Cottonseed

Texas Cottonseed Crushing Mills and Their Products 1965-66 Season

COTTON ECONOMIC RESEARCH
The University of Texas • Austin

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TEXAS COTTONSEED CRUSHING MILLS AND THEIR PRODUCTS

1965-66 SEASON

Cotton Economic Research
The University of Texas
Austin, Texas

A Part of

The Cotton Research Committee of Texas

PREFACE

The cottonseed oil mill is a doorway through which cottonseed must pass on its way to becoming the many useful products which have meant employment and revenue to Texans since cotton came to the state in the 1820's. The cottonseed oil mill divides the seed into its component parts which will find end uses both in the state and outside.

This report is based on material furnished by Texas cottonseed oil mills for the 1965-66 season, with comparative material from other sources. Work on this study was accomplished under Project 66-67-4 of the current fiscal year by the staff of Cotton Economic Research.

Appreciation is expressed to the Texas cottonseed oil mills which furnished this office with the information as to their operations. Appreciation is also expressed to Mr. Jack Whetstone, Texas Cottonseed Crushers' Association, and to Mr. Carl Cox, Director of The Cotton Research Committee of Texas, for reviewing this manuscript.

Cotton Economic Research
April 1967

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INTRODUCTION

The cottonseed oil mill is an integral part of the cotton industry. Mills take a surplus product and convert it into useful and valuable end and raw products for other segments of the cotton industry or other industries. The first oil mill officially recorded in Texas was located at High Hill in Fayette County in 1848 (2).[1/] Other records indicate that Leonard Groce built a crude cottonseed oil press on his land near Brenham in the year 1836 for his own use (2). From this early beginning, the number of oil mills in the state increased until the maximum was reached in 1914. Since then the number has decreased until there were only 48 active mills during the 1965-66 season at the time of this study.

At the end of the 1965-66 season, oil mills in the state were sent questionnaires asking for production, cost, employment and other figures. Personal interviews were also accomplished in line with this research project. Over 30 percent of the active oil mills participated by furnishing data for this project and the resulting report. Some limitation resulted in relation to cost and income data in that some reporting firms did not furnish these data. Most firms furnished the information requested, although there were some omissions involved.

Principal oil mill extraction processes utilized by cottonseed mills in the state were hydraulic press, expeller (screw) press, and solvent process. Batch type cookers were reported as being used in conjunction with the hydraulic oil mill presses. The continuous cookers were used primarily by mills using expeller presses and solvent process.

1/ Figures in parentheses refer to Reference List.

COTTONSEED QUALITY

Cottonseed oil mills are the first processing phase to affect the usage and value of cottonseed after the separation from the lint by the ginner. Cottonseed is a dependent product which is necessary in the production of cotton, yet its production in excess of planting needs results in a surplus. The surplus cottonseed is sold to the oil mill by the ginner as a raw product which, in turn, separates it into by-products which may be end-products or are other raw products that are processed further before reaching the end consumer.

The oil mill must first determine the quality and quantity of the seed delivered on the basis of the trading rules of the National Cottonseed Products Association (1). Official weighers and inspectors, or their deputies, inspect, sample, and weigh the incoming seed. The seed samples go to the chemist who determines the grade or quality which, together with the official weight, determines the amount which will be paid to the seller for the seed. The grade of a shipment of cottonseed is made up of the quantity index and quality index as determined by the chemist from the sample taken from the shipment. The quantity index is based on the amount of oil and linters present in the seed and the amount of linters on the seed. Ammonia is also a measure of the protein content. The quality index is a measure of the purity and is based on the amount of moisture present, the amount of free fatty acid in both the oil and seed, and the amount of foreign matter in the seed delivered to the oil mill.

The basis grade of cottonseed is 100, higher grades are those above 100, and lower grades are those below 100 as determined by the quantity and quality indices. If the cottonseed grade is below 40.0, the lot is

designated as a "below-grade cottonseed." The price paid for cottonseed is computed by multiplying the base price times the grade of the cottonseed times the official weight in tons (adjusted for any excess foreign matter over the allowable of one percent). The cost of transportation for the weight of the foreign matter in excess of one percent is assessed against the seller (1).

The oil and ammonia content which contribute to the quantity index vary according to the variety, location of growth, environmental conditions and the cultural practices employed during the growing and harvesting seasons. A grower should take care during the growing and harvesting seasons to preserve the oil and ammonia content of his seed to avoid anything which would increase its deterioration. The amount of linters on a seed, which is the last factor in determining the quantity index, is controlled by the ginner during the ginning process. The cotton ginner is usually interested in obtaining the maximum length of lint ginned for his customer. As a result, he may have his seed rolls set so tight that he may fracture the seed coat. This will damage the seed and scatter seed coat fragments in the lint which will reduce the value of the lint more than might have been gained in the attempt to attain a longer staple length. When the seed coat is damaged or broken, the rate of seed deterioration is increased and chance of germination is decreased. On the other hand, the seed rolls can be too loose so that the roll is lost. This loss causes down time and a loss of length on the lint even though there are more linters left on the seed. Thus an average should be strived for so that the cotton ginned will retain its length and the seed its linters and not damage the seed coat.

Climatic conditions at the time of harvesting may contribute to the presence of excessive moisture in the lint and on the seed which, in turn,

increases the free fatty acid present. Excessive moisture will not only increase the amount of free fatty acid present, it will also increase the rate and amount of seed deterioration. Foreign matter in the cottonseed delivered to the Texas oil mills is often excessively high; and as a result, the return to the ginner and farmer is decreased. The presence of excessive foreign matter in the cottonseed is a problem which a ginner should endeavor to overcome. Excessive moisture, free fatty acid, and foreign matter all reduce the return that a ginner and farmer will derive from the cottonseed sold to the oil mill.

Oil mill suggestions to ginners and farmers which would increase their revenue from the cottonseed sold to the Texas oil mills are:

1. Use better quality planting seed;
2. Use more fertilizer and irrigation;
3. Plant glandless seed;
4. Harvest cotton only when it is dry;
5. Use proper harvesting methods;
6. Do not defoliate early, but let crop mature;
7. Reduce trash in cottonseed at gin;
8. Reduce insect and rodent pellets in cottonseed at gin.

QUALITY OF TEXAS COTTONSEED

The cottonseed average grade is determined by the factors making up the quality and quantity indices as described previously. These factors, along with the average grade for the United States and Texas for the crop years 1954-55 through 1965-66 are shown in Table 1. These same data for the 10 crop reporting districts of Texas are in Table 17 in the Appendix.

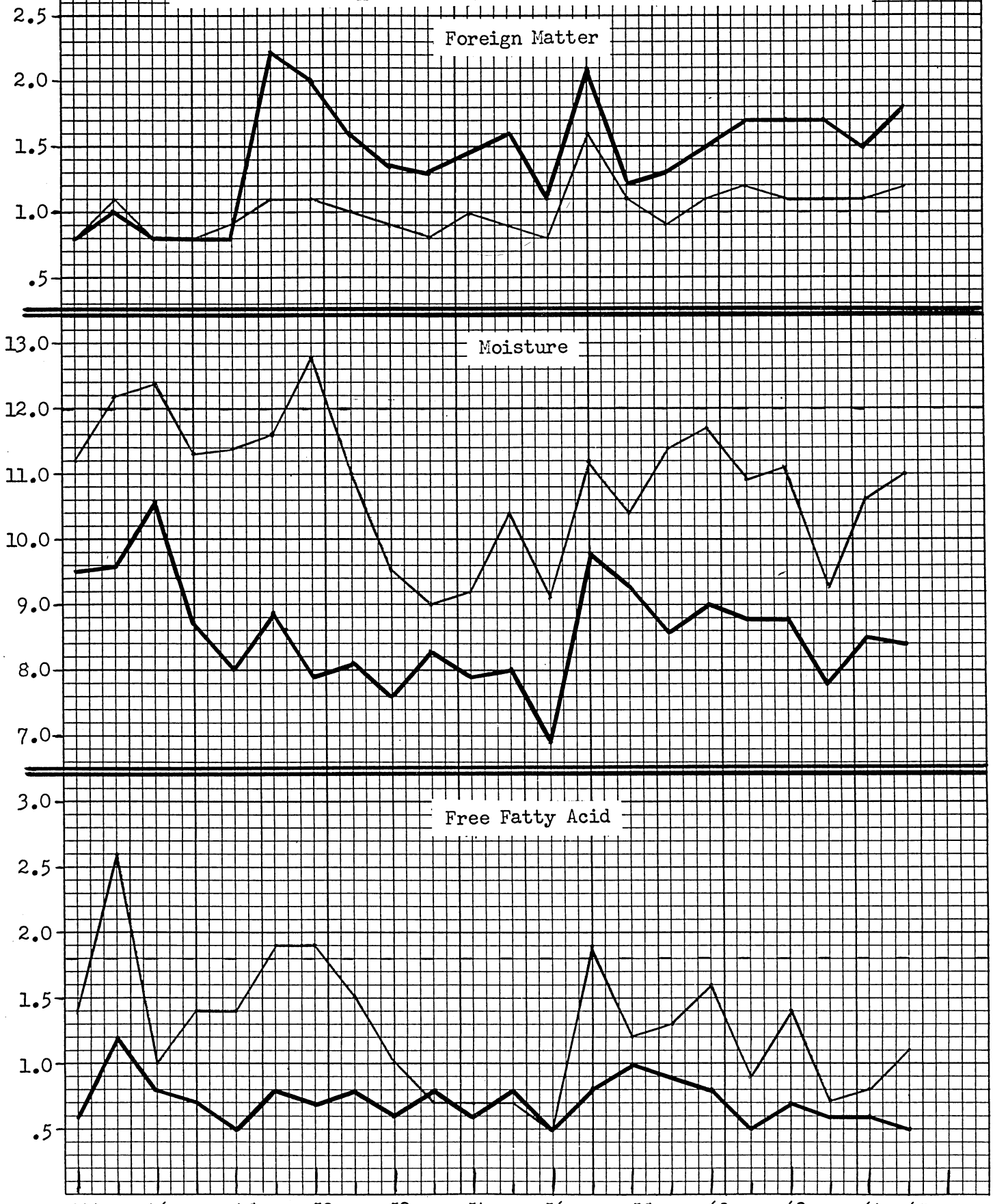
The amounts of foreign matter, moisture and free fatty acid in cottonseed which make up the quality index show Texas to be ahead of the United States average for all factors except the amount of foreign matter present (see Table 1). Excessive amounts of these three factors reduce the quality index, which in turn reduces the average cottonseed grade and thus the revenue to the ginner and grower. Since Texas is only above the United States average for the amount of foreign matter present, any effort made by the ginner to reduce this factor would result in an increase in the revenue. A pictorial presentation of these three factors in the determination of the quality index for the United States and Texas for the years 1944 through 1965 is in Figure 1. The percentage 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 acid (1.8%) are indicated by a dashed horizontal lines on the graphs. The percentage of foreign matter in Texas cottonseed exceeded the United States average beginning with the 1948 crop year and has been greater ever since. However, during the same interval, the amount of free fatty acid and moisture has been below the United States average. Foreign matter in Texas cottonseed has been below the United States average only nine percent of the entire period shown, while free fatty acid has been

