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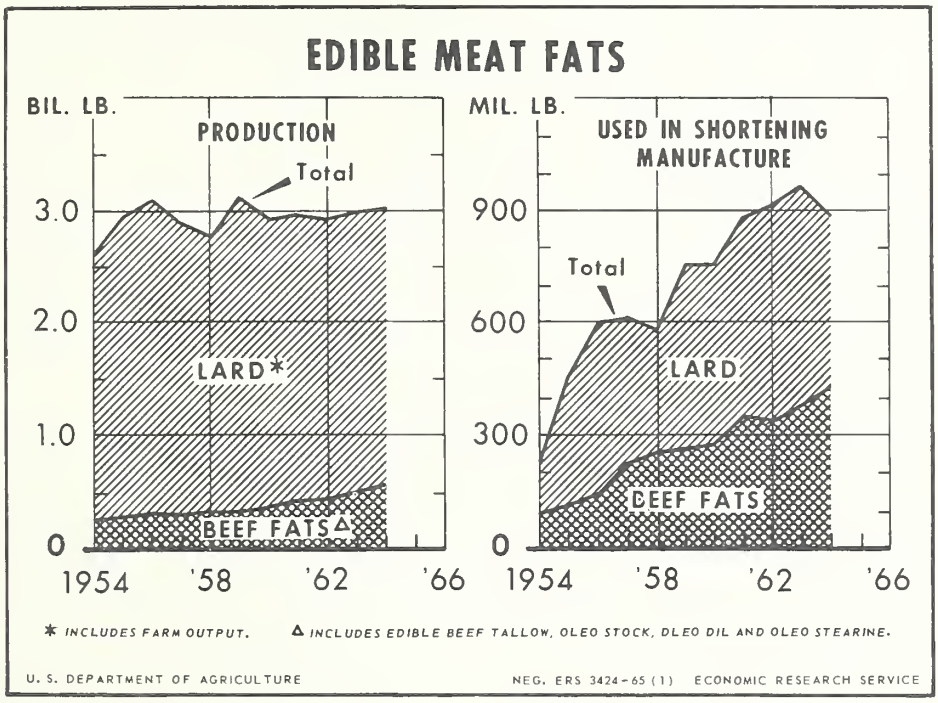

Annual U. S. production of edible meat fats has been fairly stable since 1954 at around the 2.9-billion-pound rate. A steady increase in the output of edible beef fats during this period has about offset a slight decline in lard.

Edible meat fats utilized in shortening have increased rapidly from 231 million pounds in 1954 to a record 959 million in 1963. In 1964, usage fell off to 851 million pounds but still accounted for one-third of all fats and oils consumed in shortening.

Increased production of meat-fat shortenings chiefly reflects improved technology and generally lower prices for raw materials. (See page 29).

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U. S. production of edible meat fats (lard and beef fats) has remained fairly steady since 1954 at an average annual rate of around 2.9 billion pounds. This level accounts for about one-fourth of the total U. S. output of food fats and oils. Lard production declined from 2.7 billion pounds in 1955 to about 2.5 billion in 1964 while edible beef fats increased steadily from 0.3 billion to 0.5 billion pounds during the period (see cover chart). The wholesale value of these edible byproducts of the meat packing industry totaled about $290 million in 1964.

One of the more significant developments in the domestic consumption pattern of edible meat fats in the past decade has been the rapidly increasing use of these fats in the manufacture of shortening. Such use has risen from 231 million pounds in 1954 to a record 959 million pounds in 1963 and 851 million pounds in 1964. During 1964, meat fats accounted for one-third of the total 2,650 million pounds of fats and oils used in shortening manufacture. Increased production of meat fat shortenings chiefly reflects improved technology and generally lower prices for raw materials.

Meat fats are recovered from the fatty tissues of hogs and cattle by rendering, the process of cooking to breakdown connective tissues to release the fat. The method usually employed is wet or steam rendering. An important recent development in rendering processes has been continuous low temperature rendering. According to trade sources, continuous rendering plants have some economic advantages over other methods, particularly the open-kettle method of rendering edible beef fats.

