4	4.16	8.4	.6	.6		103.5
1948	18.1	4.19	8.1	.5	.7		101.5
1949	18.7	4.03	9.3	.6	1.3		102.0
1950	19.5	4.00	8.2	.6	1.2		104.5
1951	18.6	4.18	8.2	.5	1.1		103.1
1952	18.1	4.23	7.2	.5	1.1		101.9
1953	17.7	4.19	8.8	.6	1.0		100.0
1954	18.3	4.20	7.4	.5	.8	11.6	104.0
1955	18.6	4.26	8.2	.6	1.0	9.9	102.0
1956	18.7	4.26	7.1	.5	.9	10.7	104.0
1957	18.6	3.90	10.0	.6	1.5	10.1	100.0
1958	19.0	4.07	9.2	.6	1.0	10.2	103.5
1959	18.4	4.16	8.5	.5	1.0	9.9	101.5
1960	18.5	4.07	9.1	.6	1.1	10.0	99.0
1961	18.6	3.93	9.4	.4	1.4	10.0	100.5
1962	18.0	4.13	9.4	.9	1.5	9.7	97.5
1963P	17.9	4.19	7.7	.6	1.2	10.5	101.0

P - Preliminary
Note: Pre cent linters not reported prior to crop of 1954
Source: USDA, AMS, "Cottonseed Quality Reports"

Table A-7 Cont. TEXAS COTTONSEED QUALITY BY DISTRICTS
All Data in Per Cent Except Average Grade

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
			District 3				
1944	17.9	4.14	10.0	.7	.9		101.0
1945	17.7	4.10	9.2	1.1	.8		100.0
1946	17.8	4.17	10.6	1.1	.7		100.5
1947	17.4	4.14	8.8	.6	.5		99.5
1948	17.9	4.25	7.5	.5	.5		102.0
1949	18.4	4.08	9.4	.5	.5		103.0
1950	19.4	3.98	7.8	.6	.9		106.0
1951	17.6	4.20	8.4	.5	.6		100.0
1952	17.3	4.20	7.5	.5	.8		99.6
1953	17.7	4.16	8.7	.6	.8		101.0
1954	17.1	4.17	8.1	.5	.7	12.4	99.0
1955	17.6	4.32	7.7	.6	.6	11.5	101.0
1956	17.7	4.25	7.7	.7	.6	11.6	101.0
1957	18.6	3.92	10.2	1.0	1.3	10.8	101.0
1958	18.4	3.96	9.6	.8	.9	11.7	102.5
1959	17.8	4.18	8.8	.6	.8	10.3	99.5
1960	17.7	4.08	9.0	.6	1.0	11.1	99.5
1961	18.3	4.04	9.7	.5	1.2	10.6	101.0
1962	17.4	4.11	9.5	1.4	1.3	10.4	95.5
1963P	17.1	4.23	7.8	.6	.7	11.5	99.5
			District 4				
1944	17.9	4.13	9.1	.6	.7		101.0
1945	18.6	3.86	9.6	1.0	.9		102.0
1946	17.4	4.01	10.7	.8	.7		98.0
1947	18.0	4.12	9.2	.6	.6		101.5
1948	18.1	3.98	7.5	.5	.6		101.0
1949	18.2	4.02	8.8	.6	.7		102.0
1950	18.7	3.76	9.9	.8	.8		101.5
1951	16.7	4.09	8.6	.6	.9		95.8
1952	17.0	4.27	6.7	.5	1.0		97.0
1953	18.0	4.20	7.8	.5	.9		101.5
1954	17.0	4.23	7.1	.5	.9	12.9	98.0
1955	17.4	4.23	8.2	.7	.8	11.6	100.0
1956	16.6	4.25	7.0	.8	1.3	11.1	95.0
1957	18.3	4.13	10.7	1.5	1.9	9.8	98.5
1958	17.4	4.08	10.6	2.7	1.4	10.4	92.0
1959	17.9	3.89	9.4	1.0	1.6	11.3	98.0
1960	17.4	3.93	9.6	1.4	1.2	11.2	90.5
1961	17.4	3.81	9.1	.7	1.5	12.4	97.5
1962	16.8	4.01	9.0	.9	1.9	12.0	95.5
1963P	16.8	4.13	7.3	.4	1.3	12.3	97.0

P - Preliminary
Note: Per cent linters not reported prior to crop of 1954.
Source: USDA, AMS, "Cottonseed Quality Reports."

