

MONTHLY BUSINESS REVIEW



of the FEDERAL RESERVE BANK of Dallas

Volume 33

Dallas, Texas, June 1, 1948

Number 6

THE SYNTHETIC RUBBER INDUSTRY IN THE SOUTHWEST

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During the past three decades rubber has become an indispensable contributor to the industrial community. Its services are less conspicuous than those of petroleum fuels, coal, and steel, but it is an important and essential component of the machine society because of its use in cushioning impacts, insulating against moisture, and confining electric current. The United States and other advanced economies cannot operate efficiently without its services.

Prior to the war the United States, which accounts for more than one-half of the world consumption of rubber products, depended upon the rubber-producing plantations of the southeastern Orient to supply its requirements for crude rubber. When Japanese forces pushed into the Southern Pacific, severing trade routes to the Malaysian region and interrupting the flow of natural rubber to United States industry, the successful operation of the American economy was seriously jeopardized.

American chemists, physicists, and industrial technicians succeeded, however, in perfecting practicable industrial processes to synthesize large quantities of chemical substitutes. Synthetic rubber plants built in the United States during the war have a productive capacity roughly equivalent to one-half the total acreage of the natural rubber-producing areas of the world and, if necessary, could meet minimum rubber requirements of the Nation's industry.

The Character and Location of the Synthetic Rubber Industry

Although the structure of the natural rubber molecule is known, chemists and physicists have not succeeded in producing true rubber commercially. Rubber-like plastics are synthesized commercially from natural gas, refinery gases, alcohol, and other hydrocarbons. These synthetic or chemical rubbers differ from natural rubber in their molecular structure and in their characteristics and behavior. Some synthetic rubbers are adequate substitutes for the natural product in nearly all uses, while others are superior in special functions.

Nearly all synthetic rubber produced in the United States is Buna-S, butyl, neoprene, or thiokol. Buna-S (also called GR-S), the synthetic most like natural rubber, is generally excellent in resistance to abrasion and tearing. Butyl, which is generally stable chemically, excels in resistance to sunlight, ozone, and diffusion of gases; in these characteristics it is superior to natural rubber. Neoprene also is generally excellent in resistance to sunlight and ozone but costs somewhat more to produce than Buna-S or butyl. Thiokol has the characteristics of butyl and neoprene and, in addition, excels in resistance to

swelling from oil, but it also is a high-cost product. Many other synthetic or chemical rubbers have been produced by slight variations in processing techniques; further development of synthetic rubbers with specialized characteristics for particular uses may be expected.

Buna-S and butyl, the mainstays of the synthetic rubber program, are derived principally from fractions of crude oil and natural gas, which can be made available readily in refinery centers, either as by-product refinery gases or as products of special refinery units. Buna-S also can be made with alcohol. Manufacture of thiokol likewise relies principally upon refinery by-products. Neoprene is the only prominent synthetic rubber of which petroleum fractions are not important components, coal and limestone being the principal materials used in its process.

Commercial production of the important synthetic rubbers consists of three operations. Hydrocarbons first are gathered from sources of supply and then synthesized into new hydrocarbon molecules at special purpose plants. The products of these special plants are transferred to "polymerization" plants, where they are linked into the desired synthetic.

In 1941, the annual capacity of the synthetic rubber industry of the United States was about 10,000 long tons or 1.2 percent of domestic consumption of all new rubber. During that year about 60 percent of synthetic rubber produced was neoprene type, while butadiene types accounted for about 30 percent of production, and thiokol, the remainder. At that time, synthetic rubber plants were located principally in the Middle-Atlantic coastal area, then the center of the Nation's chemical industry; none were in the Southwest.

The Reconstruction Finance Corporation entered into contracts in 1941 with major rubber manufacturers for the construction and operation of four synthetic rubber plants—three at Akron, Ohio, and one at Naugatuck, Connecticut. The possibility that the United States might be cut off from sources of natural rubber, a factor which had led the RFC to enter into these contracts, became more threatening early in 1942. Measures to conserve crude rubber and rubber products and to redevelop Central and South American sources of natural rubber were initiated but could not offset the loss of Oriental rubber. Broadening the synthetic rubber program appeared more reliable insurance. Synthetic rubber could be produced in virtually limitless quantities if costs were disregarded, since the amount of synthetic rubber output was limited only by the availability of materials to construct the required special purpose plants and the speed in attaining quantity production depended principally upon the dispatch with which technical problems of commercial synthesis and copolymerization could be solved.

Decisions concerning the types of rubber to be produced and the processes to be used were very important in determining costs and speed of the program. Concentration on the production of Buna-S rubber was desirable because it was the best general substitute for natural rubber and the least expensive of the several commercial synthetics. Since either grain alcohol or petroleum is a satisfactory source of butadiene, the base stock of Buna-S, grain was considered in some respects the better source when the broadened synthetic rubber program was initiated, because less time and fewer materials were required for construction of grain distillation units than plants to process petroleum hydrocarbons. Advocates of the use of grain alcohol also pointed out that if grain were used, competition between the synthetic rubber and the aviation gasoline programs for scarce materials would be minimized, a replaceable farm resource would be used instead of a depletable mineral resource, and a wider segment of the economy—the farm community—would be benefited.

On the other hand, use of petroleum had one very significant advantage—lower operating cost; in addition, design and process improvements which reduced requirements for scarce materials in petroleum-using butadiene plants soon were developed. A portion of authorized Buna-S rubber capa-

city was designed to use the alcohol process for producing butadiene, but a larger part of butadiene output was scheduled to be produced by the petroleum process. The program, authorized in May 1943, provided for 428,500 tons of butadiene from petroleum hydrocarbons and 230,000 tons from alcohol.

The proper location of synthetic rubber facilities requires a choice between location near centers where rubber products are fabricated and location close to the sources of raw materials. The first choice would have led to further concentration of the new industry, principally in the Akron, Ohio, area, where three of the four initial government plants had been authorized. The nature of the synthetic rubber process to be used, however, dictated the other choice. Inasmuch as petroleum and refinery gases are transmitted best by pipe line, physical proximity to the source of the base materials is desirable. Likewise, the most important synthetic bases—butadiene, styrene, and other hydrocarbons—are transportable by pipe, tank car, or barge; consequently, copolymerization plants operate most efficiently when located relatively close to their sources of supply. On the other hand, the product of copolymerization is a stable, compact solid easily transported for long distances. Under these circumstances, it was desirable to locate the synthetic rubber industry near its raw materials or in areas where

TABLE I
GOVERNMENT BUNA-S COPOLYMERIZATION PLANTS
COSTING OVER \$5,000,000 EACH

Plant location and operator	Investment (in thousands of dollars)	Design capacity (in thousands of long tons annually)
Port Neches, Texas—Firestone Tire and Rubber Co.	\$ 16,046	60
Port Neches, Texas—B. F. Goodrich Co.	16,047	60
Borger, Texas—B. F. Goodrich Co.	8,842	45
Baytown, Texas—General Tire Co.	7,829	30
Houston, Texas—Goodyear Synthetic Rubber Corp.	13,415	60
Baton Rouge, La.—Copolymer Corp.	7,332	30
Lake Charles, La.—Firestone Tire and Rubber Co.	13,061	60
Akron, Ohio—Goodyear Synthetic Rubber Corp.	7,548	30
Akron, Ohio—Firestone Tire and Rubber Co.	7,766	30
Louisville, Ky.—B. F. Goodrich Co.	11,120	60
Louisville, Ky.—National Synthetic Rubber Corp.	6,865	30
Los Angeles, Calif.—Goodyear Synthetic Rubber Corp.	10,000	60
Los Angeles, Calif.—U. S. Rubber Co.	5,080	30
Naugatuck, Conn.—U. S. Rubber Co.	8,357	30
Institute, W. Va.—U. S. Rubber Co.	18,398	90
Total United States	\$157,706	705
Total Southwest*	\$ 82,572	345
Total Eleventh District	\$ 62,179	255
Total other states	\$ 75,134	360

*Texas and Louisiana.

SOURCE: War Assets Administration, as reported June 1946.

TABLE II
GOVERNMENT BUTADIENE PLANTS COSTING
OVER \$5,000,000 EACH

Plant location and operator	Investment (in thousands of dollars)	Design capacity (in thousands of short tons annually)
Butadiene—from Petroleum		
Baytown, Texas—Humble Oil and Refining Co.	\$ 18,790	30
Port Neches, Texas—Neches Butane Products Co.	56,693	100
Houston, Texas—Sinclair Rubber, Inc.	30,889	50
Borger, Texas—Phillips Petroleum Co.	35,682	45
Baton Rouge, La.—Standard Oil Co. of New Jersey	8,762	15
Lake Charles, La.—Cities Service Co.	17,029	55
Los Angeles, Calif.—Shell Union Oil Corp.	19,917	55
Los Angeles, Calif.—Southern Calif. Gas Co.	12,189	30
El Segundo, Calif.—Standard Oil Co. of Calif.	7,859	18
Toledo, Ohio—Sun Oil Co.	7,361	15
Total United States	\$215,171	413
Total Southwest*	\$167,845	295
Total Eleventh District	\$142,054	225
Total other states	\$ 47,326	118
Butadiene—from Alcohol		
Institute, W. Va.—Carbide and Carbon Chem. Corp.	\$ 38,486	80
Louisville, Ky.—Carbide and Carbon Chem. Corp.	34,952	60
Kobuta, Pa.—Koppers Co., Inc.	42,000	80
Total United States	\$115,438	220

*Texas and Louisiana.

SOURCE: War Assets Administration, as reported June 1946.

the petroleum-refining industry was centered. Other considerations involved in the location of plants included adequate transportation, available construction labor, and security from enemy attack.

No area in the United States fulfilled these requirements quite so well as the Gulf Coast area of the Southwest. Nearly 40 percent of refinery capacity of the Nation is concentrated in a strip of coastline between Corpus Christi, Texas, and New Orleans, Louisiana. This region can supply necessary hydrocarbons abundantly from existing refineries through a network of pipe lines, inland waterways, and railroads. Moreover, when sites for synthetic rubber plants were being selected, the labor force of this area was able to meet the industry's requirements for construction workers and plant operators. It also was relatively isolated

from attack, despite its coastal position, since it is deep in the crescent of the Gulf of Mexico. In addition, a growing chemical industry which could supply some needed materials and skilled craftsmen existed in the region.

Twenty-eight plants costing more than \$5,000,000 each were built in the United States between 1942 and 1945 to produce butadiene and butadiene rubber with an investment in these major Buna-S and related plants totaling \$488,315,000, as indicated in Tables I and II. Nearly 56 percent of the investment was in thirteen major plants in the Coastal and Panhandle areas of Texas and the southern area of Louisiana. Nine of the plants are within the boundaries of the Eleventh District. Louisiana and Texas received seven of the fifteen copolymerization plants and six of the ten butadiene plants, accounting for 49 percent of the copolymerization capacity and 71 percent of the petroleum-butadiene capacity.

The Southwest also received an important share of the total investment in major butyl and styrene plants, as all butyl production capacity and a little more than one-half of styrene production capacity were located in Texas and Louisiana. No neoprene plants were built in the Southwest, but a privately financed thiokol facility was authorized near Freeport, Texas.