USDA's Meat Inspection regulations 1/on labelling permits synonymous use of the terms "animal fat" and "meat fat" to identify rendered fats obtained from cattle, sheep, swine, or goats in the name of product and ingredient statement for such meat food products as shortening and uncolored oleomargarine. The 2 primary sources of edible meat fats are pork and beef; mutton, because of relatively small availabilities, is a minor source. USDA regulations exclude certain types of raw pork fats from lard production, specifying that these fats be rendered separately and designated "rendered pork fat." Beef fats include edible beef tallow, oleo stock, oleo oil, and oleo stearine.

Lard Production Drops as Hog Slaughter Increases

Lard production declined from 2,757 million pounds in 1956 to 2,481 million in 1964, while the number of hogs slaughtered commercially increased from

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1/ Regulations Governing the Meat Inspection of the U. S. Department of Agriculture, as contained in Title 9, Chapter I, Subchapters A and K, Code of Federal Regulations, 1959 Edition, and amendments issued through June 1, 1959.

Table 19.--Lard: Supply and disposition, 1947-65

Year	Supply			Disposition						Price per pound (loose Chicago)
				Exports and shipments			Domestic disappearance			
								Direct use		
	Production	Stocks Jan. 1 1/	Total 2/	Exports 3/	Shipments	Total	Total	Total	Per civilian	
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Lb.	Cents
1947	2,402	110	2,512	383	34	417	1,929	1,792	12.6	22.5
1948	2,321	167	2,488	277	50	327	1,987	1,850	12.7	20.3
1949	2,534	173	2,707	617	50	667	1,910	1,744	11.8	11.3
1950	2,631	131	2,762	467	56	523	2,112	1,891	12.6	11.8
1951	2,863	127	2,990	689	54	743	2,143	1,855	12.3	16.1
1952	2,881	104	2,992	634	60	694	2,087	1,817	11.8	9.9
1953	2,355	211	2,566	423	53	476	2,016	1,772	11.4	11.9
1954	2,330	74	2,404	465	56	521	1,779	1,627	10.2	15.7
1955	2,660	104	2,764	562	57	620	1,998	1,639	10.1	10.6
1956	2,757	147	2,904	611	60	672	2,121	1,623	9.8	11.1
1957	2,547	112	2,659	501	62	563	1,994	1,589	9.4	12.3
1958	2,426	101	2,527	389	66	455	1,977	1,640	9.6	11.4
1959	2,780	95	2,875	605	68	673	2,078	1,536	8.8	7.9
1960	2,563	124	2,687	620	61	681	1,912	1,359	7.6	8.8
1961	2,517	94	2,611	417	69	485	2,015	1,396	7.7	9.6
1962	2,480	110	2,590	422	66	488	1,974	1,318	7.2	8.7
1963	2,476	128	2,604	538	56	594	1,891	1,203	6.4	8.3
1964 4/	2,481	119	2,600	700	65	765	1,707	1,198	6.3	9.7
1965 5/	2,375	128	2,503							

1/ Factory and warehouse stocks as reported by Bureau of the Census. 1948 and 1951 include stocks held or in transit by U. S. Department of Agriculture. 2/ Includes imports, which were less than 500,000 pounds in all years except 1952, when 7 million pounds were imported. 3/ 1947-53, include shipments by CARE. 4/ Preliminary. 5/ Forecast except stocks January 1, 1965.
Totals computed from unrounded numbers.