Table 1. UNITED STATES AND TEXAS COTTONSEED QUALITY IN PERCENT FOR SELECTED YEARS

Year	% Oil	% Ammonia	% Moisture	% F.F.A.	% Foreign M.	% Linters	Avg. Grade
			United States				
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
1963	18.7	4.05	9.3	.7	1.1	10.3	103.0
1964	18.4	3.98	10.6	.9	1.1	10.4	100.5
1965	18.0	4.00	11.1	1.2	1.2	10.3	98.5
			Texas				
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
1963	18.3	4.11	7.8	.6	1.7	9.9	101.0
1964	18.2	4.08	8.5	.6	1.5	10.0	101.0
1965	17.8	4.11	8.4	.5	1.8	9.9	99.0
1966P	18.1	3.94	-	-	-	-	99.6

P - Preliminary.
Reference (6,7).

Figure 1. QUALITY FACTORS
TEXAS AND UNITED STATES PERCENT MOISTURE, FREE FATTY ACID, AND FOREIGN MATTER FOR SELECTED CROP YEARS



above the United States average only nine percent of the period and moisture has never been above the United States average for the period shown.

The percentages of oil, ammonia, and linters which determine the quantity index for Texas and the United States are shown in pictorial form in Figure 2. Oil and ammonia percentages are for the period 1944 through 1965, while percentages for linters are shown for the period 1954 through 1965 (these data are not available for the period prior to 1954). Oil in the Texas seed has been above the national average about 40 percent of the time for the period shown. Ammonia content has been above the United States average about 91 percent of the time. The only times that Texas cottonseed ammonia content has been below the United States average have all occurred after the crop year of 1954-55. Texas seed has been below the national average for linters 50 percent of the time.

The average grade of cottonseed produced in Texas and the United States for the period 1944 through 1965 is shown in Figure 3. The Texas average cottonseed grade has been below the United States average only 23 percent of the time, and these occurrences have all been since 1951.

Preliminary figures on Texas for the 1966-67 season indicate oil at 18.1 percent, up from the season earlier, and ammonia 3.94 percent, down from the preceding season. The Texas preliminary average grade for the 1966-67 season is 99.6 percent, up over last season's average of 99.0 percent (see Table 1).

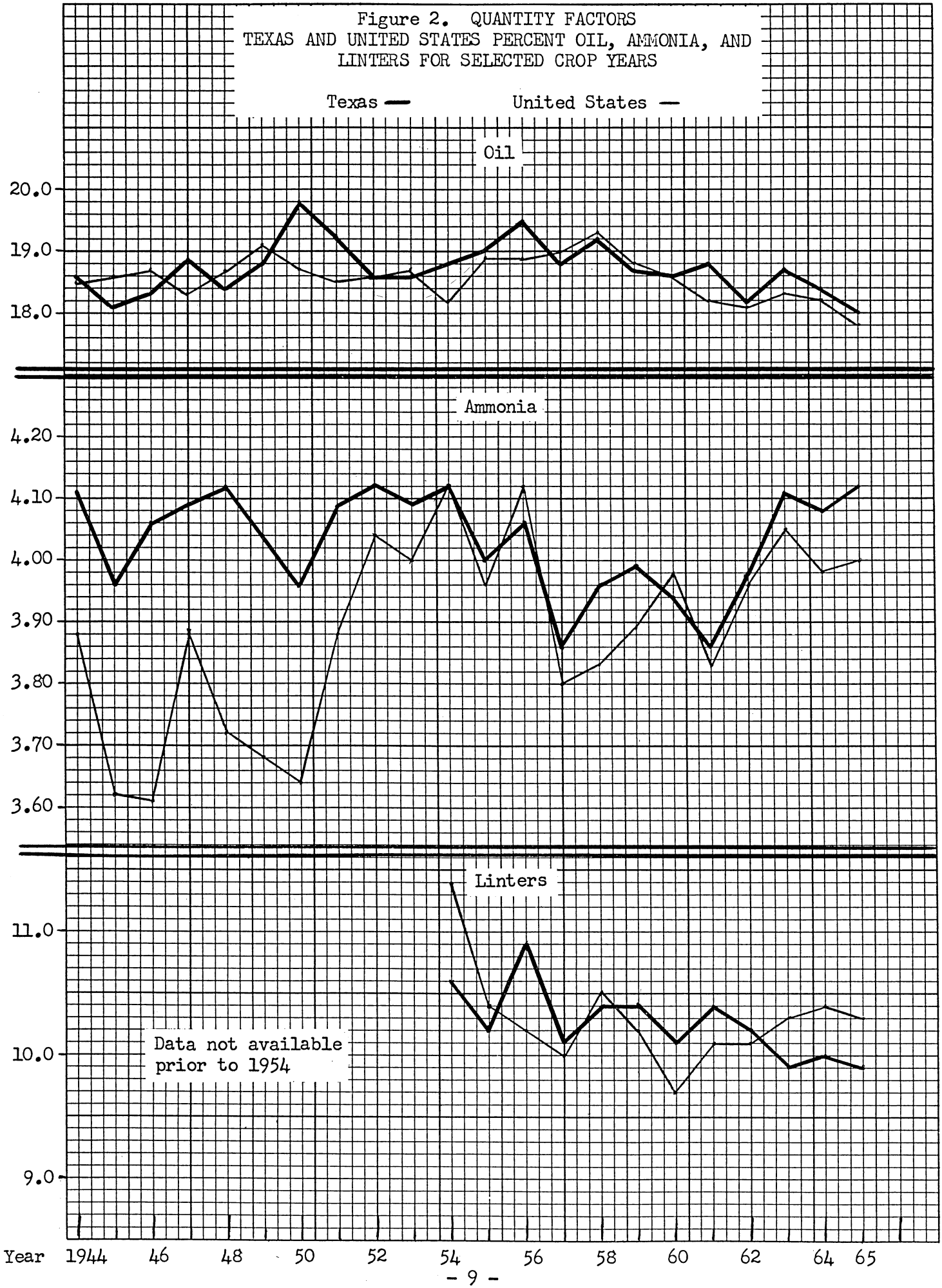
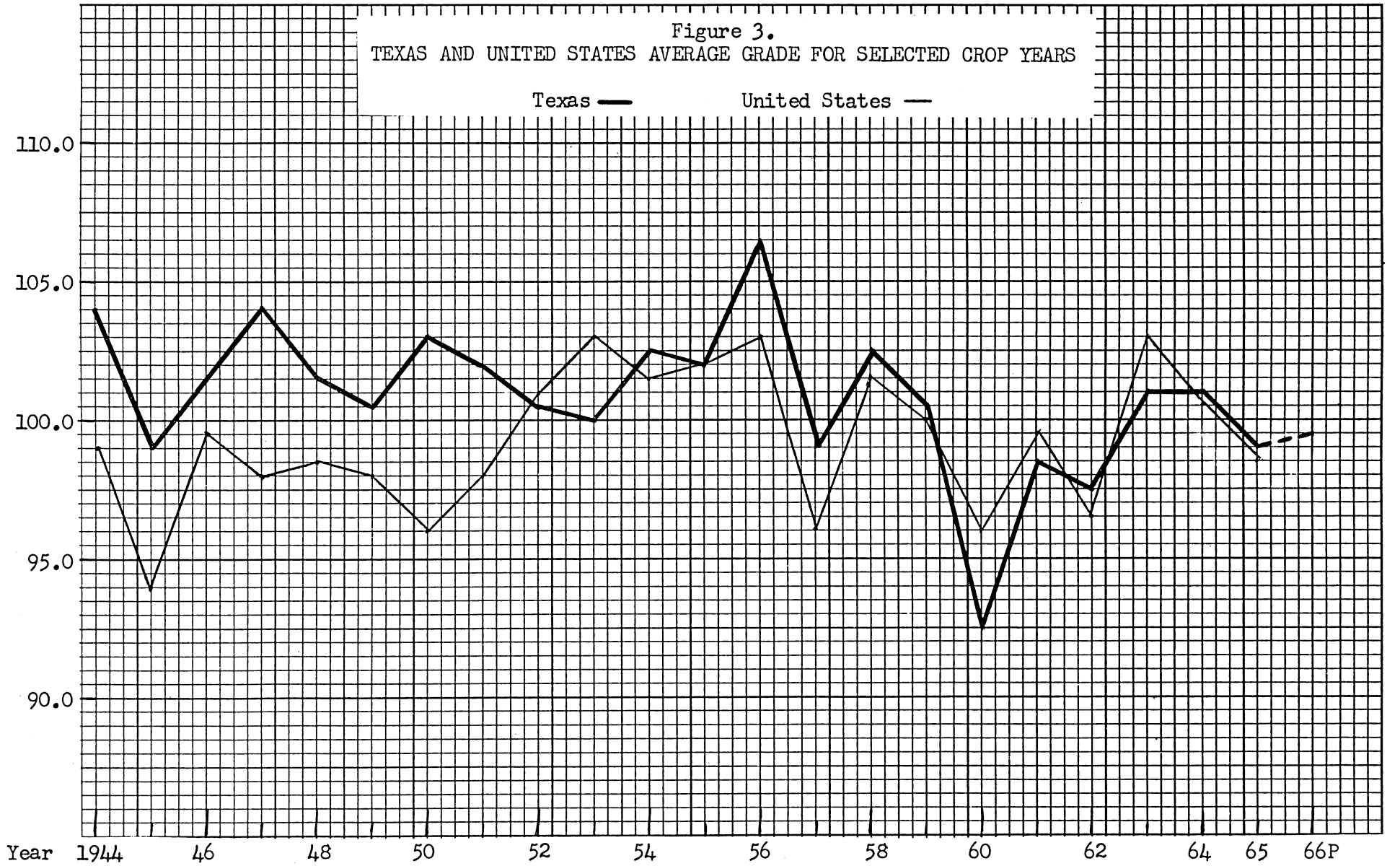