The expansion of carbon black capacity, which centered in the Southwest, may be considered a part of the synthetic rubber program. The manufacture of rubber products absorbs about 90 percent of total carbon black production. Moreover, greater quantities of carbon black are required in fabricating synthetic than natural rubber. The increase in output of rubber products for military uses and the switch

from natural to synthetic rubber consequently necessitated an expansion of carbon black plant capacity. Capacity was increased from about 630,000,000 pounds annually in 1940 to about 1,500,000,000 pounds by the end of 1945.

The carbon black industry had centered in North Louisiana, Southeast New Mexico, and the Coastal and Panhandle areas of Texas, where large natural gas deposits supply the requisite raw material at comparatively low cost, and the principal wartime carbon black plants also were located in these areas. Much of the expansion was accomplished

by private financing, but six large publicly financed facilities were built in the United States, of which three are in Texas, two in New Mexico, and one in Oklahoma.

As indicated in Tables I-IV, the investment in major government-financed synthetic rubber and associated plants in the United States totaled \$675,000,000, of which approximately \$357,500,000 or 53 percent was in four southwestern states—45 percent in Texas. In addition to the major government

TABLE III
GOVERNMENT BUTYL, NEOPRENE, AND STYRENE PLANTS
COSTING OVER \$5,000,000 EACH

Plant location and operator	Investment (in thousands of dollars)	Design capacity* (in thousands of tons annually)
Butyl		
Southwest		
Baytown, Texas—Humble Oil and Refining Co.	\$ 25,900	30.0
Baton Rouge, La.—Standard Oil Co. of N. J.	25,900	38.0
	\$ 51,800	68.0
Total United States.....	\$ 51,800	68.0
Styrene		
Southwest		
Velasco, Texas—Dow Chemical Co.	\$ 17,800	50.0
Texas City, Texas—Monsanto Chem. Co.	18,300	50.0
	\$ 36,100	100.0
Other states		
Institute, W. Va.—Carbide and Carbon Chem. Co.	\$ 9,800	25.0
Los Angeles, Calif.—Dow Chem. Co.	12,600	25.0
Kobuta, Pa.—Koppers Co., Inc.	18,800	37.5
	\$ 41,200	87.5
Total United States.....	\$ 77,300	187.5
Neoprene		
United States		
Louisville, Ky.—E. I. du Pont de N. & Co.	\$ 38,400	60.0

*Butyl and neoprene in long tons, styrene in short tons.

SOURCE: War Assets Administration, as reported June 1946.

TABLE IV
GOVERNMENT CARBON BLACK PLANTS

Plant location and operator*	Investment (in thousands of dollars)	Design capacity (in millions of pounds annually)
Odessa, Texas—United Carbon Co.	\$ 9,095	41
Seagraves, Texas—Columbia Carbon Co.	2,127	13
Sunray, Texas—Continental Carbon Co.	1,971	20
Monument, New Mexico—C. E. Johnson	1,960	15
Eunice, New Mexico—Panhandle Carbon Co.	1,705	15
Guymen, Oklahoma—Cabot Carbon Co.	2,212	15
Total United States.....	\$19,070	119
Total Southwest†.....	\$19,070	119
Total Eleventh District.....	\$16,858	104

*All plants except Cabot Carbon Company plant at Guymen, Oklahoma, are in Eleventh Federal Reserve District.

†Texas, New Mexico, and Louisiana.

SOURCE: War Assets Administration, as reported June 1946.

installations, many smaller government and privately financed facilities were located in the Southwest, including units to assemble materials which were converted to butadiene, styrene, and other base materials of synthetic rubber; smaller synthetic rubber and carbon black processing units; and rubber fabricating units. The magnitude and character of the total authorized investment in the synthetic rubber industry in the Eleventh Federal Reserve District, 1942-45, are indicated by Table V.

Total public and private wartime expenditures authorized in rubber industry facilities in the District were \$486,147,000 as compared with \$1,471,094,000 authorized for all wartime industrial facility expansion in the District. This very large investment

in facilities to produce synthetic rubber and closely related products far exceeded the investment of any of the other major industrial categories, including \$219,600,000 in ordnance plants; \$125,600,000 in aircraft plants; \$120,400,000 in nonferrous metals facilities; \$86,800,000 in establishments to produce iron and steel, their products and machinery; and \$58,000,000 in shipyards.

The synthetic rubber industry of the Eleventh Federal Reserve District and the Southwest is highly concentrated geographically. The facilities which produce butadiene, styrene, and other base components cluster about the great refinery center in the Gulf Coastal area, reflecting the strong pull which availability of by-product refinery gases has exerted upon the synthetic rubber facilities which

TABLE V

AUTHORIZED EXPENDITURES ON RUBBER INDUSTRY FACILITIES IN THE ELEVENTH FEDERAL RESERVE DISTRICT 1940-45

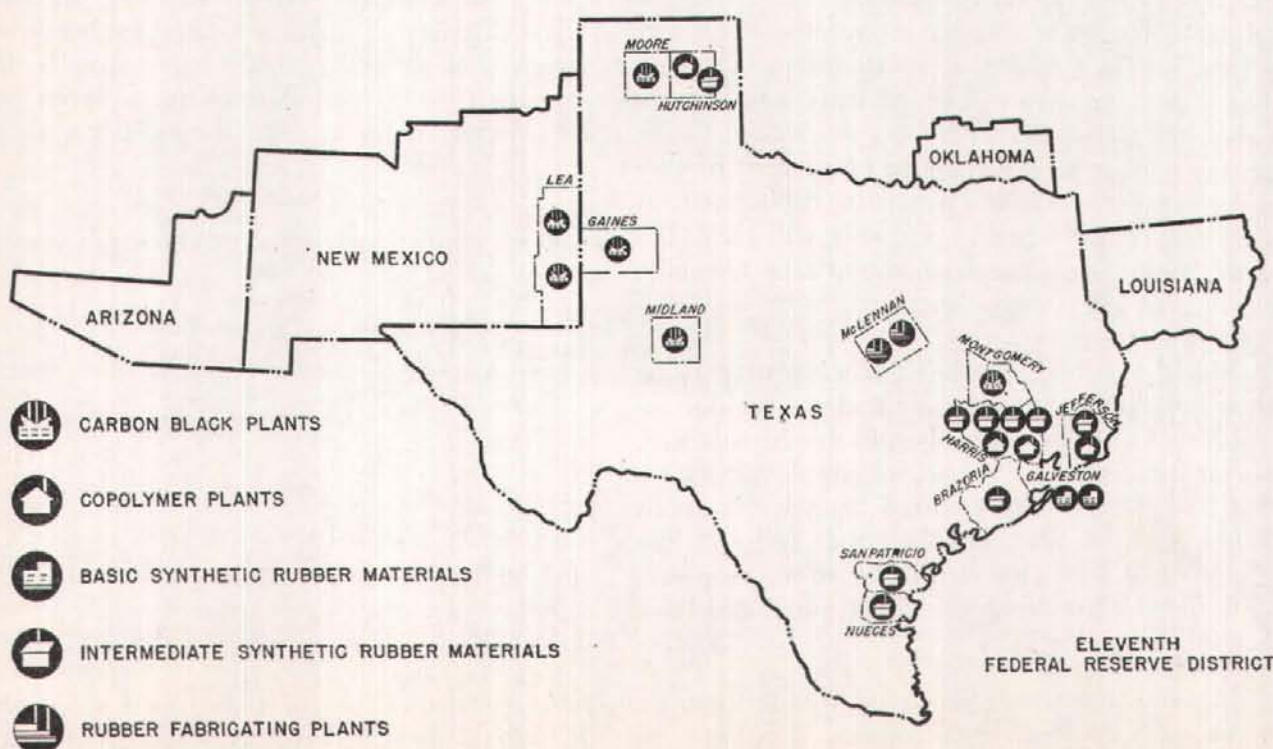
(In thousands of dollars)

Product	Total	Public	Private
Carbon black	\$ 16,772	\$ 6,763	\$ 10,009
Synthetic rubber base materials *.....	146,318	51,878	94,440
Synthetic intermediate materials	249,766	236,289	13,477
Copolymer plants	62,207	62,207	..
Rubber fabrication	11,084	998	10,086
Total	\$486,147	\$358,135	\$128,012
Area			
Texas	\$477,328	\$355,921	\$121,407
Southeast New Mexico	4,319	2,163	2,156
North Louisiana	4,250	51	4,199
Southeast Oklahoma	250	..	250
Total	\$486,147	\$358,135	\$128,012

*Also utilized in aviation gasoline.

SOURCE: War Production Board.

MAJOR SYNTHETIC RUBBER AND ASSOCIATED FACILITIES AUTHORIZED 1942-1945



utilize hydrocarbon raw materials. Copolymerization plants are centered in the same region, with the exception of a major facility in the Texas Panhandle. The base stock collecting and processing plants likewise tend to congregate in the refining area, although more widely scattered in order to tap crude oil and natural gas reserves. The carbon black facilities, as has been indicated, are concentrated in the Texas Panhandle and Southeast New Mexico and, to a lesser extent, in North Louisiana and Southeast Texas. An expansion of rubber fabricating establishments occurred at Waco, in Central Texas, which was the center of that type of activity in the Southwest.

The Postwar Position of Synthetic Rubber

Some of the synthetic rubbers perform certain tasks so well that they are preferred to natural rubber, even though they may be more expensive. Neoprene and thiokol, for example, are used extensively in chemical conduits, oil hose, and other products because of their superior resistance to oil. Butyl also has advantages over natural rubber in some uses, particularly in inner tubes, because of its "air-tight" qualities. Small quantities of these and other specialty synthetics probably will be produced for selected uses, irrespective of the price and availability of natural crude.

The synthetic rubbers—particularly Buna-S, which makes up the bulk of total United States chemical rubber production—must compete with natural rubber, however, for use in tires and other rubber products, which account for 70 percent or more of total rubber consumption. In this competition they are at some disadvantage because they are more difficult and more costly to fabricate than the natural product. Should world consumption exceed for a time the output of the principal natural rubber producing areas of the world, the synthetic rubber industry might effect economies in production and improvements in quality which would enable its products to compete on favorable terms for a share of the international rubber market. On the other hand, early development of an international rubber surplus and aggressive price competition would reduce the chances of chemical rubber sharing significantly in that market unless assured a share by government action. The world demand-supply situation and the comparative costs of natural and synthetic rubber, therefore, are likely to be important in determining the future of the synthetic rubber industry of the Southwest and the Nation.

Postwar Supplies of Rubber. In the decade preceding the entrance of the United States into the war, world production of natural rubber varied from a low of 710,000 tons in 1932 to a high of 1,528,000 tons in 1941. It declined to 252,000 tons in 1943 but expanded rapidly in 1946 and 1947, totaling 1,240,000 tons in the latter year. Present theoretical capacity of existing natural rubber-growing areas has been estimated by analysts in the rubber industry at about 2,000,000 tons annually. It is unlikely that capacity will be increased significantly during the 1948-55 period, since five to seven years are required to bring Hevea trees to efficient yielding size. Moreover, under normal conditions, output probably cannot be raised above 80 percent of the theoretical capacity. Maximum natural rubber output during the 1948-55 period probably will range between 1,500,000 tons and 1,600,000 tons annually, according to industry estimates.