Table 20.--Lard: Utilization, 1947-64

Year	Food Uses				Nonfood Uses			Domestic Disappearance	
	Shortening	Margarine	Direct use	Total	Soap	Other	Total	Total	Per civilian
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Lb.
1947	101	3	1,817	1,922	6	1	7	1,929	13.5
1948	114	3	1,864	1,982	4	1	5	1,987	13.7
1949	127	4	1,754	1,885	---	25	25	1,910	12.9
1950	177	4	1,856	2,037	36	39	75	2,112	14.1
1951	200	4	1,896	2,100	22	21	43	2,143	14.2
1952	232	5	1,826	2,062	---	25	25	2,087	13.6
1953	227	8	1,778	2,013	---	3	3	2,016	12.9
1954	142	7	1,629	1,778	1/	1/	1	1,779	11.2
1955	334	13	1,642	1,990	2	6	8	1,998	12.3
1956	459	31	1,626	2,116	2	3	5	2,121	12.8
1957	376	25	1,592	1,992	1	1	2	1,994	11.8
1958	318	16	1,642	1,976	1/	1	1	1,977	11.5
1959	493	36	1,538	2,066	---	12	12	2,078	11.9
1960	480	56	1,361	1,897	---	15	15	1,912	10.7
1961	530	72	1,398	2,000	---	15	15	2,015	11.1
1962	571	70	1,320	1,960	---	14	14	1,974	10.7
1963	587	84	1,204	1,876	---	15	15	1,891	10.1
1964 2/	447	48	1,199	1,694	---	13	13	1,707	9.0
1965									

1/ Less than 500,000 pounds.
2/ Partly estimated.

Totals computed from unrounded numbers.

78.5 million to 82.9 million head (table 19). During this period, the average live weight of hogs increased from 232 pounds in 1956 to 241 pounds in 1964. Lard output decreased despite increased slaughter and heavier hogs because more lean or "meat-type" hogs were marketed. Lard yield per hog slaughtered has trended downward, mainly as a result of improved breeding and feeding practices, from 32-33 pounds 8 to 10 years ago to an average of just under 29 pounds. In 1960-61 (latest year for available data), about one-third of the hogs slaughtered were meat-type hogs (U. S. No. 1), based on a special USDA survey.

Direct Use of Lard Still Major Outlet But Market Is Dwindling

The 3 major market outlets for U. S. lard are: (1) Direct use in retail and wholesale channels; (2) consumption in the manufacture of shortening and margarine, and (3) exports.

The direct use of lard in the home, in bakeries, and in commercial and other institutions continues to be the most important single outlet but its relative importance is dwindling. Direct use of lard has declined steadily from a postwar high of 12.7 pounds per capita in 1948 to a record low of 6.3 pounds in 1964. In poundage, the drop has been from 1,850 million to 1,198 million, or better than 35 percent (table 19).

The population shift from agricultural to urban areas has been a major factor in the declining production and declining consumption of lard as such. Farm output has declined steadily from the postwar peak of 439 million pounds in 1946 to a record low of 100 million in 1964. Also affecting the competitive nature of the cooking fats industry are shifts in price relationships between lard and other fats and oils, and changes in manufacturing techniques and consumer preferences. Most of the past growth in shortening consumption can be traced to the substitution of shortening for lard in cooking uses.

The use of lard in shortening manufacture has increased from 142 million pounds in 1954 to a record 587 million in 1963 (table 20). Usage dropped to 447 million pounds in 1964 mainly because lard was priced high relative to competitive edible vegetable oils. During most of the past decade, lard has sold at a discount to soybean oil, the major fat or oil used in shortening manufacture; but the differential has been rather narrow in recent years. (See Fig. 2, page 33). Industry sources indicate that the major portion of lard production eventually will move into consuming channels in the form of shortenings, margarine, and other highly processed fats.

In Fig. 1 (page 32), the annual average prices of lard (loose, tank cars, Chicago) are plotted against the corresponding annual use of lard in shortening manufacture, 1954-64. A straight line was fitted to this scatter diagram by the method of least squares. 1/ Statistical analysis indicates a fairly close inverse relationship between price and quantity--a correlation coefficient of -.86. Perfect correlation would be -1.00. Although other

1/ The equation of this line is as follows:

$$Y = 17.07 - .0155X$$

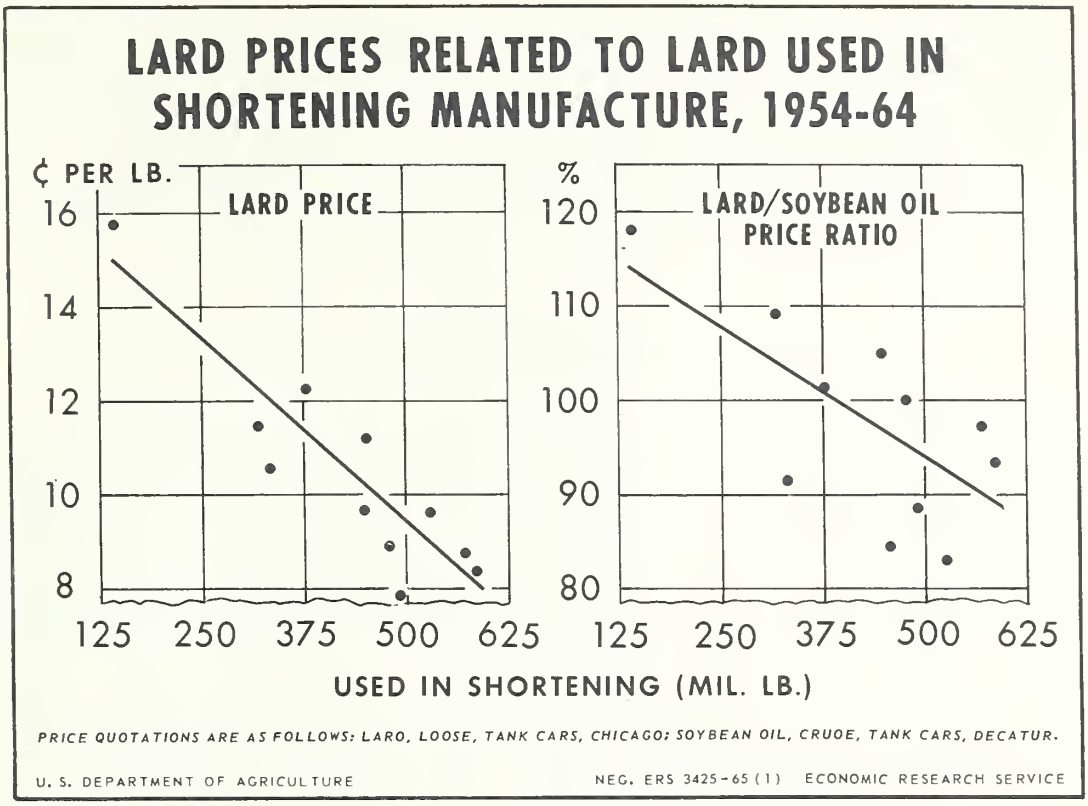

Figure 1

factors--such as the supply and price of competitive vegetable oils--influence the consumption of lard, about 74 percent of the variation in lard utilized in shortening manufacture could be accounted for by the changes in lard prices.

Also plotted in Fig. 1 is the relationship between lard prices when expressed as a percentage of soybean oil prices (crude, tank cars, Decatur) and the corresponding annual use of lard in shortening, 1954-64. Here again the relationship between price and quantity was inverse but not so close as when using lard prices alone. The correlation coefficient was -.69.

Exports and shipments of lard during recent years have varied from a low of 455 million pounds in 1958 to a high of 765 million estimated for 1964. During the period, exports accounted for about one-fourth of domestic output (table 19). Shipments to U. S. Territories (mainly Puerto Rico) have remained fairly stable in recent years at around 65 million pounds annually. U. S. lard exports are mainly to Europe and Latin America. The important foreign market outlets for U. S. lard of recent years have now narrowed to the United Kingdom, which accounts for about 80 percent of U. S. lard exports. This situation has resulted from (1) the loss of the Cuban market; (2) expanded production abroad; (3) competition of vegetable oils; and (4) the increasing number of trade barriers.

Opening of the St. Lawrence Seaway in April 1959 has enabled U. S. exporters to move lard in bulk-tank shipments from Chicago or Duluth to packing houses in England for slightly over 1 cent per pound. When the Seaway is closed for the winter, tankers leave from New York and New Orleans. The liquefaction shipping technique makes North American lard more competitive with Continental European lard in the British market. Direct use of lard in the United Kingdom is relatively stable but quantities used in manufacturing shift with changing lard prices relative to those for other competitive ingredients. Bulk-tanker shipping has virtually replaced lard shipments in drums and cartons in recent years.