Table A-7 Cont. TEXAS COTTONSEED QUALITY BY DISTRICTS
All Data in Per Cent Except Average Grade

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
				District 5			
1944	18.4	3.95	10.2	.7	.6		102.0
1945	18.6	3.68	11.3	1.8	.9		99.0
1946	18.0	3.74	12.1	.9	1.0		98.0
1947	18.2	4.01	10.1	.5	.8		101.5
1948	18.4	3.90	8.2	.5	.8		101.5
1949	19.0	3.68	10.7	2.6	.8		96.5
1950	18.8	3.64	11.7	1.6	.7		100.5
1951	17.2	4.03	9.6	1.4	.8		95.1
1952	17.7	4.16	7.2	.5	.9		100.3
1953	18.7	3.96	8.2	.9	.9		102.0
1954	17.6	4.18	7.7	.5	.9	11.8	100.5
1955	19.0	3.97	9.3	.9	.8	10.8	104.0
1956	18.0	4.30	7.7	.5	.8	10.2	101.0
1957	18.1	3.91	11.3	1.9	1.4	10.3	96.5
1958	18.4	3.87	11.9	4.6	1.0	10.1	87.5
1959	18.8	3.75	11.1	1.9	.9	10.5	98.5
1960	18.5	3.96	11.6	1.9	.7	9.8	96.5
1961	18.4	3.71	12.0	.9	1.0	10.5	98.0
1962	18.0	3.93	10.7	1.2	1.0	10.5	97.5
1963P	18.5	4.13	8.7	.8	.7	10.0	102.5
				District 6			
1944	19.9	3.94	9.0	.6	.8		108.5
1945	20.1	3.91	7.9	.6	.5		109.0
1946	19.5	4.01	8.8	.7	.8		106.5
1947	19.7	4.03	7.7	.6	.9		108.0
1948	20.3	3.95	7.8	.5	1.0		109.5
1949	20.6	3.92	8.1	.5	.6		111.0
1950	20.3	3.96	7.7	.7	1.4		109.0
1951	20.6	3.92	6.8	.6	1.0		108.5
1952	20.8	3.80	7.0	.6	1.2		109.7
1953	21.0	3.64	7.1	.5	1.7		108.5
1954	21.0	3.74	7.3	.5	2.0	11.4	110.5
1955	21.1	3.76	7.3	.6	1.7	11.2	110.5
1956	21.8	3.72	6.8	.5	1.5	12.4	114.5
1957	21.3	3.58	9.8	.7	1.6	11.3	109.5
1958	21.1	3.60	9.9	.7	1.2	11.4	109.5
1959	21.4	3.84	8.2	.5	1.0	11.2	113.0
1960	20.2	3.83	9.2	.4	1.2	11.2	107.5
1961	20.1	3.74	8.3	.4	1.0	11.9	108.5
1962	19.7	3.91	8.7	.7	1.9	11.7	106.0
1963P	19.2	3.91	7.9	.6	2.8	11.8	104.5

P - Preliminary
Note: Pre cent linters not reported prior to crop of 1954
Source: USDA, AMS, "Cottonseed Quality Reports."

Table A-7 Cont. TEXAS COTTONSEED QUALITY BY DISTRICTS
All Data in Per Cent Except Average Grade

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
District 7							
1944	17.6	4.29	9.4	.8	.5		101.0
1945	17.2	4.27	8.6	.8	.6		99.5
1946	17.4	4.23	10.2	.6	.4		99.5
1947	17.6	4.29	7.5	.6	.5		101.0
1948	17.4	4.31	7.9	.6	.6		99.5
1949	17.5	4.23	9.3	1.0	.9		99.5
1950	18.3	4.22	8.5	.6	.6		102.5
1951	17.7	4.28	8.1	.9	.5		102.8
1952	16.7	4.28	7.6	.7	.9		99.7
1953	17.3	4.26	8.4	.7	.8		100.5
1954	17.3	4.23	7.3	.6	.6	12.3	102.5
1955	17.6	4.33	7.2	.8	.7	9.9	99.0
1956	18.4	4.20	8.3	.7	.7	11.8	104.0
1957	18.2	4.00	10.2	.8	1.0	11.0	100.0
1958	18.3	4.06	10.2	.8	1.0	10.7	101.0
1959	18.0	4.15	8.6	.6	.9	10.4	100.0
1960	18.0	4.08	8.3	.5	.9	10.6	99.0
1961	17.9	4.00	9.6	.5	1.6	10.1	98.5
1962	17.1	4.17	8.7	.7	1.0	11.0	97.5
1963P	17.1	4.25	7.6	.6	1.1	11.3	99.5
District 8							
1944	17.8	3.93	10.1	.8	.4		99.5
1945	17.8	3.85	10.7	1.8	.5		96.5
1946	16.6	3.90	10.4	1.3	.5		92.5
1947	17.4	3.96	9.8	1.0	.4		98.5
1948	18.0	2.66	7.6	.4	.2		100.0
1949	18.4	4.05	9.9	6.4	1.0		80.0
1950	18.1	3.98	9.1	.8	.3		101.5
1951	17.4	4.03	8.6	3.6	.6		90.6
1952	16.8	4.20	7.9	.8	.6		97.0
1953	17.1	4.16	8.2	1.6	.5		96.0
1954	17.8	4.25	8.0	.8	.7	12.0	101.5
1955	17.1	4.19	9.0	1.5	.4	12.3	98.0
1956	17.2	4.21	9.6	.7	1.4	9.7	96.0
1957	19.0	4.06	8.2	.3	1.2	10.1	103.0
1958	17.3	3.91	12.1	6.1	1.1	11.0	78.5
1959	18.0	3.83	10.1	1.9	.8	11.2	97.0
1960	17.7	3.94	10.4	3.0	1.0	11.3	92.5
1961	18.2	3.76	10.1	.6	.8	12.3	101.0
1962	16.9	3.85	8.7	.6	1.0	12.8	97.0
1963P	16.8	4.05	9.6	.6	.7	11.4	96.0

P - Preliminary
Note: Per cent linters not reported prior to crop of 1954
Source: USDA, AMS, "Cottonseed Quality Reports."