Figure 2. QUANTITY FACTORS
TEXAS AND UNITED STATES PERCENT OIL, AMMONIA, AND
LINTERS FOR SELECTED CROP YEARS
Texas —
United States —
Oil
20.0
19.0
18.0
Ammonia
4.20
4.10
4.00
3.90
3.80
3.70
3.60
Linters
11.0
10.0
9.0
Data not available
prior to 1954
Year
1944
46
48
50
52
54
56
58
60
62
64
65

Figure 3.
TEXAS AND UNITED STATES AVERAGE GRADE FOR SELECTED CROP YEARS



P - Preliminary

COTTON PRODUCTION

The United States cotton production for the 1966-67 season and the three previous seasons, along with similar data for the other major cotton-producing states, is shown in Table 2. United States production was down some 36 percent in the 1966-67 season as compared with the previous season. The 1966-67 Texas production was down 32 percent, California 28 percent, and Louisiana 20 percent. At the same time, production in Kentucky, Illinois, and Virginia was down more than 71 percent.

In the world picture, cotton production in the free world, excluding the United States, has been increasing almost every year for the past several decades, while the United States Production has been fairly constant. As a result, world supply also increased. However, world consumption has not increased at a rate equal to production which resulted in a large carryover, particularly as of August 1, 1966. The United States had the largest amount (some 16 million bales) of this carryover at the start of the 1966-67 season. The decreased United States production in the 1966-67 season should aid in the reduction of this abnormally large excess of supply.

The small United States production this season was due to the cotton acreage diverted under the 1965 Agricultural Act, assisted by the adverse weather conditions in many of the nation's cotton-producing areas. This explains many of the large reductions in percentages experienced by several of the cotton-producing areas. When cotton production decreased, the production of cottonseed also declined since it is a dependent product.

It is expected that the United States cotton production for the 1967-68 season will be above the 9.6 million bales for the 1966-67 season unless adverse weather again cuts production.

Table 2. COTTON PRODUCED FOR THE YEARS 1963 THROUGH 1966 IN THE UNITED STATES AND PRINCIPAL PRODUCING STATES, YEAR BEGINNING AUGUST 1, THOUSANDS OF BALES

	1963	1964	1965*	1966*
United States	15,290	15,149	14,916	9,557
Alabama	869	880	846	461
Arizona	842	799	783	512
Arkansas	1,494	1,577	1,445	764
California	1,729	1,781	1,718	1,243
Georgia	608	621	562	317
Louisiana	679	590	559	449
Mississippi	2,108	2,221	2,011	1,351
North Carolina	355	380	236	101
Oklahoma	329	281	358	211
South Carolina	467	569	505	288
Tennessee	645	671	627	363
Texas	4,384	4,057	4,631	3,150
All Others	781	722	635	347

* Ginnings to March 20.

Reference (10).

OIL MILL PRODUCTS

To have cottonseed products there must be cottonseed to crush. Texas cottonseed production for the period 1942-43 to date is shown in Table 3. The Texas oil mill data on cottonseed carryover, received, and crushed are also included in the table, along with the average price per ton received by the farmers for the seasons listed. The 1966-67 season production is the smallest since the 1950-51 and 1948-49 seasons and the World War II years of 1943 through 1947. Texas produces nearly one-third of the nation's total cottonseed as it does cotton. United States cottonseed production,

Table 3. 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
1945-56	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	1,823	140,657	1,765,005	1,839,023	52.60
1964-65	1,745	66,639	1,691,621	1,681,676	47.50
1965-66	1,966P	76,584	1,744,408P	1,761,500P	46.89P
1966-67	1,310E	59,492P	1,202,900E		67.50P

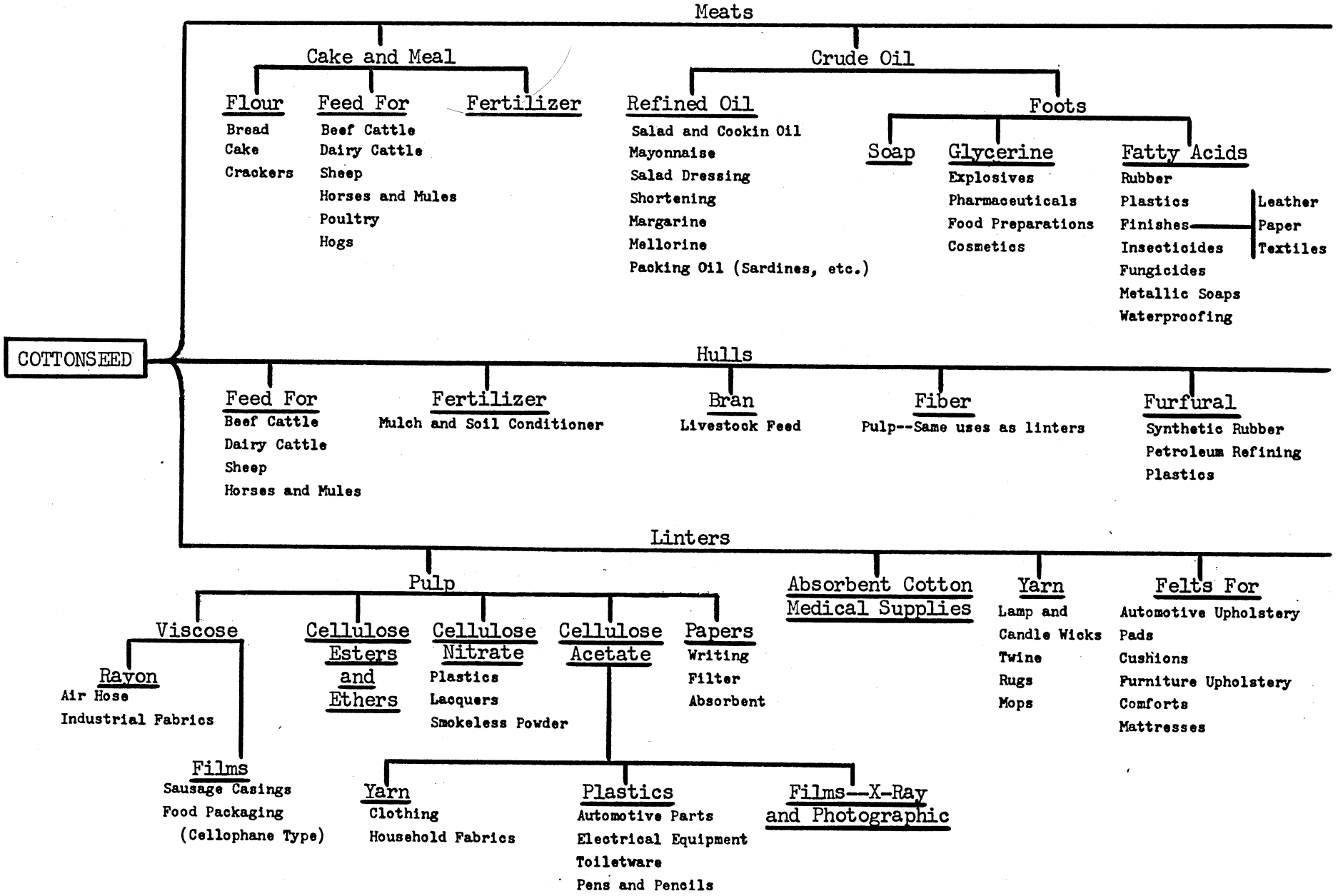
P - Preliminary E - Estimated Reference (8,11).