Edible Beef Fat Output Moves Steadily Upward

The production of edible beef fats has nearly doubled in the past 10 years, rising from 283 million pounds in 1955 to a record 521 million pounds in 1964 (table 21). Yields of edible beef fats rendered per head of federally inspected cattle slaughtered increased during the period from around 15 pounds to 22 pounds. The increase is attributable to the strong domestic demand for edible beef fats as a raw material for shortening manufacture, which has diverted them from inedible channels. This expanded demand has increased the market price of edible tallow from 5 cents under lard in 1954 to approximately the same as lard in 1964. (See Fig. 2 below).

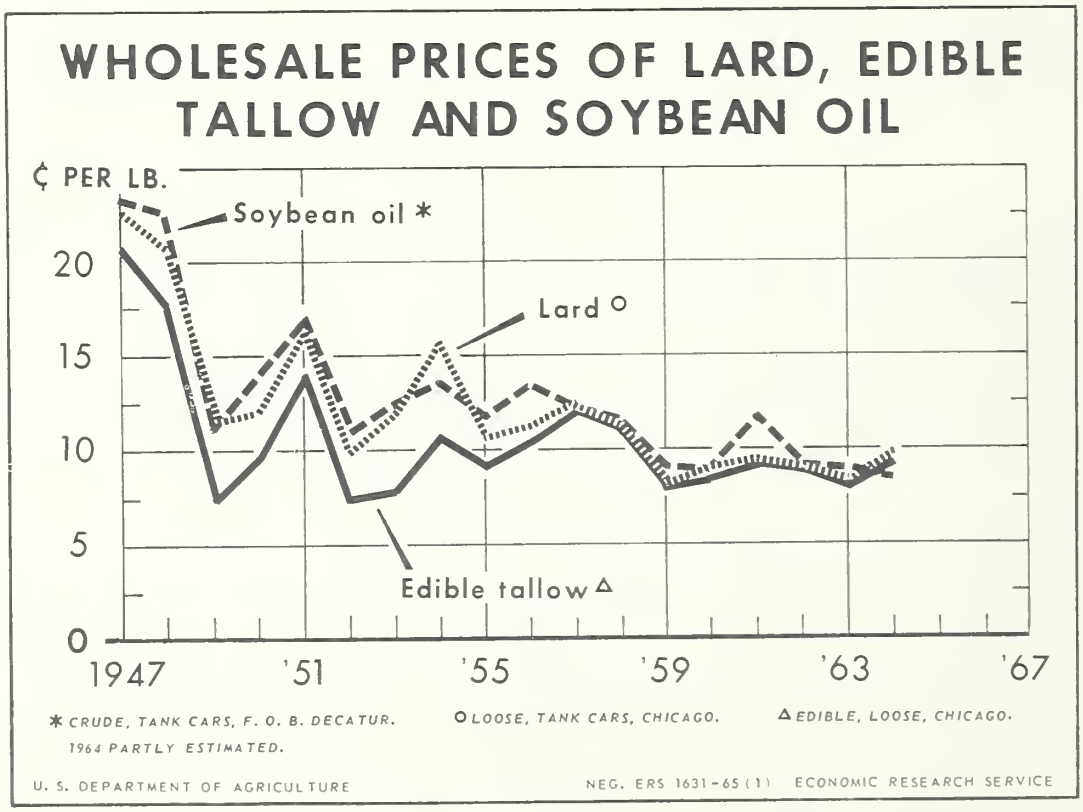

Figure 2

Table 21.--Edible beef fats[1]: Supply and disposition 1947-64

Year	Supply				Disposition		Edible tallow price per pound (loose, Chicago)
	Production	Imports	Stocks January 1	Total	Exports	Domestic disappearance	
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Cents
1947	182	---	10	192	2	179	20.5
1948	137	---	11	148	2	130	17.5
1949	169	---	17	186	32	143	7.5
1950	175	---	10	185	16	158	9.6
1951	145	2/	11	157	15	132	13.7
1952	183	2/	11	194	36	146	7.3
1953	235	2/	12	247	45	188	7.6
1954	271	---	14	285	36	235	10.6
1955	283	2/	14	297	34	243	9.0
1956	321	2/	19	341	39	280	10.3
1957	318	2	22	343	13	308	11.9
1958	338	1	22	361	13	313	11.0
1959	332	2/	35	367	23	321	7.9
1960	359	2/	23	382	19	337	8.5
1961	440	2/	26	466	8	433	9.2
1962	435	2/	25	460	10	416	8.8
1963	501	2/	33	534	9	490	8.0
1964 3/	521	1	36	558	5	511	9.5
1965 4/	550	1	42	593			