World synthetic rubber capacity may be as high as 1,050,000 tons annually and can be increased rapidly. Capacity probably will not be enlarged, however, unless access to natural rubber supplies is threatened. United States rated capacity is about 850,000 tons per year, distributed as follows: Buna-S, 705,000 tons; butyl, 68,000 tons; neoprene, 60,000 tons; Buna-N types, 18,000 tons; and thiokol, nominal.

In 1947, the world produced a little more than 1,800,000 tons of natural and synthetic rubber. On the basis of available estimates, it appears that during the next five to ten years total annual

TABLE VI
WORLD PRODUCTION OF NATURAL AND SYNTHETIC RUBBER
(In long tons)

Year	Natural Rubber	Synthetic Rubber*	Total
1947†	1,240,000	511,000	1,751,000
1946	950,400	740,000	1,690,000
1945	268,600	820,373	1,088,973
1944	274,300	762,630	1,036,930
1943	251,700	231,722	483,422
1942	400,800	22,434	423,234
1941	1,527,800	9,540	1,537,340
1940	1,389,000	3,260	1,392,260
1935	863,000	..	863,000
1930	821,800	..	821,800

*United States only.

†Estimated.

SOURCE: United States Department of Commerce.

production could be raised to about 2,700,000 tons with existing plantation areas and synthetic rubber installations, about one-third of the total being accounted for by facilities built in the United States during the war. Should output of natural rubber again reach 1941 levels and synthetic rubber continue at 1947 rates, world production would total 2,100,000 tons per year as compared with the prewar peak of 1,500,000 tons in 1941 and an average of 950,000 tons annually during the 1935-39 period.

Postwar Demand for Rubber. World consumption of new rubber reached an all-time peak of 1,720,000 tons in 1947, 500,000 tons above the prewar peak in 1941 and about 700,000 tons above the 1935-39 average. As Table VII indicates, the United States consistently has been the principal consumer of crude rubber, accounting for from 50 percent to 65 percent of the world total prior to the war and 73 percent and 65 percent of the total in 1946 and 1947, respectively. Since the end of the war, United States consumption of new rubber has been at rates more than double those of most years prior to 1939 and 30 percent to 40 percent above the prewar peak in 1941. In addition, consumption of reclaimed rubber has been maintained at very high levels, attaining in 1947 a near peak volume of 289,000 tons as compared with the 1935-39 average of 150,362 tons. Total United States consumption of all rubbers in 1947 was about 125 percent above the 1935-39 average.

This markedly higher level of consumption principally reflects enlarged production of tires and tubes. The backlog of replacement demand for these products apparently was satisfied in 1947, and sales may turn down sharply this year. Original equipment sales should increase as automobile production expands but are unlikely to offset the anticipated decline in replacements. Consumption of other rubber products appears to be leveling off. Although it may remain considerably above prewar rates, United States consumption probably will not continue at the 1947 level unless unforeseen developments raise requirements. Foreign needs for rubber products are extremely large, but effective demands are curtailed by shortages of foreign exchange, and, consequently, consumption abroad may not rise very much above the 1947 rate of about 600,000 tons. If orderly international trade is restored and world income is sustained, world consumption of new rubber may range between 1,500,000 and 1,750,000 tons annually during the 1948-55 period as compared with somewhat less than 1,000,000 tons prior to the war.

World capacity to produce natural and synthetic rubber probably will exceed world consumption substantially during the 1948-55 period, and perhaps much longer. As indicated earlier, production of natural rubber may be raised to about 1,600,000 tons, approximating anticipated world requirements for all new rubber in the foreseeable future. In addition, the synthetic rubber industry can produce perhaps 1,050,000 tons of rubber. Maximum anticipated annual requirements for new rubber, therefore, are about 1,000,000 tons below the production potential of synthetic and natural rubber. Should world consumption decline to prewar levels, it would absorb only about 35 percent of world capacity and could be supplied easily either by natural or by synthetic rubber.

While consumption in the United States remains at the 1947 level, substantial imports of natural rubber will be required, since the total is about 300,000 tons above the existing capacity of the synthetic rubber industry. Should United States requirements decline to prewar levels, however, they could be met easily by the domestic synthetic rubber industry. Even in 1947, imports of natural rubber could have been held considerably below prewar rates by utilizing the total capacity of synthetic rubber plants.

Under these circumstances, competition between synthetic and natural rubber can become extremely vigorous in the United States market unless the Government intercedes. Success in a freely competitive battle between natural and synthetic rubber probably would be determined chiefly by

TABLE VII
CONSUMPTION OF NEW NATURAL AND SYNTHETIC RUBBER

Year	(In long tons)			World Total
	Natural	United States Synthetic	Total	
1947	562,000	560,000	1,122,000	1,720,000
1946	277,600	761,700	1,039,300	1,368,000
1945	105,400	693,600	799,000	1,136,000
1944	144,100	566,700	710,800	897,000
1943	317,600	170,900	488,500	703,000
1942	376,800	17,600	394,400	699,000
1941	775,000	6,300	781,300	1,220,000
1940	648,500	2,900	651,400	1,066,000
1935	491,500	..	491,500	940,000
1930	375,700	..	375,700	685,000

SOURCE: United States Department of Commerce.

price considerations, with the market shifting to the rubber which could undersell its competitor. The comparative costs of producing the natural and artificial products, therefore, are important factors in determining whether the synthetic industry can operate on a large scale without government assistance.

The Cost of Natural and Synthetic Rubber

The consumption of rubber goods, consisting largely of tires and tubes, is subject to wide fluctuations because of the alternate contraction and expansion of business activity and consumer incomes; on the other hand, production and deliveries of natural rubber tend to fluctuate within narrow limits because of the necessity of meeting heavy fixed costs and of maintaining at a minimum level the labor force and shipping facilities. The relative inflexibility of supply, combined with the marked variations in demand, therefore, produced wide fluctuations in prices of natural rubber in the United States and world markets prior to the war. These marked price variations occurred despite the efforts of producers in the principal rubber-growing areas to stabilize prices through assignment of production quotas.

As Table VIII indicates, during the 10 years preceding the entry of the United States into the war, the average price per pound of crude rubber delivered at New York fluctuated between a low of 3.45 cents during 1932 and a high of 22.34 cents during 1941. The average price for the decade was about 12 cents. During the war and for a considerable period thereafter, prices of both natural and synthetic rubber were controlled by the Government. While under government price control, natural rubber was quoted within a range of 22.5 cents and 25.75 cents per pound; however, since the restoration of a free market in April 1947, price fluctuations have been more pronounced, ranging from about 14 cents to 25 cents per pound.

TABLE VIII
CRUDE RUBBER PRICES
Average of one price weekly, Plantation Ribbed,
Smoked Sheets, Spot, at New York

(In cents per pound)					
Year	Average	Year	Average	Year	Average
1941	22.34	1931	6.15	1921	16.4
1940	20.25	1930	11.93	1920	36.3
1939	17.97	1929	20.65	1919	48.7
1938	14.72	1928	22.36	1918	60.2
1937	19.44	1927	37.9	1917	72.2
1936	16.46	1926	48.6	1916	72.5
1935	12.36	1925	72.5	1915	65.7
1934	12.95	1924	26.2	1914	65.3
1933	5.96	1923	29.7	1913	82.0
1932	3.45	1922	17.6		

SOURCE: *New York Journal of Commerce*.

Should world stocks of rubber become abundant and vigorous competition for markets develop, natural rubber might sell considerably below the prices of the last decade. Estimates based on data assembled by the War Production Board indicate that total United States requirements for rubber probably could be supplied by the more efficient plantations and small holdings at out-of-pocket costs of less than 9 cents per pound. Analysts of the industry have stated that adaptation of the Far Eastern plantations to peacetime conditions will tend to reduce average costs, making operations profitable at less than 8 cents per pound.

Synthetic rubbers have not yet been sold in large quantities on an unregulated market. Prior to the war, neoprene and other specialty rubbers sold for as much as 65 cents per pound at a time when natural rubber was available at about 20 cents. Controlled selling prices were reduced considerably as the larger synthetic plants came into production. Prices quoted for the principal synthetic rubbers by the Rubber Reserve Corporation as of August 1, 1947, were as follows: Buna-S, 18.5 cents per pound; butyl, 18.5 cents per pound; and neoprene, 32.0 cents per pound. Since the reopening of the free market, natural rubber frequently has been quoted considerably below these prices.

The out-of-pocket costs of producing the several synthetic rubbers vary considerably. Government and private estimates of costs indicate variations of 50 percent or more between different types of synthetics and between plants producing much the same type of synthetic product. Neoprene is estimated to have cost about 24 cents per pound during the war but now might be produced for somewhat less. Butyl, which has ranged as high as 22 cents per pound, perhaps could be reduced to about 10 cents. The cost of Buna-S has been estimated at about 12 cents per pound. According to industry

analysts, postwar reduction in the costs of butadiene and styrene produced from petroleum hydrocarbons might lower out-of-pocket cost of Buna-S to 11 cents per pound. With further experience, variable costs as low as eight cents per pound for Buna-S are said to be feasible. On the basis of available data it appears that total out-of-pocket manufacturing costs of the several synthetics, plus selling and shipping expense, range about as follows, depending upon the level of operation of plants and the type and cost of base stock: Buna-S, 11 to 17 cents per pound; neoprene, 20 to 29 cents per pound; and butyl, 11 to 27 cents per pound.

The fixed costs, which also might be included in selling prices, will be determined principally by the valuations placed upon the government-owned facilities. Since they were built under duress of war, the plant investment might be allocated to war costs, thereby minimizing fixed expenses of producing synthetic rubber. Moreover, fixed costs per unit of output probably would comprise only a small part of total cost per unit, if a large portion of the original investment were amortized over the postwar life of the facilities, provided operations were maintained near capacity rates. Available data indicate that fixed costs might fall below two cents per pound in the larger facilities at full-scale operation.

It appears from these estimates that, at present, in an intense competitive battle natural rubber would have an advantage in general uses over synthetic rubber, because of lower costs. Although some general purpose synthetic might be produced for about 10 or 11 cents per pound, a large part of the output of natural rubber probably can be delivered at a lower price.

The Future of the Synthetic Rubber Industry of the Southwest

Despite its cost disadvantage in competition with natural rubber, the synthetic rubber industry may continue to operate at a rate considerably above that required to supply synthetics for specialty uses. If rubber consumption for a time is sustained at high levels, technological progress may reduce costs of producing synthetics, increase their workability, and improve their quality. Even though costs of synthetics are not reduced, demands for them may continue in substantial volume, since combinations of general purpose synthetics with natural rubber yield standard products with superior characteristics and further experimentation with synthetics may develop new uses which will increase greatly the amount consumed. Moreover, considerations of national welfare and international economic policy may require continued operation of a significant portion of synthetic rubber capacity.