carryover, received and crushed figures for the same selected years are in Table 18 in the Appendix.

The cottonseed oil mill takes the cottonseed as it comes from the gin and reduces it to the four major by-products of oil, cake and meal, hulls, and linters. These by-products have many and varied end uses. See Figure 4. Cottonseed oil is used in the manufacture of margarine, shortening, salad and cooking oils, and non-food uses. Cake and meal are used in and as livestock feed, fertilizer, flour for human consumption, etc. The hulls are used in livestock feed, fertilizer, mulch, stuffing, packing, etc. Linters are divided into two basic divisions--"felting linters" and "chemical linters." Felting linters represent 39 percent of the total and are used for mattresses, automotive, furniture felting, stuffing and padding, paper, and yarn. Chemical linters, making up 60 percent of the total, go to the "bleachers." The bleachers convert the linters to cellulose pulp for the manufacture of plastics, paper, lacquers, sausage casings, cellulose ethers and nitrocellulose products such as explosives and film.

The Texas production of these four major by-products is given in Table 4 for the 1942-43 season to date. The Texas oil mill production of cottonseed oil for the period 1942-43 through 1962-63 has averaged over 29 percent of the national production for this interval, while the production of Texas cake and meal amounted to over 28 percent of the national total. During this same period, Texas oil mills produced nearly 31 percent of the nation's hulls and over 27 percent of the linters. United States linters supply and distribution data for the same selected years is in Table 19 in the Appendix. The high percentage of the nation's hulls, cake and meal produced and sold in the state is not just because of the large production of seed, but is also due to the large livestock population in

Figure 4.
COTTONSEED PRODUCTS AND THEIR MANY USES



Source: Cottonseed and Its Products, Seventh Edition 1966, National Cottonseed Products Association, Inc.

Table 4. TEXAS PRODUCTION OF COTTONSEED BY-PRODUCTS FOR SELECTED YEARS

Year Beginning Aug. 1	Oil in 1,000 of Pounds	Cake & Meal in Tons	Hulls in Tons	Linters in Bales*
1942-43	300,135	451,339	258,960	308,286
1943-44	287,475	466,717	226,217	284,363
1944-45	286,811	442,183	215,700	281,104
1945-46	211,784	325,123	163,306	221,803
1946-47	191,795	297,746	140,452	214,852
1947-48	375,514	569,391	275,556	398,973
1948-49	370,841	569,567	275,176	378,811
1949-50	606,379	910,863	451,735	539,347
1950-51	386,169	558,633	285,133	352,934
1951-52	489,429	722,766	344,414	445,817
1952-53	502,899	732,544	352,530	428,432
1953-54	572,571	814,695	398,773	499,312
1954-55	541,841	541,841	373,492	441,878
1955-56	520,565	699,655	366,837	416,750
1956-57	481,203	653,917	331,362	403,064
1957-58	490,765	673,901	375,184	401,237
1958-59	585,157	810,157	437,838	481,012*
1959-60	592,706	802,830	447,020	484,422
1960-61	582,140	777,805	455,957	467,147
1961-62	613,508	814,866	520,938	507,166
1962-63	628,377	879,560	506,476	485,092
1963-64	592,982	855,099	462,722	426,786
1964-65	546,762	792,692	419,725	401,261
1965-66**	564,200	827,600	439,500	424,300
1966-67***	212,900	318,400	172,700	183,000

* 600-pound bale average 1958 through 1966, running bales of varying size for prior years.
** Preliminary.
*** Partial.

Reference (8,11).

the state that represents a built-in market for these products. The average oil mill in the state sold their production of cake and meal as follows: 46.9 percent as meal, 32.6 percent as pellets and cubes, 8.5 percent as meal or hull mixture, 7.6 percent as cracked cake, 3.5 percent in mixed feed, and the remaining .9 percent as slab. A few oil mills also operate a feed mill in connection with their oil mill operation.

The oil and linters produced in the state find their markets, for the most part, in areas outside the state boundaries; however, cake and meal and hulls have their primary market within the state. This is substantuated by the figures below that were furnished by the Texas oil mills.

Texas Cottonseed Products Sales Areas

Area of Sales	Cake & Meal	Hulls	Oil	Linters
Locally	1	1		
Texas	2	2	3	3
Regionally*	4	3	4	4
Nation-wide	3		1	1
International			2	2

* Texas adjacent states.
Note: 1 - main market, 2 - second market, 3 - third market, 4 - fourth market.

Cottonseed oil mills came into prominence in the United States after the Civil War. This was because of the various problems encountered in the development of efficient equipment for delinting, cracking, or opening the hulls and the extraction of the oil from the kernel. This equipment was not developed until this period, even though small amounts of oil had been extracted previously. The number of oil mills in the nation increased rapidly from the Civil War until 1914 when the maximum of 882 mills was reached. Since 1914, the individual oil mills have become more efficient through the use of new and modern machinery with greater capacities. In the 1920-21 season, the number of active oil mills in the United States had declined to 675, of which Texas had 28 percent for a total of 193 mills. By the 1949-50 season, the number of oil mills in Texas had decreased to 101 mills which represented 30 percent of the nation's total of 335 mills. In the 1963-64 season, the number of oil mills in the nation had decreased to 188, of which Texas had 30 percent, or 56 active mills. Only 48 Texas mills were reportedly active during the 1965-66 season.

The increased capital requirements, improved oil mill machinery, and demand and utilization of cottonseed products have all contributed to the reduction in the number of oil mills. These factors have also increased the percentage of the crop crushed per mill and the number of pounds of the four by-products produced per ton of seed crushed over the years since 1914. The percentage of the cottonseed crop crushed, along with the number of pounds of the four by-products produced per ton of seed crushed, are in Table 5. The annual percentage of seed crushed has gone from 5 percent for the 1872-76 period to 90 percent for the 1942-63 period. Oil has always been the primary by-product, and the amount of oil extracted per ton of seed crushed has increased. Cottonseed cake and meal has been the secondary product because of its value as a livestock feed. Here, as with oil, the amount produced from a ton of seed has increased; but there has been some regression during various periods in the overall interval covered in the table. The amount of hulls produced per ton of seed has apparently been decreasing, but it should be remembered that the improved oil mill machinery made it possible to remove more linters, oil, and cake and meal from the hulls than was possible earlier. During the earlier periods of cottonseed crushing in the nation, more of these materials stuck to the hulls; and as a result, were considered part of the hulls.

A comprehensive comparison between the Texas and United States average number of pounds of linters, oil, hulls, and cake and meal for the crop years 1942-43 through 1966-67 is contained in Table 6. Texas has been producing less oil and linters per ton crushed than the national average. However, Texas has produced more hulls per ton than the United States average since the 1950-51 crop year. Texas production of cake and meal per ton of seed exceeded the national average for the period 1942-43 through 1952-53

Table 5. FIVE-YEAR AVERAGES FOR UNITED STATES COTTONSEED PRODUCTION, CRUSHINGS AND COTTONSEED BY-PRODUCTS DERIVED FOR THE YEARS 1872 THROUGH 1941

5 Years Beginning 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 % Production	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
1942-63**	5,410	4,850	89.7	794	326	2,245	923	1,108	458	444	182

* Data from 1899 to 1901 only.
** Twenty-one year aveage.
Reference (11).