1/ Includes edible beef tallow, oleo stock, oleo oil, and oleo stearine. Since 1959 mainly edible tallow. 2/ Less than 500,000 pounds. 3/ Partly estimated. 4/ Forecast except stocks January 1, 1965.

Totals computed from unrounded numbers.

Table 22.--Edible beef fats[1]: Utilization, 1947-64

Year	Food uses				Non food uses			Domestic disappearance	
	Shortening	Margarine	Other	Total	Soap	Other	Total	Total	Per civilian
	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Mil. lb.	Lb.
1947	65	8	98	171	7	1	8	179	1.3
1948	44	6	75	126	2	2	4	130	.9
1949	30	7	104	141	---	2	2	143	1.0
1950	31	8	117	156	1	1	2	158	1.1
1951	23	7	101	131	2/	1	1	132	.9
1952	35	7	101	144	---	2	2	146	1.0
1953	46	13	127	187	---	1	1	188	1.2
1954	89	10	130	230	---	5	5	235	1.5
1955	118	9	111	239	1	3	4	243	1.5
1956	141	6	129	276	2/	4	4	280	1.7
1957	227	9	65	302	2/	6	6	308	1.8
1958	252	8	47	308	---	5	5	313	1.8
1959	257	8	50	315	---	6	6	321	1.8
1960	268	6	54	328	---	8	8	337	1.9
1961	348	6	70	424	---	9	9	433	2.4
1962	338	10	59	407	---	10	10	416	2.3
1963	372	11	95	478	---	11	11	490	2.6
1964 3/	404	8	89	501		10	10	511	2.7
1965									

1/ Includes edible beef tallow, oleo stock, oleo oil, and oleo stearine. Since 1959 edible tallow only. 2/ Less than 500,000 pounds. 3/ Partly estimated.

Totals computed from unrounded numbers.

Volume of cattle slaughter limits the amount of beef fat available for rendering. By law, the raw fat available for edible rendering must come from federally inspected cattle which is handled and processed under Government regulations. Thus, the supply of raw material available for edible tallow is more limited than that available for inedible tallow production. Continued high edible tallow prices would provide the incentive for holding additional amounts of killing and cutting fats for edible tallow.

Shortening is by Far the Major Outlet for Edible Beef Fats

Amount of edible beef fats used in shortening has risen steadily from 89 million pounds in 1954 to a record 404 million in 1964--nearly a 5-fold increase. The shortening industry utilizes about 80 percent of U. S. - produced edible beef fats (table 22). Increased technology in the use of beef fats as a shortening ingredient and increased consumer acceptance of meat fat shortenings have contributed to this increased use.

A wide variety of shortenings are now being manufactured. Some contain meat fats only, some vegetable oils only, and some a blend of the 2 ingredients. It is in the manufacture of blended shortenings that edible meat fats must compete with other edible fats and oils, mainly soybean oil. Because these fats and oils are substitutable in shortening production, relative prices of raw materials affect the volume of any one type utilized in this market outlet. Expanding demand for convenience foods and a greater centralization of bakeries and other food processors have stimulated the production of specialized shortenings in recent years.

Edible Tallow Prices Now Average Close to Lard

Edible beef fats compete directly with lard for use in manufactured food products. Historically, the price of lard has averaged above that of edible tallow, although both prices closely follow the same pattern. (See Fig. 2, page 33). During 1954, lard prices (tanks, loose, Chicago) averaged 15.7 cents per pound compared with 10.6 cents for edible tallow (loose, Chicago). Since 1954, however, the price spread has narrowed considerably and in recent years has virtually disappeared. During 1964, lard prices on the Chicago market averaged 9.7 cents per pound compared with 9.5 cents for edible tallow.

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