In the immediate future, considerations of national welfare may be the most important factor in determining the disposition of synthetic rubber facilities and the levels at which they are to be operated. National security probably demands that the principal synthetic rubber plants be retained intact while there is a possibility that the ocean commerce of the Nation can be disrupted. Conversion of some facilities to other uses is feasible, but for others it would be technically difficult and possibly undesirable. Styrene has alternative uses which will absorb the output of existing facilities. Plants which produced alcohol for butadiene also find ready markets for their products. On the other hand, extensive plant modifications would be required to shift petroleum butadiene, butyl, and copolymerization plants to other uses, and their efficiency as components of the synthetic rubber industry might be impaired. The advantages of keeping operating crews intact, providing practical laboratories for further experimentation, and maintaining efficient inter-industry relations with refinery sources of supply and with fabricating establishments also will be considerations in determining whether operations are to be continued.

Complex considerations of domestic and international policy may influence the level at which synthetic rubber production is to be maintained. Synthetic rubber production could be stepped-up to supplement imports of natural rubber if demand expanded rapidly or could be decreased sharply if consumption diminished. The industry's operations thus might contribute to greater stability of rubber prices in the United States market, reducing the great inventory risks of rubber fabricators.

The effects upon international trade which might result from curtailing United States imports of crude rubber also may be an important consideration in setting production levels for the synthetic rubber industry. For many years before the war, natural rubber was one of the principal import items

of the United States, its value often exceeding that of any other single commodity import. In 1947, United States imports of crude rubber amounted to \$323,000,000, accounting for about 6 percent of total imports, despite synthetic rubber supplying about one-half the requirements of the domestic market. Moreover, natural rubber is potentially more important as an import now than before the war, since other commodities which were significant components of the Nation's import list prior to 1940, particularly silk and certain manufactured goods, may not recover their prewar positions for several years because of limited production capacity or shifts in consumer preferences to substitutes produced in the United States. Maintenance of consumption of synthetic rubber at high levels by limiting imports of natural rubber might deprive foreign nations of critically needed dollar exchange, thus partly offsetting the United States' foreign aid extended to assist in world recovery and amplifying the already badly unbalanced position of world trade.

A long run policy for the synthetic rubber industry has not yet been adopted by the United States, although regulations now in effect require the use of certain proportions of synthetic rubber in the manufacture of designated products. Several bills have been introduced in Congress, however, which outline general conditions for the industry's operation until 1950. These bills propose that the President be empowered to issue regulations to assure domestic consumption of specified percentages of general purpose synthetic rubber in such items as tires, camel-back, and flaps and any or all special purpose synthetic rubber in pneumatic inner tubes. Generally, they provide, as well, for maintenance at all times of rubber-producing facilities, public and private, with total production capacity sufficiently large to meet minimum domestic requirements. The annual capacity of general purpose synthetic rubber which shall be maintained is set at 600,000 tons annually, and the capacity for special purpose rubber, at between 65,000 and 75,000 tons. Adoption of these or similar provisions would assure the maintenance of a major part of the synthetic rubber industry in the Southwest, and possibly continued operation of a portion of the facilities.

Despite its youth, the synthetic rubber industry is a moderately important component of the industrial structure of the Southwest. The heavy wartime investment in Buna-S and other synthetic rubber plants, totaling about \$486,000,000 in the Eleventh District, is considerably greater than the aggregate investment in many other important manufacturing industries in the area and represents probably one-third of the total investment in chemical facilities. Employment in synthetic rubber plants in the Southwest is estimated to total 6,000 workers at present, of whom perhaps 4,500 are engaged in "non-convertible" facilities.

Continued operation of the synthetic rubber industry might prove an important stimulus to further industrialization of the Southwest. An important potential development is the possibility that other industries might be attracted to this area to be near the sources of materials which are the intermediate products of the synthetic rubber plants. Styrene, for example, is a base for many plastics as well as an important component of Buna-S. Its availability, combined with that of other important chemical materials abundant in the coastal region, such as salt, limestone, and sulphur, already has influenced chemical expansion along the Gulf Coast since the end of the war.

Availability of specialty and general purpose synthetic rubbers over a longer period also may influence strongly the location of additional rubber fabricating establishments in the southwestern area. In fact, the Gulf Coastal area may prove exceptionally attractive to rubber fabricators, for besides being the center of the synthetic rubber industry, its ports and intercoastal waterways provide excellent means of bringing natural and synthetic rubbers to plant sites and transshipping rubber products by cheap ocean and barge transport to important marketing areas in the United States and abroad. The regions in which the principal rubber fabricating facilities now are located cannot duplicate these advantages.

Should the rubber fabricating industry be developed further in the Southwest to utilize the synthetic rubbers produced in the area and to benefit from the locational advantages of the port region, a substantial "heavy industry" would be added to the economic organization of the southwestern area. The additions to pay roll and income and the diversification of industrial activities which would be achieved thereby would far exceed in importance the contributions which the synthetic rubber industry alone might make toward the industrial development of the Southwest.

Review of Business, Industrial, Agricultural, and Financial Conditions

DISTRICT SUMMARY

Weather conditions in the District during the past month had diverse effects upon developments in the agricultural and livestock industries. The generally favorable conditions prevailing in the eastern half of the District were partly counterbalanced by the growing intensity of the severe drought in much of the western portion. In the latter area, where only light rains have fallen, planting operations and the growth of crops and range feeds are being retarded because of inadequate moisture, and substantial numbers of livestock are being moved to market or to other areas where pasturage and water are available. In the eastern half of the District moisture conditions generally are satisfactory, and crops and pasture feeds are making good growth.

The value of department store sales was sustained in April at a level 15 percent above that in April last year. After adjustment for seasonal factors and the early date of Easter, April sales were in record volume. Sales of furniture stores increased further from March to April and were one-fifth larger than in April last year.

Daily average production of crude petroleum reached a new peak in April, exceeding the rate a year ago by 12 percent. According to a recent report prepared by the Economic Advisory Committee of the Interstate Oil Compact Commission, the demand for crude petroleum and petroleum products in the United States is expected to rise substantially during the next year. The magnitude of the requirements will exert a strong pressure toward increased output of crude petroleum in this District. The value of construction contracts awarded in the District increased from March to April and was nearly one-fourth larger than in April 1947.

The loans, investments, and deposits of weekly reporting member banks in leading cities of the Eleventh District turned upward during the four-week period between April 14 and May 12, after having declined substantially during the preceding three months.

BUSINESS

The dollar value of department store sales in the District during April was sustained at the March level, although normally a decline occurs when Easter falls in late March. Factors contributing to the favorable sales experience included aggressive post-Easter clearance of spring merchandise, widespread promotional sales, and generally favorable shopping weather, which were successful in stimulating consumer buying interest. In comparison with April last year, sales were up 15 percent, bringing cumulative sales for the first four months of 1948 to 12 percent above those for the corresponding period of 1947.

The adjusted index of department store sales, which makes allowance for seasonal factors and the variable date of Easter, rose in April to 448 percent of the 1935-39 average, the highest of record and well above the 384 percent in March this year and 377 percent in April last year. The favorable sales experience during April was characteristic of trade throughout the United States, but the gain over last year in this District was more pronounced than that for the country.

The ratio of cash sales to total sales declined slightly in April, offsetting the small increase that occurred in March. The ratio of 35 percent for April compares with 41 percent in the corresponding month of 1947. The ratio of April collections on

regular charge accounts to accounts receivable outstanding at the first of the month was 56 percent as compared with 53 percent in March, 51 percent in February, and 55 percent in April last year. Collections during April on instalment accounts outstanding declined seasonally, being 20 percent of receivables outstanding at the first of the month as compared with 25 percent in March, 19 percent in February, and 29 percent in April 1947.

Merchandise inventories at reporting department stores remained at approximately the same level in April as in the previous month but were about one-fourth larger than in the same month of the previous year. The downward trend in outstanding orders, which was evident in February and March, continued in April. At the end of April the total was 21 percent below that at the close of March and only 2 percent above the low level to which it had fallen on April 30, 1947. For several months department stores have kept receipts of new merchandise well in line with sales, and, as delivery schedules are reduced, forward commitments are trimmed accordingly. Moreover, many stores are placing orders for only a portion of fall requirements, pending a more accurate appraisal of business trends later in the year.

WHOLESALE AND RETAIL TRADE STATISTICS

	Number of reporting firms	Percentage change in			Stocks †	
		April 1948 from April 1947	March 1948 from April 1947	Jan. 1 to April 30, 1948 from April 1947	April 1948 from April 1947	March 1948 from April 1947
Retail trade:						
Department stores:						
Total 11th Dist.	48	15	†	12	24	1
Corpus Christi	4	3	-10	-1	†	†
Dallas	7	12	-4	7	16	1
Fort Worth	4	13	2	11	31	5
Houston	7	31	-2	25	43	2
San Antonio	5	10	8	10	24	-2
Shreveport, La.	3	20	-3	19	22	-†
Other cities	18	10	4	7	22	-†
Furniture stores:						
Total 11th Dist.	40	20	7	..	10	1
Dallas	4	30	20	..	-10	-3
Houston	4	18	11	..	..	..
Port Arthur	4	6	-31	..	9	-1
San Antonio	4	12	-4	..	..	..
Wholesale trade: *						
Machinery, equip't, and supplies	3	75	-4	..	..	..
Industrial supplies	3	13	-4	..	26	..
Jewelry	3	-14	-32	..	..	..
Drugs	5	3	-4	-†	9	1
Dry goods	6	12	-2	..	-3	1
Groceries	30	17	4	5	14	-4
Hardware	10	12	2	5	15	5
Tobacco & products	10	-4	3	†	18	6

*Compiled by United States Bureau of Census. (Wholesale trade figures preliminary.)

†Stocks at end of month.

†Indicates change less than one-half of one percent.

INDEXES OF DEPARTMENT STORE SALES AND STOCKS

Daily average sales—(1935-39=100)

	Unadjusted*			Adjusted			April 1947
	April 1948	March 1948	February 1948	April 1948	March 1948	February 1948	
11th District	399	384	324	347	448	384	377
Dallas	363	363	320	326	395	374	354
Houston	453	447	359	346	472	502	360

Stocks—(1935-39=100)

	Unadjusted*			Adjusted			April 1947
	April 1948	March 1948	February 1948	April 1948	March 1948	February 1948	
11th District	409	399	377	316	411	420	326

*Unadjusted for seasonal variation.

The dollar value of sales at reporting furniture stores in the District continued to increase in April, being 7 percent greater than in March and one-fifth above that of April 1947. Credit sales rose 7 percent from the previous month and constituted

86 percent of total sales in April as compared with 82 percent in April 1947. The marked rise in credit sales during the past year has been reflected in a steady growth of end-of-month receivables, which rose 4 percent in April to a level 56 percent above that at the end of April a year ago. Collections have been increasing at a much slower rate than receivables, indicating a decrease in the collection ratio. April collections were in about the same volume as in March and were only 13 percent greater than in April last year. Inventories at the end of April showed a further increase of 1 percent over those a month earlier and were 10 percent greater than at the end of April 1947. Although furniture output has increased substantially over the past year, retail stores have evidenced a disposition to maintain purchases well in line with current and prospective sales.