Table 6. AVERAGE NUMBER OF POUNDS OF PRODUCTS OBTAINED PER TON OF COTTONSEED CRUSHED FOR TEXAS AND THE UNITED STATES

Crop Year	Crude Oil		Cake & Meal		Hulls		Linters		Total		Waste	
	U.S.	Texas	U.S.	Texas	U.S.	Texas	U.S.	Texas	U.S.	Texas	U.S.	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	333	328	937	915	464	525	171	152	1905	1920	95	80
1963-64	336	322	948	930	455	503	171	146	1910	1901	90	99
1964-65	338	325	936	943	458	499	176	151	1908	1918	92	82
1965-66E	331	320	940	940	453	499	175	150	1899	1909	101	91
1966-67E	330	322	946	960	450	523	180	166	1906	1971	94	29
20-Year Average 1942-62	326	322	923	931	458	480	183	173	1890	1906	110	94

E - Estimated.
Reference (8,11).

and again for the last three seasons, but Texas figures fell below the national average for the period 1953-54 through 1963-64 except during the 1958-59 season.

Based on the material furnished by the oil mills in the state, the products produced per ton of seed crushed for the 1965-66 season are given below in percentage and in pounds per ton of seed crushed.

Products Per One Ton of Seed Crushed

Product	Pounds	Percent of Total
Oil	315	16
Cake and meal	979	49
Linters	145	7
Hulls	532	27
Other (motes, waste)	29	1
Total	2,000	100

BY-PRODUCT UTILIZATION

Early cottonseed oil utilization in the United States was primarily in the manufacture of soap. The next largest usage of cottonseed oil was in the manufacture of salad oil, although the French and the Italians were the first to use cottonseed oil in large quantities for edible end uses in place of olive oil. Another early use in the United States for cottonseed oil was in illumination, but this was not a major use. This oil is still used for medicinal purposes, but the percentage of oil going to this use is small.

The major use of cottonseed oil is for edible oil. Domestic utilization figures for these end-products for the period 1932 through 1965 are in Table 7. Shortening was the major end-product of cottonseed oil from 1940 to 1946. In 1947, the utilization of cottonseed oil in the manufacture of salad and cooking oils and spreads took over the lead.

United States export data for cottonseed and cottonseed oil for the period 1930 through 1965 are in Table 8. Total oil exports have increased over the period shown, and the 1964 figure of 8,347 million pounds is nine times the figure for 1930. Cottonseed oil exports fluctuated from 1930 to 1946 without any real trend in evidence. From 1947 through 1964, cottonseed oil exports increased about 21 times. The exports of cottonseed increased from 1940 until a high of 42 million pounds was reached in 1954. Since 1954, the amount exported has generally decreased with large annual fluctuations. The absence of a definite and continuous trend toward increased exports and domestic utilization of cottonseed oil is not because of any lack of demand or consumption of fats and oils, but is due to the fact that the production of cottonseed and oil is limited to the production of cotton

Table 7. UNITED STATES DOMESTIC 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	817	112	6	1,379
1963	103	351	827	95	11	1,387
1964	103	365	982	107	16	1,573
1965P	120	460	1005**	105	10	1,700

* Crop year beginning in August for years after 1946.
** Includes unreported disappearance.
P - Preliminary and partly estimated.
Reference (7).

Table 8. UNITED STATES 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***	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	22	374	6,007	6.6
1963	15	483	6,551	7.6
1964	7	701	8,347	8.5
1965P	9	348	7,721	4.6

* Calendar year. Includes oil equivalent of cottonseed, soybeans, peanuts and flaxseed exported for crushing abroad. Includes commercial exports, voluntary or civilian relief, re-exports, shipments to United States Territories. In 1942 and 1943, includes shipments by USDA.

** Not separately classified prior to July 1941.

*** Year beginning in August for 1947 on.

P - Preliminary.

Reference (3,8).

since the seed is a dependent product. The increasing supply of all food fats and oils with annual production and consumption figures for the United States covering the period 1956 through 1966 are shown in Table 9. This increase is further indicated by the data in Table 10 which shows United States major edible fats and oils production and consumption for the period 1935 through 1965. It can be noted that the production of butter has decreased, lard has held its own, cottonseed oil is still about the same and soybean oil has increased phenomenally to supply most of the needs of the increased consumption during the period.

Utilization of a product also depends on the price. The average annual United States wholesale price in cents per pound for coconut, corn, cottonseed, olive, soybean and peanut oils is in Table 20 in the Appendix.

Cake and meal utilization has been primarily for livestock feed. Here again, the production of cottonseed cake and meal is dependent on the production of cotton. As a result, production of cottonseed cake and meal has not been able to increase annually to match the increased requirements necessary to feed the increased livestock population. The increased demand has been met by increased production of soybean cake and meal. This is true not only for domestic usage, but also in the export market. Increased production of soybean cake and meal is possible since they are not dependent products. The data on United States production and distribution of the major oilseed cakes and meals for the period 1962-63 through 1966-67 (preliminary) are in Table 11. The price of cottonseed cake and meal in dollars per ton bagged in carlots at the Fort Worth market is given in Table 21 in the Appendix.

Cottonseed hulls are primarily used for livestock feed and, like the other cottonseed by-products, are dependent on the production of cotton.

Table 9. SUPPLY AND DISPOSITION OF FOOD FATS AND OILS FOR THE UNITED STATES, MILLIONS OF POUNDS, YEAR BEGINNING IN OCTOBER

	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965*	1966**
Stocks, October 1	889	834	828	906	1,021	1,567	2,014	2,500	1,625	1,072	1,210
Imports	52	70	74	66	81	91	55	73	50	63	60
Production	10,857	10,762	11,909	12,654	12,472	13,416	14,049	14,005	14,348	14,894	14,050
Total Supply	11,798	11,666	12,811	13,626	13,574	15,074	16,118	16,578	16,023	16,029	15,320
Exports	2,903	2,593	3,323	3,880	3,168	4,082	4,350	5,078	5,139	4,513	--
Total Use for Food	7,886	8,145	8,389	8,438	8,560	8,602	8,849	9,607	9,285	9,958	--
Total Use for Non-Food	202	100	196	291	284	375	393	262	--	--	--
Per Capita (Civilian and Military) Per Lb.											
Butter	6.9	6.8	6.6	6.1	6.1	6.1	5.7	5.9	5.3	4.9	--
Other	37.7	38.5	39.4	39.3	39.2	38.7	39.8	42.9	41.2	44.6	--
Total	44.6	45.3	46.0	45.4	45.3	44.8	45.5	48.8	46.5	49.5	--

* Preliminary.
** Forecast.

Reference (8).

Table 10. MAJOR EDIBLE FATS AND OILS PRODUCED IN THE UNITED STATES AND CIVILIAN CONSUMPTION OF FATS AND OILS, MILLIONS OF POUNDS

Year Beginning October	Animal Origin		Vegetable Origin				Used in Products for Civilian Consumption - Includes Imports		
	Butter		Cottonseed			Corn*	Food Products	All Products	
	All	Lard	Crude	Soybean	Peanut	Crude	Total**	Total**	Per Capita**
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	5,091	100	380	8,402	13,117	71.4
1963	1,454	2,482	1,939	4,822	90	400	8,641	13,422	71.9
1964	1,423	2,210	2,001	5,146	NA	NA	8,002	13,974	73.8
1965P	1,175	1,875	1,952	5,725	NA	NA	9,143	13,986	72.9

Note: Per Capita in units of pounds.
* Calendar year prior to 1946.
** Including only fat content of butter and margarine.
Reference (3,8).

P- Preliminary and estimated.
NA - Not available.

Table 11. UNITED STATES SUPPLY AND DISTRIBUTION OF OILSEED CAKE AND MEAL, THOUSANDS OF TONS, YEAR BEGINNING IN OCTOBER

	Supply				Distribution		
	Stocks October 1	Production	Imports	Total	Feed	Other Uses*	Exports
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	0	69	67	--	--
Copra	--	101	9	110	110	--	--
Total	202	14,385	52	14,639	12,638	60	1,613
1963-64							
Soybean	159	10,609	--	10,768	9,138	30	1,478
Cottonseed	160	2,729	30	2,919	2,696	30	54
Linseed	7	399	1	407	327	--	61
Peanut	2	79	--	81	79	--	--
Copra	--	93	--	93	93	--	--
Total	328	13,909	31	14,268	12,333	60	1,593
1964-65							
Soybean	122	11,286	0	11,408	9,236	30	2,036
Cottonseed	139	2,768	20	2,927	2,680	30	139
Linseed	19	372	1	392	306	--	73
Peanut	2	98	--	100	98	--	--
Copra	--	101	--	101	100	--	--
Total	282	14,625	21	14,928	12,420	60	2,248
1965-66**							
Soybean	106	12,907	0	13,013	10,312	30	2,537
Cottonseed	78	2,603	45	2,726	2,533	30	99
Linseed	13	396	1	410	284	--	114
Peanut	2	107	--	109	108	--	--
Copra	1	108	--	109	109	--	--
Total	200	16,121	46	16,367	13,346	60	2,750
1966-67***							
Soybean	134	13,750	0	13,884	11,000		
Cottonseed	64	1,950	75	2,089	1,975		
Linseed	12	400	--	412	325		
Peanut	1	110	--	111	110		
Copra	--	125	--	125	125		
Total	211	16,335	75	16,621	13,535		

* Estimated quantities of soybean meal used for industrial purposes and cottonseed meal used for fertilizer on farms of cotton growers.
** Preliminary.
*** Forecast (except for stocks) - based on indications in October 1966. Reference (9).