Table A-7 Cont.   TEXAS COTTONSEED QUALITY BY DISTRICTS
All Data in Per Cent Except Average Grade

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade

District 9

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
1944	18.2	3.97	10.9	.8	.5		101.0
1945	18.0	3.83	11.4	4.1	.8		88.5
1946	17.8	3.89	12.2	7.2	.8		74.0
1947	18.5	3.92	10.0	1.6	10.0		99.5
1948	18.8	4.01	8.1	.6	.4		103.5
1949	18.6	3.77	10.6	5.4	1.0		84.0
1950	18.9	3.66	10.5	1.9	1.0		98.5
1951	18.1	4.02	9.8	3.7	.8		90.6
1952	17.8	4.10	9.0	.8	.6		100.4
1953	17.5	4.16	9.6	5.8	1.0		80.5
1954	17.5	4.22	9.0	.7	.5	10.9	100.0
1955	18.0	4.15	11.6	3.5	.6	9.3	87.5
1956	17.1	4.17	10.1	1.0	.3	9.5	95.0
1957	17.0	3.93	13.9	1.5	.5	8.9	89.0
1958	17.0	3.94	13.2	5.4	.8	10.0	75.0
1959	18.1	3.77	12.2	6.1	.9	9.7	80.5
1960	18.4	3.79	11.8	6.8	.7	10.1	78.0
1961	19.5	3.43	11.1	1.1	.5	11.2	102.5
1962	17.9	3.73	9.9	.8	.8	11.5	98.5
1963P	18.3	4.04	10.2	1.1	.7	10.4	99.5

District 10

Crop of	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Avg. Grade
1944	18.6	4.08	8.7	.8	.5		103.0
1945	18.7	4.13	8.6	.6	.4		104.5
1946	18.4	4.19	8.3	.9	.6		103.5
1947	18.6	4.00	10.1	1.6	.8		102.0
1948	19.3	4.19	7.7	.8	.6		107.0
1949	18.4	4.09	9.6	.8	.5		103.0
1950	18.5	3.78	10.5	.7	.7		101.5
1951	18.8	4.04	9.4	1.0	1.0		103.9
1952	17.9	4.14	9.7	.6	.6		100.8
1953	18.4	4.06	8.6	.6	.4		102.5
1954	18.3	4.07	10.2	.6	.6	11.2	102.0
1955	17.3	4.32	7.5	.8	.8	11.3	100.0
1956	19.1	4.00	8.1	.7	1.0	10.2	103.5
1957	--	--	--	--	--	--	--
1958	17.1	3.83	12.5	4.2	2.0	11.4	87.0
1959	18.1	3.98	9.2	.6	1.2	11.2	100.5
1960	18.3	3.82	7.4	.6	.8	12.2	102.0
1961	18.1	3.92	10.4	.6	.5	11.1	100.5
1962	18.3	3.93	8.7	.5	.5	12.2	102.5
1963P	18.2	3.98	9.6	.8	.5	11.8	102.0

P - Preliminary
Note: Per cent linters not reported prior to crop of 1954
Source: USDA, AMS, "Cottonseed Quality Reports."

Table A-8. U. S. COTTONSEED CRUSHED AND VALUE OF PRODUCTS
FOR SELECTED YEARS

| Year | Amount of Seed Crushed Tons | | Value of Products | |
	Total 1,000 Dollars	Average Per Mill	Total 1,000 Dollars	Average Per Mill
1859			741	105,857
1869			2,206	84,831
1879	235	5,222	7,691	170,909
1889	874	7,345	19,336	162,487
1899	2,479	6,718	58,727	159,151
1904	3,345	4,678	96,408	134,836
1909	3,269	4,001	147,868	180,989
1914	5,780	6,553	212,127	240,507
1919	4,013	5,644	581,245	817,503
1921	3,008	4,931	217,225	356,107
1923	3,308	6,473	226,388	443,029
1925	5,558	10,390	295,685	552,681
1927	4,654	8,508	276,338	505,189
1929	5,016	9,070	298,376	539,559
1931	5,328	10,571	181,347	359,816
1933	4,157	8,751	104,212	219,393
1935	3,818	8,336	187,887	410,234
1937	6,326	14,152	242,043	541,483
1939	4,151	9,286	171,476	383,616

Source: Bureau of the Census, Census of Manufactures, Cotton Production and Distribution.