AGRICULTURE

Favored by open weather and adequate moisture, ranges and most growing crops in the eastern half of the District made satisfactory to excellent progress during April and early May. The western half of the District, however, has received only light rains, and there is an urgent need for additional moisture to stimulate growth of crops and range feeds and to enable farmers to complete spring planting. In the Lower Rio Grande Valley, crops are suffering severely from inadequate soil moisture and the depletion of irrigation water supplies. Livestock made slight improvement during April but on May 1 were still substantially below average condition for this season of the year.

The drought in the winter wheat belt of northwest Texas and New Mexico is gradually becoming more critical. Although light rains or showers have afforded temporary relief from time to time, the wheat crop in some areas has continued to deteriorate. While abandonment of seeded acreage has not been excessive thus far, an increasing number of fields are being grazed or plowed in anticipation of planting other crops. Grain in some areas is already heading short. Despite the very unfavorable moisture conditions and acreage abandonment, the United States Department of Agriculture forecast for Texas on May 1 a wheat crop of 49,136,000 bushels—276,000 bushels above the April 1 forecast. This estimate, although less than 40 percent of the crop harvested last year, is more than 7 percent above the 10-year (1937-46) average production. The acreage of wheat left for harvest on May 1, including volunteer, was estimated at 6,142,000 acres, about 16 percent below the record of 7,310,000 acres last year but 55 percent above the 10-year average. The estimated yield per acre of 8.0 bushels compares with 17.0 bushels last year and an average of 11.6 bushels.

Corn is in good condition throughout most eastern and southern sections of the District, with early corn in the southern counties of Texas nearing maturity. Some hail and wind damage has occurred in scattered parts of northcentral and northeast Texas. The sorghum crop continues to make good progress in southcentral and southern counties of Texas, where the crop is heading out. Early sorghums are making fair to good progress in central and northern counties of Texas. In the Plains areas of the State, however, planting is being delayed due to the lack of soil moisture. The Texas oat crop on May 1 was reported to be in the poorest condition for that date since 1936. The mid-March freeze caused severe losses both to acreages and stands, and limited moisture supplies in important producing areas have further reduced yield prospects. Planting of rice in Texas was about completed by May 1, and growing conditions have been favorable.

Cotton has made fair to good growth in central and south-east Texas and in north Louisiana, where cultivation and chopping are proceeding rapidly. In south Texas much of the crop is blooming and fruiting. In the northern and northeastern counties of the State more than half of the crop is planted, but seeding in northwest Texas is being retarded by the drought.

The condition of the Texas hay crop on May 1, while slightly above average for that date, was considerably below the condition of the crop a year ago. Due to an unusually long winter feeding period caused by the extended cold weather and the spring drought, the stocks of old hay on Texas farms were reduced to an estimated 136,000 tons on May 1—the lowest level for that date since 1935. Largely because of losses from the freeze, the Texas peach crop is expected to amount to only about 961,000 bushels, compared with a 1947 crop and an average production of nearly 1,700,000 bushels.

Growing conditions in the Lower Rio Grande Valley have been unfavorable for commercial vegetables, as irrigation water is at a very low level and strong winds and high temperatures in late April and early May depleted the meager supply of soil moisture. In other areas, however, tomato, cantaloupe, water-melon, onion, and early potato crops have made good progress under favorable moisture and growing conditions, although some crops are late. The supplies of commercial vegetables have become more plentiful with the increase in harvest of potatoes, corn, and tomatoes in the Lower Valley and of early cucumbers and onions in the Coastal Bend and Raymondville districts.

PRODUCTION OF SELECTED SPRING VEGETABLES IN TEXAS

(In thousands of units)

Crop	Units	10-year (1937-46) average	1947	Estimated 1948
Snap beans—early	Bushels	305	328	187
Cucumbers—early	Bushels	222	264	273
Garlic—early	Sacks	13	9	8
Onions—early	Sacks	3,760	4,094	3,959
Onions—late	Sacks	1,206	1,019	553
Irish potatoes—early	Bushels	798	1,152	1,215
Irish potatoes—late	Bushels	553	555	578
Strawberries—early	Crates	79	39	63
Tomatoes—early	Bushels	2,244	2,912	2,197
Tomatoes—late	Bushels	2,103	2,700	2,618

*Lower Rio Grande Valley only.

Range feeds in the eastern half of the District made rapid growth following the rains in late April and are now in generally good condition. Although the April rains temporarily relieved droughty conditions in scattered areas of the western portion of the District, precipitation generally has been too light to relieve the critical drought. While supplemental feeding is being continued on many ranches, the movement of livestock to market or to better grazing areas is taking place on considerable scale. The condition of range feeds in Texas on May 1 was reported to be slightly improved from a month earlier but still about 8 percent below average for this season of the year. Cattle and calves in the eastern half of the District made rapid improvement on the plentiful supply of new feed during April. In most other areas cattle made poor to only fair gains on the limited new feed supplies. Cattle in Texas on May 1, although in slightly better condition than a month earlier, were still six percent below average for this season.

Reflecting poor range conditions, stock sheep generally came through the winter in very poor flesh despite heavy supplemental feeding. Lamb losses have been considerable and many young animals have been stunted. Reports indicate that many spring lambs intended for marketing in late May or June may be held for fall marketing because of retarded growth and lack of finish. In the northeastern Edwards Plateau counties lambs

are making good gains on the improved feed supply. The slightly improved condition of sheep and lambs in Texas on May 1 was still 12 percent below average for this date. Partly because of the unfavorable price of mohair, goats are being marketed in considerable volume.

CASH RECEIPTS FROM FARM MARKETINGS

(In thousands of dollars)

State	March 1948			March 1947 Total	Cumulative receipts Jan. 1 to Mar. 31, 1948	
	Crops	Livestock	Total		1948	1947
Arizona.....	\$ 10,831	\$ 6,326	\$ 17,157	\$ 12,784	\$ 50,943	\$ 40,155
Louisiana.....	13,937	9,135	23,072	13,194	69,293	47,705
New Mexico.....	3,656	6,609	10,265	8,915	30,265	24,726
Oklahoma.....	6,944	21,117	28,061	39,239	117,942	115,400
Texas.....	67,379	57,149	124,528	104,469	411,235	287,243
Total.....	\$102,747	\$100,336	\$203,083	\$178,601	\$679,678	\$515,229

SOURCE: United States Department of Agriculture.

Livestock moved to market in heavy volume from Texas farms and ranches during April, reflecting both the usual seasonal increase and the acute shortage of range feeds in many areas. April receipts of cattle at the Fort Worth and San Antonio markets, combined, were more than double those of March and slightly higher than during April 1947. Receipts of calves were up 55 percent above the previous month and 25 percent above April of last year, while receipts of hogs were up more than 50 percent over the previous periods. Receipts of sheep and lambs in April rose 79 percent above March and were 40 percent above April receipts last year.

LIVESTOCK RECEIPTS—(Number)

Class	Fort Worth			San Antonio		
	April 1948	April 1947	March 1948	April 1948	April 1947	March 1948
Cattle.....	85,583	78,544	34,354	32,849	37,194	21,191
Calves.....	14,318	15,010	9,509	22,649	14,630	14,281
Hogs.....	97,001	61,702	56,239	9,177	6,344	8,512
Sheep.....	143,232	105,746	75,524	58,397	29,323	37,266

COMPARATIVE TOP LIVESTOCK PRICES

(Dollars per hundredweight)

Class	Fort Worth			San Antonio		
	April 1948	April 1947	March 1948	April 1948	April 1947	March 1948
Beef steers.....	\$30.50	\$25.00	\$29.00	\$30.50	\$23.00	\$28.75
Stocker steers.....	28.50	20.75	26.50	28.50	23.00	28.75
Heifers and yearlings.....	30.00	24.50	29.25	30.50	23.00	28.75
Butcher cows.....	24.00	17.50	23.00	23.50	17.25	23.00
Calves.....	30.00	23.00	29.00	30.00	23.00	28.00
Hogs.....	22.50	23.75	26.50	21.75	26.50	23.25
Lambs.....	25.00	23.75	23.50	23.50	22.90	22.00

Prices received by Texas farmers for most agricultural products continued to advance during the month ended April 15, according to the mid-month price report of the United States Department of Agriculture. Advances in prices received for cattle and cotton, together with gains made in March, have more than offset the sharp declines which occurred in February. Feed grains have regained a substantial part of the mid-February price decline. Other prices showing significant increases during the month ended April 15 were those received for wheat, potatoes, cowpeas, cottonseed, and wool. Dairy and poultry products registered only limited price changes, while declines occurred in prices received for hogs and citrus fruits.

Varied price movements were registered in the commodity markets between mid-April and mid-May. Prices for cotton and most classes of livestock made slight gains, and prices of spring lambs were up almost one-fourth. Prices received for sorghums showed little change, but prices received for other feed grains and wheat declined substantially.

Present Rice Outlook¹

Production of rice in the United States has increased steadily since 1942, when, with the outbreak of war, supplies from the Orient were cut off and the demand for American rice increased sharply to meet the requirements of Cuba, Canada, and our European allies, as well as to fill domestic and military needs. As the result of this increased demand and rising prices, the acreage devoted to the production of this crop increased sharply each year between 1942 and 1947, and a near-record acreage is indicated for 1948. Production of rough rice in the United States last year rose to a record level of 79,345,000 bushels—10 percent above the previous record crop harvested in 1946 and 59 percent above the prewar (1935-39) average. In Texas, production rose from a prewar average of 12,236,000 bushels to 17,700,000 bushels in 1946 and to 23,700,000 bushels in 1947.

World production in the 1947-48 (August-July) season, which is expected to total about 7,100,000,000 bushels, will be about 2 percent above that harvested during the 1946-47 season but still 5 percent below the prewar average. Despite the recent gain in total production, world supplies available for export in the 1947-48 season are estimated at only 200,000,000 bushels of rough rice, compared with a prewar average of 600,000,000 bushels and 170,000,000 bushels during 1946-47. The major part of the increased production during the 1947-48 season occurred in the war-affected countries of Asia. China is estimated to have produced 2,348,000,000 bushels, compared with 2,329,000,000 bushels harvested during the preceding season and a prewar average of 2,623,000,000 bushels. Production in Burma totaled 270,000,000 bushels during the 1947-48 season—about 39 percent above the preceding year's crop but still 23 percent below prewar. A substantial increase in production also occurred in Formosa, Siam, and Korea. In India and Japan, however, production was somewhat lower than in the preceding season. European production was substantially above that of 1946-47 and even slightly above the prewar average. Production in that area, however, still falls substantially below requirements. The South American crop is expected to be somewhat lower during 1947-48 than in the preceding season, but the indicated crop of 160,000,000 bushels is about 79 percent above the prewar average. The reduction in South America this season is due entirely to the sharp decline in the acreage in Brazil.