The bulkiness of hulls and the freight rate on such items precludes the long distance shipment of this product. Consequently, hulls generally find usage locally as livestock feed, etc. The bulk carlot price for cottonseed hulls at Fort Worth for a selected period of years is given in Table 21 in the Appendix.

Sixty percent of cottonseed linters, as stated previously, goes to the bleacheries for conversion to cellulose pulp for chemical usage, while 39 percent goes to the felting industry. Since linters are baled similar to cotton, they can be, and are, shipped all over the United States and the world. Although the United States exports linters annually, there are often more linters imported than exported since the United States supply of linters is limited by the cotton produced and the demand exceeds the production. Imports exceed exports in those years during which the United States was engaged in war or conflict. During those years, linters are used as a source of nitrocellulose for smokeless powder. The average price per pound for linters for a selected period of years is in Table 21 in the Appendix.

OPERATING CHARACTERISTICS OF TEXAS OIL MILLS

Storage and Value

Oil mill operation is seasonal for the most part as large quantities of seed only become available beginning in July. Operations may extend into February depending on the location of the oil mill in the state. Thus an oil mill must store cottonseed for crushing at a later date since it is impossible to crush all the seed as soon as it arrives. The state's oil mills store cottonseed in three major types of facilities--muskogee seed storage houses, silo (tank) storage, and open yard storage--depending on the mill location. The mills in the western and northwestern parts of the state are the prime users of open yard and muskogee seed houses for seed storage. In the rest of the state, muskogee houses are the first choice. Silo or tank storage is not widely used for seed storage in any of the areas of the state. The average state-wide muskogee storage capacity is some 35,000 tons per mill, or 11,800 tons per muskogee house, with about three muskogee houses per mill. Average open yard storage is approximately 33,000 tons of capacity per mill for those mills employing this type of storage.

During the 1965-66 season, the average state-wide mill storage capacity represented a little over 54 percent of the volume crushed in the state. Individual mill rates for storage capacity as a percentage of the volume they crushed ran from 37 percent to a high of 100 percent. Based on the 1965-66 cottonseed crop, the state-wide average number of tons of seed purchased would amount to over 36,500 tons per active mill during the season. None of the mills reporting indicated the purchase of cottonseed from sources outside the state.

The average replacement value of the Texas oil mill based on the replies is estimated at $2,091,000 each. The estimated total replacement value of all active oil mills in the state for the 1965-66 season is nearly $100 million. The size, amount of equipment, and method of extraction employed by a mill determines the replacement value of the mill. The average replacement value of an oil mill using hydraulic presses is estimated at over one-half million dollars each, while a mill using expeller presses has an estimated replacement value of over $1\frac{1}{4}$ million. A solvent mill has the most costly replacement value of all.

The oil mills indicated that over 80 percent of their fixed assets for the 1965-66 season before depreciation was in the form of buildings and processing equipment. Land represented nearly five percent; and the remainder was composed of other fixed assets such as trucks, autos, office furniture, etc.

Crushing Capacity

Machines used to remove the linters from the cottonseed are called delinters. The average number of delinters per mill was 32 with an average of 141 saws to the delinter.

Texas oil mills equipped with hydraulic presses for oil extraction indicated they crush an average of 73 tons per mill for a 24-hour period, while the mills using expellers average about 121 tons per 24-hours. On a state-wide average for all types of mills, the 24-hour average crushing capacity per mill was estimated at 215 tons for the 1965-66 season. Based on 48 active mills, the state's 24-hour estimated total crushing capacity would amount to 10,320 tons.

The cottonseed crushing industry is much like the steel industry in that the most efficient operation is on a 24-hour basis, seven days a week.

Heat is the key in both instances, for when the oil mill shuts down, the heat in the plant equipment is lost; and before operation is started again, the equipment must be reheated. Thus the maximum annual crushing capacity for the state's oil mills at 100 percent efficient utilization would be the daily 24-hour crushing of 10,320 tons times 365 days or an estimated 3,766,800 tons annually.

Texas oil mills received cottonseed throughout the year during the 1965-66 season although less than .05 percent was received in the month of April. The largest monthly total was in December with 31.4 percent. The peak receipt months for seed in Texas are October through January.

The amount crushed during the season was more evenly distributed throughout the year. The peak crushing month follows the peak receipt month, thus for the 1965-66 season, January was the peak month for crushing during which over 12 percent of the total was crushed. The lowest crushing month for Texas oil mills during the season was August with five percent of the season total being crushed in that month. The following table shows the percent of the total that was received and crushed by months:

Month	Percent Received/Month	Percent Crushed/Month
August	13.8	5.0
September	8.8	5.4
October	9.9	8.5
November	17.0	10.3
December	31.4	11.7
January	14.3	12.5
February	1.9	10.9
March	2.1	10.9
April	*	7.4
May	.1	6.7
June	.3	5.6
July	.4	5.1
Total	100.0	100.0

* Less than .05 percent. Reference (8).

The supply of locally available seed and the price determine the length of time that a mill will crush. When a mill must pay premiums to obtain seed and/or haul it great distances, it no longer becomes economically feasible to operate year around, or even to operate at all if the seed supply is low in an oil mill area. This reason was reported by one mill which was not active during the 1965-66 season and by others which did not know if they would operate during the 1967-68 season.

Using the maximum 24-hour daily Texas crushing capacity of 10,320 tons, in 1965-66 it would have been possible to crush the entire Texas cottonseed crop in 171 days of continuous operation. If the same daily crushing capacity applies, it would be possible to crush the 1966-67 Texas crop in 127 days of continuous operation. Actually, the Texas mills used more days to crush the 1965-66 crop than the calculated 171 days because many did not operate seven days a week and/or they did not crush 24 hours a day during their entire period of operation. Oil mills in the state operated 73.4 percent of the total season at effective utilization rate of 79 percent of their maximum daily potential to crush the 1965-66 crop, and it is estimated that they will operate 54.2 percent of the entire 1966-67 season at an effective utilization rate of 78 percent of their maximum daily potential.

During the 1949-50 season, 101 mills were active in Texas. These mills had a 10-month capacity of 2,765,590 tons which would amount to 3,318,708 tons for 12 months of operation. These mills in 1949-50 were operating at 70.2 percent of their 10-month capacity which would be 58.5 percent of capacity on a 12-month basis. In the 1949-50 season, the state's average daily mill crushing capacity was 91 tons per day per mill (5). When this is compared with the 1965-66 figure of 215 tons,

the daily average mill crushing capacity in the state has increased nearly $2\frac{1}{2}$ times over the 16-year period.

The length of operation for the Texas oil mills during the 1965-66 season was:

Percent of Mills	Months of Operation
33	1 to 6
37	6 to 9
30	9 to 12

Employment

The oil mills in Texas during the 1965-66 season employed nearly 3,000 workers for an average of 62 employees per mill. The oil mill employment for the 1966-67 season was down five percent on a state-wide average. Some mills reported employing the same number of workers for both seasons, some reported a reduction in 1966-67, and others indicated an increase in employment. This points out that although the amount of cottonseed available for crushing decreased some 29 percent during the 1966-67 season, the oil mills do not reduce the number of workers in proportion to reductions in seed production as can be done with seasonal cotton workers at the farm level. The number of required hourly workers in an oil mill remains the same in most cases. Instead, the mills reduced the length of time (shorter crushing season) involved in the crushing operation by about the percentage of decrease in the seed production this season.

During the 1965-66 season, the oil mills indicated that on a state-wide average, over 58 percent of their employees were permanent and the other 42 percent were temporary generally employed during the peak receiving and crushing months of the season. During a typical crushing day (24-hour operation) the average man-hours distribution in an oil mill according

to the different phases of operation were:

Operation	Percent of Total Mill Man-Hours Per Operation*
Moving seed to and from storage	9.9
Seed cleaning	10.6
Linter room (including saw filers, changers, and oilers)	13.0
Bale-press room	4.3
Huller-separation room	2.3
Press room or oil extraction	14.6
Meal room	13.8
Hull storage and loading	1.2
Boilerroom	.2**
Yard and cleanup	2.6
Maintenance	4.0
Superintendent and lab personnel	9.6
All others	13.9
Total	100.0

* 24 hours of operation.
** 70 percent of mills indicated boilers were automatic.

The average man-hours per ton of seed crushed for the 1965-66 season based on oil mills reporting was 1.88.

Operating Costs

Cost for selected items involved in oil mill operation was furnished by reporting mills for the 1965-66 season. The average cost to the oil mill per ton of cottonseed purchased during the season is estimated at $65.76. The cost per ton of seed crushed for selected operation costs for the 1965-66 season is in Table 12.

The cost of direct labor involved in the actual processing of cottonseed into its by-products amounted to over 27 percent of the operating costs listed. The second largest category is "other--general" which includes such items as warehouse expense, advertising, insurance, travel, etc. The total average cost per ton of seed crushed for those selected costs amounted to $12.59 for the season.

Table 12. SELECTED OPERATING COSTS IN DOLLARS PER TON OF SEED CRUSHED

Item	Dollars Per Ton
Direct labor	$ 3.45
Repairs	1.93
Electric power	1.15
Fuel	.34
Taxes	.39
Packaging	1.34
Trucking	.51
Administration	.58
Other--general	2.90
Total	$12.59

Original data.

The Bureau of Census reported that the cottonseed oil mills in the United States in 1965 spent $6.5 million on new equipment, structures, etc. It should be noted that this amount was one-third of their capital expenditures for 1963. In 1965, the soybean oil mills invested $17.5 million for plant and equipment expenditures.

The costs of operation are expense items which the Texas oil mills pay in order to develop products which will be purchased by the next user or end-use consumer. In other words, these expenses, when paid by the mills, result in revenue or increased business to the state. The per-ton costs for these selected cost items have been expanded on the basis of the estimated "crush" in the state of 1,761,500 tons for the 1965-66 season. These estimated cost figures for the season by items are in Table 13. The cost of obtaining the cottonseed to be crushed is the largest single item involved and represents nearly 84 percent of the overall cost of operation (cost of seed plus mill operation).

Table 13. TEXAS OIL MILL EXPENSES FOR SELECTED ITEMS, 1965-66 SEASON

Item	Cost	Percent of Total
Cottonseed	$115,836,240	83.9
Operating Costs		
Direct labor	6,077,175	4.4
Repairs and parts	3,399,695	2.5
Electric power	2,025,725	1.5
Fuel	598,910	.4
Taxes	686,985	.5
Packaging (supplies, etc.)	2,360,410	1.7
Trucking	898,365	.7
Administration	1,021,670	.7
Other--general	5,108,350	3.7
Sub-total	$ 22,177,285	16.1
Grand total	$138,013,525	100.0

Calculated from original data.

Revenue From By-Products

The oil mills derive their revenue from sales of cottonseed by-products. During the 1965-66 season, the mills reported their revenue derived from the various by-products which they produced. By using these data, it is possible to estimate the average state-wide income received for these products on a per-ton-of-seed-crushed basis for the season (see Table 14). Income due to oil amounted to over 48 percent of all the income derived from the by-products developed from one ton of crushed seed. Cake and meal was second and contributed over 38 percent of the total derived from each ton crushed. Revenue from linters was third followed closely by hulls. The last item, "others," refers to revenue from waste, motes, etc., which accounted for 3 percent of the total revenue.

Seventy-nine percent of the mills indicated that their entire business

Table 14. ESTIMATED REVENUE IN DOLLARS PER TON OF SEED CRUSHED FOR THE 1965-66 SEASON BY-PRODUCTS

Product	Dollars Per Ton	Percent of Total
Oil	$38.40	48.3
Cake and meal	30.31	38.2
Linters	5.30	6.7
Hulls	3.23	4.1
Others (waste, motes, etc.)	2.18	2.7
Total	$79.42	100.0

Original data.

was due to cottonseed. Combining the replies of all oil mills reporting, 96 percent of all their total business was from cottonseed for the 1965-66 season; and 91 percent of their 1966-67 season business is estimated to be from cottonseed.

The cottonseed for which the Texas oil mills paid an estimated $115.8 million is now worth $139.9 million as it leaves the oil mill on its way to the final consumers. The Texas 1965-66 estimated income due to these various by-products as they leave the mill is listed in Table 15. Their total value has gone up over $24 million as a result of the oil mill processing. In the marketing of these by-products, their value will increase as they move to the retail consumer. Some of this value added can be seen in Table 16 where the 1965-66 season estimated average prices received by the oil mills in Texas for their by-products is compared with the Fort Worth market prices for meal and hulls, the Memphis price for oil, and the United States average price of linters.

These differences in price between the oil mill and market points represent a $14.6 million increase in value by the 1965-66 season cottonseed

Table 15. TEXAS ESTIMATED TOTAL INCOME FOR PRODUCTS DURING THE 1965-66 SEASON AT THE MILL LEVEL IN DOLLARS

Product	Estimated Total Revenue
Oil	$ 67,641,600
Cake and meal	53,391,065
Linters	9,335,950
Hulls	5,689,645
Others (waste, motes, etc.)	3,840,070
Total	$139,898,330

Original data.

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Table 16. AVERAGE PRICES OF COTTONSEED BY-PRODUCTS AT TEXAS OIL MILLS AND OTHER MARKETING POINTS, 1956-66 SEASON

Product	Price at Texas Oil Mills	Price at Indicated Market
Meal	$61.60/ton	$75.54/ton at Fort Worth
Hulls	$12.20/ton	$20.08/ton at Fort Worth
Oil	12.2¢/pound	12.5¢/pound at Memphis
Linters	2.95¢/pound	3.71¢/pound U.S. average

Reference (8,12) and original data.

products produced as they move on to the end consumer. The largest price increase in a single by-product was for hulls and is primarily due to the high cost of transportation because of bulkiness. These increases in cost are due to cost of transportation, storage, and wholesale fees. A table showing the pounds of by-products produced per ton of Texas cottonseed crushed for the seasons 1942-43 to preliminary data for 1966-67 is in the Appendix (Table 22). Also included is the calculated value of the products produced per ton of seed crushed based on oil price at southeastern mills; hull, cake and meal prices at Fort Worth; and United States average linters price for the respective seasons.

SUMMARY AND CONCLUSIONS

Texas cottonseed oil mills are an integral part of the Texas cotton industry and the first step in the utilization of cottonseed and the numerous by-products attributed to cottonseed. These mills have been declining in number since 1914 until there were only 48 active mills in the state during the 1965-66 season. Although the number of oil mills has decreased in Texas and the United States, the remaining mills have larger individual crushing capacities than the mills of the past so that the total amount of seed crushed in Texas and the nation is almost the same.

The increased crushing capacity in the modern oil mills is due to new and improved processes and equipment which have increased the cost of building an oil mill. The 1965-66 Texas average mill replacement value was over $2 million each which, for a state-wide total, amounts to nearly a $100 million investment. These mills also have an annual direct labor payroll of over $6 million. These mills, during the 1965-66 season, contributed nearly three quarters of a million dollars to the various tax coffers and spent over $2 million for electrical power in the operation of their plants.

Texas oil mills furnished employment to nearly 3,000 Texans, spent an estimated $115 million to purchase the seed they crushed, and raised the overall value of the cottonseed by-products by $24 million during the 1965-66 season. These by-products from the state's oil mills provide end-products upon which the livestock industry of the state depends and by-products upon which other industries, both in the state and out, depend as source of raw materials for other end-products.

Texas cottonseed oil mills indicated that their 1966-67 production was expected to decrease 29 percent in comparison with the 1965-66 season. Some mills were doubtful as to whether they would operate during the 1967-68 season due to the decreased cottonseed production in the state. Mills indicated that the taxes during the 1966-67 season had increased 6.5 percent over the preceding season. During the 1966-67 season, the mills had a decrease in employment amounting to only 4.8 percent which, coupled with a 13 percent reduction in the length of crushing time, created an estimated 10.2 percent reduction in total payroll for the season. This loss in payroll amounted to over three quarters of a million dollars for the 1966-67 season.

The decrease in cotton and cottonseed production in the state will cause some oil mills to cease operations at least until the production of cotton returns to 4 to $4\frac{1}{2}$ million bales as in the past few years. This reduction in the cottonseed supply will be felt all along the chain from the gin to the producer of salad oil and could amount to a $40 million decrease in business and economy for those directly connected. Oil mills are an integral part of the Texas cotton industry and are affected by seed production and, in turn, affect other segments further along in the processing steps of the Texas cotton industry.