PRODUCTION OF ROUGH RICE
(In thousands of bushels)

	Average 1935-39 to 1939-40	1946-47	1947-48 ^a
North America†.....	62,900	91,600	100,400
United States.....	49,852	72,216	79,345
Texas.....	12,236	17,716	23,700
Europe*.....	53,100	41,000	54,200
Asia*.....	7,111,700	6,499,400	6,598,000
Burma.....	348,534	194,114	270,500
China.....	2,623,383	2,328,736	2,348,082
Formosa.....	85,704	55,109	73,100
India.....	1,904,819	2,104,781	2,050,000
Korea.....	195,763	110,112	128,650
Japan.....	595,845	561,082	545,447
Siam.....	213,079	128,000	143,000
South America‡.....	89,500	162,403	159,400
Brazil.....	66,424	118,000	111,000
Africa§.....	106,000	136,600	154,300
Total World.....	7,442,000	6,950,000	7,086,000

†Crop harvested during first half of the crop season.

‡Crop harvested during latter half of the crop season.

*Indicated.

*Excluding U. S. S. R.

SOURCE: U. S. Department of Agriculture, Office of Foreign Agricultural Relations.

¹This article brings up to date some information contained in an article entitled "The Rice Industry in Texas" which appeared in the November 1, 1947 issue of the *Monthly Business Review*.

Coincident with the decline in production abroad and the increased demand for American rice during the war period, foreign shipments from this country, including exports and shipments to possessions and occupied areas, increased sharply, rising from an average of only 18,660,000 bushels in the prewar (1935-39) period to 40,290,000 bushels in the 1946-47 season. Moreover, estimates made by the United States Department of Agriculture indicate that shipments in the 1947-48 season will at least equal those of the preceding year and may be well above that level. During the first seven months of the current season, commercial exports of 19,500,000 bushels were 3 percent above those during the same period in 1946-47. Cuba, the most important foreign market for United States rice, received 67 percent of the exports during this seven-month period, compared with 36 percent in 1946-47 and a prewar average of 77 percent. Canada, historically the second most important importer of United States rice, received 8 percent of the exports during the seven-month period, compared with 4 percent last season and 5 percent in the prewar period. China, which imported only very small quantities from the United States prior to the war, received 12 percent of the shipments made during the seven-month period and 8 percent of the shipments in 1946-47. The European Continent, which received 12 percent of the rice exported from this country in the prewar years, received less than 2 percent during the first seven months of the current season. The Philippines, which imported a large volume of United States rice in 1946-47 to offset the small crop produced in that country, received less than 20,000 bushels this season.

It is expected that foreign shipments from the United States this season will be maintained at a relatively high level, in spite of the improved supply outlook in several major importing countries in the Orient and the general shortage of American dollars abroad. In fact, if foreign aid should be extended by the United States in the amount now contemplated, foreign shipments may be substantially above those of last season. Recent reports on the European Recovery Program indicate that

rice-producing countries such as Cuba and Canada with additional dollars with which to maintain their volume of rice purchases in the United States.

Foreign outlets will continue to be a very strong supporting factor in the rice market for a number of years if exchange difficulties can be solved. The Food and Agricultural Organization of the United Nations has estimated that in spite of recent improvement in production abroad, five years may be required to restore production in the war-affected countries of Asia. In addition, the population in Asia has increased very rapidly, and present demands for rice are considerably above prewar. Therefore, that area may provide a profitable outlet for American rice for several years. Continued large shipments to the Orient, however, will depend upon an increase in total exports of goods from that area or upon continuation of aid from the United States.

In addition to the continued large foreign market, the domestic market should absorb an increased volume of rice in the years ahead if the supply is available at prices competitive with those of other cereals. During the war years, when a large part of the United States supply was diverted abroad, the per capita consumption of rice in this country declined significantly, falling from an average of 5.7 pounds of milled rice during the prewar period to 4.1 pounds in 1945-46. Per capita consumption increased in 1946-47 to 4.9 pounds, and a further increase is anticipated in the 1947-48 season. Total domestic consumption for all purposes averaged 30,590,000 bushels in the prewar period but, due to the increase in population and expanded industrial uses of rice, rose to 31,160,000 bushels in 1946-47 and, according to estimates of the United States Department of Agriculture, is expected to rise to 33,500,000 bushels in 1947-48. Further increases in domestic consumption, however, might be limited by high retail prices for rice and rice products, since reports indicate that consumers are turning to other and cheaper substitute cereals. At the same time, this competitive factor may tend to sustain consumption, if the recent declines in prices of most grains should result in lower prices received for rice.

The record production of rice in the United States in 1947 plus the carry-over of 2,000,000 bushels at the beginning of this season provided a total supply of 81,345,000 bushels. If total domestic consumption equals the 33,500,000 bushels forecast by the United States Department of Agriculture and if overseas shipments equal no more than the 40,290,000 bushels moved abroad last year, a carry-over of 7,500,000 bushels would result. Stocks of this size would be almost four times as large as those of the preceding season and approximately double the prewar average. However, in view of the continued world-wide shortage of rice, it appears probable that foreign shipments will be well above those of last season, possibly totaling as much as 43,500,000 or 44,000,000 bushels, in which event this season's carry-over would be reduced to between 4,000,000 and 4,500,000 bushels.

A near-record production of rice is expected in the United States in 1948, since the indicated acreage of 1,666,000 acres is only slightly below the record planting of 1947. The area devoted to rice in Texas is expected to total 483,000 acres and

SUPPLY AND DISTRIBUTION OF ROUGH RICE—CONTINENTAL UNITED STATES

(In thousands of bushels)

	Average 1935-36 to 1939-40	1946-47	1947-48 ^a
Total supply.....	55,160	73,820	81,340
Civilian food.....	25,950	22,910	24,800
Seed and feed.....	3,720	4,700	4,700
Used by brewers.....	920	3,550	4,000
Total U. S. disappearance.....	30,590	31,160	33,500
Exports and shipments.....	18,660	37,900	43,500
Military services and relief.....	..	2,390	to 44,000*

^aIndicated.

*Available for foreign shipment if a carryover equal to prewar average is maintained.

SOURCE: United States Department of Agriculture, Bureau of Agricultural Economics.

between \$35,000,000 and \$40,000,000 may be provided under the program for the purchase of rice in Western Hemisphere countries for shipment to Europe alone between April 1948 and the end of June 1949. This amount is in addition to approximately \$12,000,000 worth of rice which would be shipped to Europe but paid for from other sources. Total shipments to Europe during the 15-month period, therefore, may equal at least \$45,000,000 to \$50,000,000, which would be far above those of recent years and approaching the prewar average. Substantial aid also will be extended to China and, through the Department of the Army, to Japan. The extension of foreign aid will not only provide for a continued flow of rice and other products to Europe and Asia but might also improve exchange conditions generally through the sale of goods by other countries to the United States for shipment under the aid program. Such purchases by the United States would provide other important

RICE ACREAGE

(In thousands of acres)

	Average 1937-46	1947	Indicated 1948
Arkansas.....	240	360	360
Louisiana.....	551	616	610
Texas.....	343	474	483
California.....	185	237	213
United States.....	1,319	1,687	1,666

SOURCE: United States Department of Agriculture, Bureau of Agricultural Economics.

to be about 2 percent above that of the preceding year. The acreage in Arkansas is expected to remain unchanged, and only a very small decline is indicated in Louisiana; however, a reduction of about 10 percent is expected in the planted acreage in California.

The short-run outlook for the price of United States rice at this time appears to be generally favorable. The tendency of per capita domestic consumption to rise toward the prewar rate and the prospective strong foreign demand seem likely to provide an outlet for probable supplies that will be available through the middle of 1949. An appraisal of the price trend, however, should take into consideration the effect of a possible downward readjustment in prices of other grains, which might cause the price of rice to show a sympathetic decline.

The longer-run outlook for the rice industry in the United States seems to indicate a probable downward readjustment in production and some modification of the favorable relationship now existing between the price of rice and the price of non-agricultural products. The factors bearing upon the situation include the following:

- After the initial period, it is anticipated that shipments of food under the European Recovery Program will constitute a diminishing proportion of the total, and, hence, rice shipments from the United States may be reduced somewhat.
- Rice producers in the United States are likely to face increasing competition, not only from the Orient as production is restored or increased in those areas but also from new areas in South America and Africa which were brought into production during the war period.
- If the present shortage in dollar exchange should persist, countries importing rice and other commodities from the United States may turn to sources of supply where exchange may be obtained with greater ease.

Factors which may temper the long-run readjustment include:

- The possibility that increasing world population and the food deficiencies in the Oriental countries may provide a sufficiently strong demand for rice to absorb available supplies for a long period.
- The possibility that domestic consumption may absorb an increasing proportion of domestic production.
- The possibility that domestic producers may reduce acreage to permit a rebuilding of the soil which was depleted through overcropping during the war and post-war periods.
- The probability that the Congress will enact legislation providing a long-range price support program for agricultural products.

FINANCE

Figures of the weekly reporting member banks in the Eleventh District showing principal asset and liability accounts reveal an increase in total loans and investments of approximately \$14,450,000 during the four-week period ended May 12 and an increase in adjusted demand deposits of almost \$52,000,000 in the same period. Time deposits of the weekly reporting member banks declined slightly, while deposits of the United States Government increased by almost \$4,000,000.

Although the week to week movement of these accounts was somewhat mixed, no important change in the underlying trend which has been in evidence since earlier in the year was apparent.

Commercial, industrial, and agricultural loans, which represent the principal loan category of these banks, decreased during the weeks ended April 21 and May 5 but increased by more than offsetting amounts during the weeks of April 28 and May 12. As a result of a series of weekly decreases in commercial, industrial, and agricultural loans early in the year followed by an alternating movement of moderate weekly increases and decreases, the total amount of commercial, industrial, and agricultural loans as of May 12 was approximately \$6,000,000 less than the amount outstanding on December 31, 1947. It appears that during the first four and one-half months of this year banks located in the larger cities of the District have been meeting business requirements for financing by utilizing the proceeds of loan repayments and have avoided adding significantly to their loan volume. The demand for credit continues relatively strong, according to reports; but there is no evidence that business firms needing funds are unable to meet their requirements, provided, of course, that the essentials of a sound, bankable credit are met.

The category "all other" loans, comprising a miscellany of finance type borrowings and consumer loans, showed moderate decreases between April 14 and May 5 but increased by about \$2,650,000 during the week ended May 12. The net effect of these movements resulted in a total of all other loans amounting to \$168,764,000 on May 12 in contrast with \$169,715,000 on April 14. Since the first of the year, however, this category of loans has increased by about \$9,200,000, probably reflecting a gradual increase in loans of a consumer credit character. Real-estate loans increased by relatively minor amounts during each week between April 14 and May 12. As has been the case with commercial, industrial, and agricultural loans, however, new credit extensions for real-estate purposes appear to have only slightly exceeded repayments during the four-week period ended May 12, and since December 31, 1947, have increased by something less than \$5,000,000.