APPENDIX

Table 17. TEXAS COTTONSEED QUALITY BY DISTRICTS
ALL DATA IN PERCENT EXCEPT AVERAGE GRADE

Crop Year	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Average Grade
			District 1				
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
1963	18.4	4.13	7.6	.5	1.8	9.1	100.5
1964	18.8	4.07	7.9	.5	1.6	9.3	102.5
1965	18.1	4.11	7.8	.5	2.0	9.2	99.5
			District 2				
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
1963	17.9	4.19	7.7	.6	1.2	10.5	101.0
1964	17.9	4.17	8.7	.7	1.4	10.1	100.5
1965	17.5	4.19	9.0	.5	1.7	10.0	99.0

Table 17.--Continued

Crop Year	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Average Grade
			District 3				
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
1963	17.1	4.23	7.8	.6	.7	11.5	99.5
1964	17.4	4.10	9.3	1.1	1.2	10.4	99.0
1965	17.0	4.22	9.6	.6	1.0	10.6	98.0
			District 4				
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
1963	16.8	4.13	7.3	.4	1.3	12.3	97.0
1964	15.7	4.21	8.4	1.0	1.4	11.5	92.5
1965	16.2	4.17	8.9	.6	1.6	11.5	95.5

Table 17.--Continued

Crop Year	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Average Grade
			District 5				
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
1963	18.5	4.19	8.7	.8	.7	10.0	102.5
1964	17.8	4.14	10.5	1.2	.8	10.2	99.5
1965	17.5	4.07	10.8	.9	1.2	10.4	98.0
			District 6				
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
1963	19.2	3.91	7.9	.6	2.8	11.9	104.5
1964	19.2	3.94	7.8	.8	3.1	11.5	104.0
1965	19.5	3.90	8.1	.5	2.2	11.4	106.0

Table 17.--Continued

Crop Year	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Average Grade
			District 7				
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
1963	17.1	4.25	7.6	.6	1.1	11.3	99.5
1964	16.7	4.17	8.9	1.5	1.3	10.9	96.0
1965	17.0	4.30	8.1	.6	1.0	11.6	99.5
			District 8				
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
1963	16.8	4.05	9.6	.6	.7	11.4	96.0
1964	16.5	4.12	10.1	.6	.9	11.4	96.5
1965	16.1	4.06	10.4	.6	1.1	11.6	95.0

Table 17.--Continued

Crop Year	Oil	Ammonia	Moisture	F.F.A.	Foreign Matter	Linters	Average Grade
			District 9				
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
1963	18.3	4.04	10.2	1.1	.7	10.4	99.5
1964	17.6	3.94	11.8	1.0	.8	10.4	97.5
1965	17.2	4.00	11.8	.9	.7	10.5	97.0
			District 10				
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
1963	18.2	3.98	9.6	.8	.5	11.8	102.0
1964	17.2	4.09	9.2	.5	.7	12.1	100.0
1965	17.2	3.87	10.7	.6	.6	12.4	98.5

Note: Percent linters not reported prior to crop of 1954.
Reference (6).

Table 18. UNITED STATES 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	53,770	4,516,084	4,497,779	45.61
1943-44	4,680	72,075	3,984,022	3,954,542	52.10
1944-45	4,902	101,555	4,362,633	4,254,149	52.70
1945-46	3,663	210,039	3,162,939	3,261,915	51.10
1946-47	3,511	111,063	3,071,412	3,089,590	72.00
1947-48	4,683	92,885	4,071,437	4,081,885	85,90
1948-49	5,943	82,437	5,381,953	5,331,892	67.20
1949-50	6,614	132,498	5,867,536	5,712,083	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	4,944,902	4,958,503	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	5,495,699	5,491,173	38.80
1960-61	5,886	104,845	5,436,070	5,352,454	43.60
1961-62	5,978	188,461	5,630,927	5,538,902	51.10
1962-63	6,139	280,486	5,786,215	5,833,073	47.90
1963-64	6,192	233,628	5,821,655	5,886,855	50.70
1964-65	6,227	168,428	5,908,670	5,921,052	47.10
1965-66	6,116P	156,046	5,938,000P	5,734,000P	46.70
1966-67	3,964E	330,046P			65.80P

P - Preliminary. E - Estimated. Reference (8,11).

Table 19. UNITED STATES LINTERS SUPPLY AND DISTRIBUTION

Year	Supply 1000 Bales*				Distribution 1000 Bales*		
	Stocks Aug. 1	Production	Imports	Total	Consumption	Exports	Destroyed
1942-43	637	1,355	79	2,071	1,301	28	2
1943-44	739	1,186	74	1,999	1,365	61	3
1944-45	567	1,251	199	2,017	1,481	41	1
1945-46	379	993	215	1,587	1,055	22	1
1946-47	422	995	92	1,509	984	53	**
1947-48	357	1,288	127	1,772	1,156	235	**
1948-49	370	1,646	115	2,131	1,406	193	1
1949-50	495	1,710	200	2,405	1,616	189	1
1950-51	455	1,244	103	1,803	1,396	92	1
1951-52	264	1,767	113	2,144	1,306	226	2
1952-53	548	1,799	339	2,686	1,359	107	2
1953-54	1,111	2,003	164	3,278	1,324	237	2
1954-55	1,543	1,699	186	3,427	1,474	256	25
1955-56	1,491	1,703	204	3,398	1,789	396	
1956-57	1,026	1,507	135	2,668	1,438	334	
1957-58	824	1,256	139	2,219	1,102	185	
1958-59	810	1,347	172	2,329	1,210	243	
1959-60	543	1,665	164	2,373	1,446	329	
1960-61	465	1,595	124	2,184	1,281	339	
1961-62	468	1,639	183	2,290	1,338	250	
1962-63	576	1,657	113	2,346	1,328	351	
1963-64	550	1,607	164	2,322	1,358	322	
1964-65	601	1,652	152	2,406	1,386	301	
1965-66	671	1,581	193	2,444	1,453	283	
1966-67	647	1,175	195	2,017	1,450	260	

* 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.

** 200 bales.

Reference (4).

Table 20. AVERAGE ANNUAL WHOLESALE PRICES IN CENTS PER POUND FOR UNITED STATES IN BULK LOTS

Year	Butter1/	Coconut Oil2/	Corn Oil3/	Cottonseed Oil3/	Lard4/	Olive Oil5/	Peanut Oil2/	Soybean Oil2/
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	10.9
1964	59.9	17.3	14.0	13.2	15.0	32.4	15.6	11.5
1965	61.2	20.2	16.8	14.2	17.7	36.8	16.2	13.4
1966	67.3	20.2	19.2	16.9	15.3	36.8	15.4	13.5

1/ Creamery, Grade A (92-score) New York.
2/ Refined, New York, drums.
3/ Refined, New York, tanks (drums prior 1960).
4/ Refined 1-pound cartons, Chicago.
5/ Imported edible, drums f.o.b. New York.
* Crude.
** Domestic.

Reference (3,8).

Table 21. U.S. AVERAGE PRICE PER POUND FOR LINTERS AND TEXAS AVERAGE PRICE PER TON FOR CAKE & MEAL AND HULLS AT FORT WORTH

Year	Price per Ton at Ft. Worth		U.S. Weighted Avg. Price/Lb. in Cents
	Cakes & Meal[1]	Hulls[2]	Linters
1942-43	50.00	5.95	5.71[3]
1943-44	52.97	12.72	4.14[3]
1944-45	52.76	12.00	3.83[3]
1945-46	63.00	13.00	4.58
1946-47	90.40	18.35	9.46
1947-48	100.40	22.97	6.70
1948-49	71.90[3]	8.80	3.94
1949-50	63.35	9.25	5.61
1950-51	82.66	22.42	16.21
1951-52	90.03	29.41	8.68
1952-53	87.03	27.83	5.95
1953-54	68.12	17.47	4.58
1954-55	73.72	22.06	3.94
1955-56	63.34	14.64	3.76
1956-57	63.90	24.62	5.08
1957-58	60.24	16.03	4.36
1958-59	67.21	14.98	3.43
1959-60	66.60	18.32	3.85
1960-61	63.13	19.09	4.10
1961-62	68.30	15.44	5.25
1962-63	75.12	24.91	4.00
1963-64	75.42	24.42	3.50
1964-65	69.88	20.03	3.92[4]
1965-66	75.54	20.08	3.71[4]
1966-67	91.79[4]	24.71[4]	5.37[3]

1/ For 43% protein prior to 1948 and 41% afterward. Wholesale prices bagged carlots supplied by Western Feeders Supply Company, Inc., Ft. Worth.

2/ Supplied by National Cottonseed Products Association 1947 and prior, 1948 estimated, 1949 partial, 1949 on furnished by Western Feeders Supply Company, Inc.

3/ Estimated.

4/ Preliminary.

Reference (4,11,12).

Table 22. POUNDS OF PRODUCTS PER TON OF TEXAS COTTONSEED CRUSHED--PRICE OF PRODUCTS--VALUE PER TON OF SEED CRUSHED--PRICE PER TON RECEIVED BY TEXAS FARMERS

Date	Oil			Cake and Meal			Hulls			Linters			Total Value Dollars	Price/ Ton to Farmers
	Weight Pounds	1/ ¢/Lb.	Value Dollars	Weight Pounds	2/ $/Ton	Value Dollars	Weight Pounds	2/ $/Ton	Value Dollars	Weight Pounds	3/ ¢/Lbs	Value Dollars		
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	328	10.48	34.37	915	75.12	34.37	525	24.91	6.54	152	4.00	6.08	81.36	47.70
1963-64	322	9.95	32.04	930	75.42	35.07	503	24.42	6.14	146	3.50	5.11	78.36	52.60
1964-65	325	11.54	37.50	943	69.88	32.95	499	20.03	5.00	151	3.92*	5.92	81.37	47.50
1965-66P	320	13.01	41.63	940	75.54	35.50	499	20.08	5.01	150	3.71*	5.57	87.71	46.89
1966-67E	322	14.36	46.24	960	91.79	44.06	523	24.71	6.46	166	5.37*	8.91	105.67	67.50

1/ Tanks F.O.B. Southeastern mills.
2/ 1942-43 through 1948-49 Reference (1), 1949-50 and on Reference (12).
3/ Reference (4).
* Grade 4.
P - Preliminary. E - Estimated.
Reference (11).

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