CONDITION STATISTICS OF WEEKLY REPORTING MEMBER BANKS
IN LEADING CITIES—Eleventh Federal Reserve District
(In thousands of dollars)

Item	May 12, 1948	May 14, 1947	April 14, 1948
Total loans and investments.....	\$2,187,646	\$2,070,097	\$2,173,195
Total loans.....	1,021,974	812,283	1,010,507
Commercial, industrial, and agricultural loans....	705,054	539,595	697,540
Loans to brokers and dealers in securities.....	6,255	7,265	6,207
Other loans for purchasing or carrying securities....	59,004	71,642	55,921
Real-estate loans.....	81,831	72,356	80,748
Loans to banks.....	466	1,752	376
All other loans.....	168,764	119,673	169,715
Total investments.....	1,165,672	1,257,814	1,162,688
U. S. Treasury bills.....	19,582	40,115	11,311
U. S. Treasury certificates of indebtedness.....	163,558	236,921	163,011
U. S. Treasury notes.....	93,418	118,013	93,007
U. S. Government bonds (incl. gtd. obligations)....	774,089	767,048	778,822
Other securities.....	115,025	95,717	116,537
Reserves with Federal Reserve Bank.....	492,069	451,461	467,488
Balances with domestic banks.....	316,032	287,234	300,408
Demand deposits—adjusted*.....	1,893,801	1,735,272	1,841,953
Time deposits.....	398,367	374,002	399,846
United States Government deposits.....	42,491	37,701	38,624
Interbank deposits.....	531,000	542,122	531,185
Borrowings from Federal Reserve Bank.....	None	None	None

*Includes all demand deposits other than interbank and United States Government, less cash items reported as on hand or in process of collection.

Holdings of Government securities of the weekly reporting member banks showed relatively little over-all change during the period, rising from \$1,046,151,000 on April 14 to \$1,050,647,000 on May 12. The increase of almost \$4,500,000 in holdings of Government securities was accounted for by an increase of approximately \$8,271,000 in holdings of United States Treasury bills, offset in part by a decrease of \$4,733,000 in

holdings of United States Government bonds. During the past year, holdings of Government securities by the weekly reporting member banks in this District have declined by almost \$111,500,000, with most of the decline having resulted from smaller investments in Treasury certificates of indebtedness and Treasury notes.

Averages of daily figures of gross demand deposits of all member banks in the Eleventh District showed a decline of almost \$32,000,000 during April, with virtually all of the decline being reported by country banks of the District whose gross demand deposits decreased from \$2,661,000,000 to \$2,633,000,000, a decline of \$28,000,000. Time deposits of the country banks of the District showed virtually no change during April, while this class of deposits of the reserve city banks of the District increased by slightly less than \$5,000,000.

GROSS DEMAND AND TIME DEPOSITS OF MEMBER BANKS

Eleventh Federal Reserve District
(Averages of daily figures. In thousands of dollars)

	Date	Combined total		Reserve city banks		Country banks	
		Gross demand	Time	Gross demand	Time	Gross demand	Time
April 1948	1948	\$5,012,092	\$472,155	\$2,520,721	\$300,908	\$2,491,341	\$171,247
April 1947	1947	4,617,549	524,355	2,208,463	330,604	2,409,086	193,751
December 1947	1947	5,284,150	549,098	2,516,849	342,638	2,767,301	207,000
January 1948	1948	5,319,138	557,571	2,527,706	349,429	2,791,432	208,142
February 1948	1948	5,088,150	564,973	2,392,425	355,853	2,695,725	209,120
March 1948	1948	5,019,464	569,800	2,357,864	357,605	2,661,600	212,195
April 1948	1948	4,987,656	574,507	2,354,485	362,306	2,633,171	212,201

The relatively constant level of time deposits held by member banks in this District is also reflected by figures received from 102 reporting banks, showing only a fractional percentage decline in this type of deposit during April.

SAVINGS DEPOSITS

Eleventh Federal Reserve District

City	Number of reporting banks	April 30, 1948		Percentage change in savings deposits from	
		Number of savings depositors	Amount of savings deposits	April 30, 1947	March 31, 1948
Louisiana: Shreveport.....	3	32,945	\$ 25,555,303	- 3.5	- 0.9
Texas:					
Beaumont.....	3	12,056	6,333,060	-11.4	0.1
Dallas.....	8	137,689	78,642,859	1.4	- 0.4
El Paso.....	2	35,463	23,315,556	- 2.2	- 1.3
Fort Worth.....	4	42,970	34,623,390	- 0.3	- 1.3
Galveston.....	4	23,068	21,915,203	4.4	2.0
Houston.....	8	105,798	72,062,747	1.8	1.1
Lubbock.....	2	1,410	1,824,342	12.1	3.8
Port Arthur.....	2	6,174	4,959,969	- 6.7	0.3
San Antonio.....	5	38,775	47,125,726	1.6	- 1.0
Waco.....	3	10,111	9,597,342	- 0.8	- 0.6
Wichita Falls.....	3	9,937	4,538,704	- 1.6	- 0.4
All other.....	55	63,495	54,423,152	1.1	- 0.7
Total.....	102	516,792	\$384,937,373	0.5	- 0.4

†Indicates change of less than one-half of one percent.

In contrast with developments of the preceding month, bank debits in twenty-four cities throughout the District showed a decrease during April of approximately one percent from the total of the preceding month, while the turnover of deposits during this latest reporting month was at an annual rate of 13.1 in contrast with a rate of 13.3 during March. Decreases in debit figures were reported by banks in eleven of the twenty-four reporting cities, with largest decreases being reported from Austin and Port Arthur, while banks in other cities showed relatively small increases or virtually no change from the amounts of the preceding month. Despite the decline in bank debits reported during April, total debits exceeded those of April a year ago by approximately 25 percent, and the annual rate of turnover of deposits as indicated above for April 1948 compared with a rate of 11.4 for the same month last year.

BANK DEBITS, END-OF-MONTH DEPOSITS, AND ANNUAL RATE OF TURNOVER OF DEPOSITS

(Amounts in thousands of dollars)

City	Debits			End-of-month deposits* April 30, 1948	Annual rate of turnover		
	April 1948	April 1947	March 1948		April 1948	April 1947	March 1948
Arizona: Tucson.....	\$ 62,076	19	- 6	\$ 84,924	8.6	7.8	9.1
Louisiana:							
Monroe.....	32,213	27	- 4	40,410	9.5	8.4	9.8
Shreveport.....	135,578	29	4	156,321	10.4	8.8	10.0
New Mexico: Roswell.....	13,493	13	- 5	17,785	9.1	8.2	9.5
Texas:							
Abilene.....	33,756	24	2	40,341	10.0	8.9	9.7
Amarillo.....	86,452	20	5	84,707	12.4	11.8	12.0
Austin.....	111,769	17	-13	103,133	13.1	11.9	15.4
Beaumont.....	94,137	30	- 7	95,072	11.9	10.7	12.5
Corpus Christi.....	78,348	16	- 3	75,046	12.5	11.9	13.1
Corsicana.....	10,620	29	1	19,333	6.6	5.2	6.1
Dallas.....	992,183	26	1	698,182	17.2	14.5	17.2
El Paso.....	122,519	27	- 4	115,414	12.7	10.9	13.2
Fort Worth.....	301,754	8	2	270,683	13.4	12.4	13.3
Galveston.....	67,293	17	- 8	92,137	8.8	8.2	9.5
Houston.....	1,031,937	37	- 2	855,991	14.8	12.2	15.4
Laredo.....	19,150	14	12	23,192	10.2	10.0	9.5
Lubbock.....	67,233	43	-14	70,453	11.5	10.1	11.8
Port Arthur.....	34,181	18	-14	39,424	10.4	9.0	11.9
San Angelo.....	30,945	9	1	37,235	9.8	8.0	9.8
San Antonio.....	248,327	9	2	313,471	9.5	8.8	9.4
Texarkana.....	15,211	14	10	22,026	8.2	7.3	7.3
Tyler.....	42,712	34	5	50,753	10.2	9.0	9.7
Waco.....	40,407	3	-10	61,926	9.0	8.9	9.8
Wichita Falls.....	53,513	26	4	77,069	8.4	7.9	8.0
Total—24 cities.....	\$3,729,807	25	- 1	\$3,445,028	13.1	11.4	13.3

*Demand and time deposits at the end of the month include certified and officers' checks outstanding but exclude deposits to the credit of banks.

†Indicates change of less than one-half of one percent.

‡This figure includes only one bank in Texarkana, Texas. Total debits for all banks in Texarkana, Texas-Arkansas, including two banks located in the Eighth District, amounted to \$25,455.

Principal changes in the condition statement of the Federal Reserve Bank of Dallas for the month ended May 15 included a decline of approximately \$6,000,000 in earning assets, accounted for by an almost equivalent decline in holdings of United States Government securities, an increase of approximately \$25,000,000 in member bank reserve deposits, and a slight decline in the amount of Federal Reserve notes of this bank in actual circulation. A comparison of the condition statement of this bank with the statement of May 15, 1947 shows substantial increases in all major accounts. Total gold certificate reserves reflected an increase of almost \$78,000,000, holdings of Government securities amounted to about \$924,000,000 in contrast with a portfolio a year ago of \$890,835,000, while Federal Reserve notes of this bank in actual circulation totaled \$587,678,000 as compared with \$570,481,000.

CONDITION OF THE FEDERAL RESERVE BANK OF DALLAS

(In thousands of dollars)

Item	May 15, 1948	May 15, 1947	April 15, 1948
Total gold certificate reserves.....	\$554,203	\$475,931	\$525,097
Discounts for member banks.....	705	200	549
Foreign loans on gold.....	5,338	719	5,202
U. S. Government securities.....	924,029	890,835	930,315
Total earning assets.....	930,162	891,754	936,066
Member bank reserve deposits.....	822,066	749,787	797,919
Federal Reserve notes in actual circulation.....	687,678	570,481	689,143

MEMBER BANK RESERVES AND RELATED FACTORS

Eleventh Federal Reserve District
(In millions of dollars)

Item	Changes in weeks ended				Cumulative changes	
	May 12, 1948	May 5, 1948	April 28, 1948	April 21, 1948	4 weeks ended May 12, 1948	Jan. 1 to May 12, 1948
Federal Reserve credit—local.....	0.7	1.1	- 1.7	4.9	5.0	- 3.7
Interdistrict commercial & financial transactions.....	5.1	- 5.7	-42.3	- 3.0	-45.9	-26.4
Treasury operations.....	4.8	23.2	22.5	14.6	65.1	-52.2
Currency transactions.....	- 0.2	- 4.7	1.6	..	- 3.3	40.6
Other deposits at the Federal Reserve Bank.....	1.3	- 2.2	- 0.1	0.1	- 0.9	- 0.3
Other Federal Reserve accounts.....	0.7	2.1	0.2	0.1	3.1	4.7
Member bank reserve balances.....	12.4	13.8	-19.8	16.7	23.1	-37.3

Note: Amounts preceded by a minus sign reduce reserves; all others add to reserves.

NEW MEMBER BANK

The American State Bank, Lubbock, Texas, a newly organized institution located in the territory served by the Head Office of the Federal Reserve Bank of Dallas, opened for business on May 20, 1948, as a member of the Federal Reserve System and of the Federal Deposit Insurance Corporation. This bank has total capital funds of \$250,000, including capital of \$100,000, surplus of \$100,000, and undivided profits of \$50,000. Its officers are: Jack Payne, President; Earl B. Collins, Vice President; and J. W. Langston, Cashier.

NEW PAR BANK

The First State Bank, El Paso, Texas, a newly organized nonmember bank located in the territory served by the El Paso Branch of the Federal Reserve Bank of Dallas, was added to the Federal Reserve Par List on its opening date, May 6, 1948. This bank, a member of the Federal Deposit Insurance Corporation, has total capital funds of \$150,000, including capital of \$100,000, surplus of \$25,000, and undivided profits of \$25,000. Its officers are: Paul Harvey, President; H. S. Bryan, Cashier; and E. J. Pondrom, Assistant Cashier.

INDUSTRY

Daily average production of crude oil reached new all-time peaks in April of 2,655,000 barrels in the District and 2,740,000 barrels in other areas in the United States. Total United States production averaged 5,395,000 barrels daily as compared with 4,918,208 barrels in April 1947. The Economic Advisory Committee of the Interstate Oil Compact Commission estimates that production of domestic crude oil and natural gas liquids must increase further throughout 1948 and the first quarter of 1949 in order to meet all requirements. In addition, the country must become a net importer of crude oil and its products for the first time in a quarter century to assist in meeting domestic needs. As the accompanying table indicates, total demand for petroleum products is expected to approach 6,400,000 barrels daily during the 12 months ending March 31, 1949, as compared with 5,900,000 barrels daily in 1947. Daily average demand during the first quarter of 1949 may exceed that of the comparable period in 1947 by 395,000 barrels. This higher level of consumption would require a stepping up of production of crude oil by perhaps 290,000 barrels daily above current levels.

PROJECTION OF DEMAND AND SUPPLY OF UNITED STATES

PETROLEUM PRODUCTS
(In thousands of barrels—daily)

	Year 1947	1948				Year 1949	First quarter
		First quarter	Second quarter	Third quarter	Fourth quarter		
Demand							
Gasoline	2,308	2,105	2,550	2,655	2,480	2,450	2,230
Kerosene	301	435	265	240	410	337	460
Distillate fuel oils	899	1,320	820	765	1,205	1,028	1,495
Residual fuel oils	1,450	1,580	1,400	1,390	1,580	1,475	1,600
Others	942	900	995	1,110	995	1,000	950
Total demand	5,900	6,340	6,040	6,130	6,650	6,290	6,735
Domestic demand	5,449	6,033	5,634	5,685	6,280	5,907	6,385
Export	451	307	406	445	370	383	350
Supply required to meet demand and stock changes							
Required crude production	5,085	5,335	5,475	5,532	5,570	5,478	5,625
Natural gas liquids	364	395	400	410	415	405	420
Imports	437	475	475	500	520	492	520
Total required supply	5,886	6,205	6,350	6,442	6,505	6,375	6,565

SOURCE: Economic Advisory Committee, Interstate Oil Compact Commission.

Winter demands for petroleum products in 1948 probably can be met, according to the Committee's report, only if all operations of the oil industry are expanded promptly and large stocks

of kerosene and distillate fuel oils are accumulated in the area east of the Rocky Mountains. Despite maintenance of record levels of production since August last year, national stocks of crude oil were about 14,000,000 barrels smaller on May 1 than a year earlier. Inventories of petroleum products, although

CRUDE OIL PRODUCTION—(Barrels)

Area	April 1948		Increase or decrease in daily average production from	
	Total production	Daily avg. production	March 1948	April 1947
Texas:				
District 1	773,400	25,780	310	5,033
2	5,167,050	172,235	1,776	14,197
3	14,795,550	493,185	1,732	11,937
4	7,601,700	253,390	177	11,378
5	1,379,700	45,990	2,485	7,910
6	9,506,100	316,870	-5,769	-16,668
Other 6	3,641,700	121,390	134	9,890
7b	1,333,950	44,465	1,288	7,460
7c	1,331,100	44,370	488	8,150
8	20,357,400	678,580	11,183	191,818
9	4,124,700	137,490	1,730	1,672
10	2,526,150	84,205	753	-690
Total Texas	72,538,500	2,417,950	16,287	252,087
New Mexico	3,830,250	127,675	-1,198	24,865
North Louisiana	3,280,600	109,353	1,263	13,235
Total Eleventh District	79,649,350	2,654,978	16,352	289,717
Outside Eleventh District	82,211,600	2,740,385	61,570	187,439
United States	161,860,950	5,395,363	77,923	477,157

SOURCE: Estimated from American Petroleum Institute weekly reports.

about 19,000,000 barrels above May 1947 levels, are small relative to anticipated consumption during the coming summer and winter seasons. The Committee estimates that net additions of about 117,000,000 barrels to stocks of petroleum products will be required during the second and third quarters of 1948 in order to assure adequate supplies at mid-winter.

VALUE OF CONSTRUCTION CONTRACTS AWARDED

(In thousands of dollars)

	April 1948	April 1947	March 1948	January 1 to April 30 1948	January 1 to April 30 1947
Eleventh District—total	\$ 54,124	\$ 43,816	\$ 50,490	\$ 240,887	\$ 231,195
Residential	19,697	17,897	20,403	88,506	89,074
All other	34,427	25,919	30,086	152,472	142,121
United States*—total	873,882	602,388	689,763	2,860,818	2,212,918
Residential	351,604	250,668	276,541	1,098,493	1,005,350
All other	522,278	345,670	413,222	1,761,325	1,207,569

*37 states east of the Rocky Mountains.

SOURCE: F. W. Dodge Corporation.

The value of construction contracts awarded in the District increased moderately in April, reflecting larger awards for nonresidential construction, and was about 24 percent above the level of April 1947. During the first four months of 1948, however, the total value of awards in the Eleventh Federal Reserve District was only about 4 percent greater than during the same period in 1947, whereas in the thirty-seven states east of the Rocky Mountains awards were 29 percent greater.

BUILDING PERMITS

City	April 1948		Percentage change		Jan. 1 to Apr. 30, 1948		Percentage change valuation from 1947
	No.	Valuation	Apr. 1947	Mar. 1948	No.	Valuation	
Louisiana:							
Shreveport	362	\$ 1,137,845	58	-91	1,249	\$ 17,569,696	391
Texas:							
Abilene	110	789,180	-37	14	376	2,072,445	10
Amarillo	212	627,145	-18	-54	707	3,375,970	57
Austin	412	3,211,325	41	34	1,374	9,239,349	53
Beaumont	455	1,166,317	216	44	1,355	3,033,096	117
Corpus Christi	399	1,392,321	29	89	1,191	7,661,533	47
Dallas	1,046	10,063,472	95	-20	5,245	36,767,466	127
El Paso	140	1,094,080	162	67	471	3,640,633	55
Fort Worth	747	3,695,222	109	37	1,993	8,967,332	22
Galveston	230	426,204	228	119	643	1,105,703	47
Houston	884	7,707,340	73	28	3,281	39,597,867	110
Lubbock	260	1,091,739	87	-5	974	4,218,876	14
Port Arthur	210	244,835	28	21	485	716,557	-7
San Antonio	1,364	2,974,566	84	-19	5,176	12,770,151	80
Waco	167	874,580	88	14	608	5,058,177	128
Wichita Falls	86	574,955	397	22	285	1,805,651	206
Total	7,884	\$37,061,186	73	-22	25,413	\$157,601,502	97

Wholesale prices of most building materials have changed little during the past three months, but, as the accompanying table indicates, prices of several important materials are con-

siderably higher than a year earlier. The combined index of all building material prices increased about 8 percent from March 1947 to March 1948, duplicating the rate of increase of the price index of all commodities. Prices of plumbing and heating, structural steel, and brick and tile, which had risen more slowly from March 1945 to March 1947 than many other commodities, increased rapidly during the ensuing 12 months. Lumber prices, also, increased considerably, although at a rate below that of 1947. Among important building materials, only paint and paint materials declined in price, falling about 11 percent.

INDEX NUMBERS OF WHOLESALE PRICES OF BUILDING MATERIALS UNITED STATES

(1926=100)

Groups *	March 1948	March 1947	March 1946	March 1945	March 1940
All commodities.....	161.4	149.5	108.9	105.3	78.4
All building materials.....	193.0	177.5	124.9	117.1	93.3
Brick and tile.....	151.6	132.4	117.4	110.7	90.4
Cement.....	127.4	112.3	102.3	99.4	91.2
Lumber.....	304.0	269.3	167.6	154.3	97.8
Paint and paint materials	155.7	176.1	107.8	103.3	87.2
Plumbing and heating..	138.7	117.9	95.1	92.4	81.0
Structural steel.....	149.4*	127.7	120.1	107.3	107.3
Other building materials.	159.4*	143.5	112.3	103.8	92.7

*February 1948.

SOURCE: Bureau of Labor Statistics.

The better flow of materials apparently has permitted an increase in construction efficiency during the past 12 months, but the improvement probably has been insufficient to offset the increases in building materials prices and in wage rates of construction craftsmen. Reports from representative contractors suggest that costs of construction are now 5 to 8 percent higher than a year ago.

Reflecting increased cotton production during 1947, receipts of cottonseed at Texas cottonseed oil mills were larger during the first 9 months of the current season than during the comparable period of any season since 1937-38 and about dou-

ble the very low receipts of the first nine months of 1946-47. Crushings for the period were at the highest level in a decade. United States mill operations also exceeded substantially the 1946-47 levels. Increased production of crude cottonseed oil, cake and meal, and hulls, resulting from the larger supplies of

cottonseed, have relieved the acute shortages of those products which had persisted for several years. Mill stocks of cottonseed and its products in Texas and the United States also have been increased and at the end of April were somewhat larger than at that time in several prior seasons. Stocks still are small, however, when compared with either the typical prewar level or the anticipated domestic and world demands.

COTTONSEED AND COTTONSEED PRODUCTS

	April 1948		United States	
	Texas		August 1 to April 30	
	August 1 to April 30	Last season	This season	Last season
Cottonseed received at mills (tons).....	1,118,168	565,608	3,944,155	2,980,358
Cottonseed crushed (tons).....	1,064,380	595,628	3,721,893	2,841,811
Cottonseed on hand April 30 (tons).....	108,216	27,234	321,790	256,253
Production of products:				
Crude oil (thousand pounds).....	330,221	180,207	1,156,619	890,005
Cake and meal (tons).....	501,863	279,711	1,725,662	1,252,316
Hulls (tons).....	242,159	132,558	839,468	666,024
Linters (running bales).....	353,636	203,500	1,166,425	911,741
Stocks on hand April 30:				
Crude oil (thousand pounds).....	4,309	2,165	14,734	13,471
Cake and meal (tons).....	23,462	27,724	92,080	127,171
Hulls (tons).....	12,815	11,996	42,084	45,869
Linters (running bales).....	52,081	16,835	149,342	103,800

SOURCE: United States Bureau of Census.

DOMESTIC CONSUMPTION AND STOCKS OF COTTON—(Bales)

	April 1948	April 1947	March 1948	August 1 to April 30	Last season
	This season	Last season	This season	Last season	
Consumption at:					
Texas mills.....	13,338	16,188	14,720	117,367	164,012
United States mills.....	829,730	882,390	876,714	7,131,046	7,810,484
U. S. stocks—end of month:					
In consuming establs....	2,195,881	2,117,197	2,286,114	.....	.....
Public stg. & compresses..	2,860,277	2,504,402	3,676,735	.....	.....